

Shelley Mulligan

# Occupational Therapy Evaluation for Children

SECOND EDITION



A Pocket Guide



Wolters Kluwer  
Health

Lippincott  
Williams & Wilkins

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# OCCUPATIONAL THERAPY EVALUATION FOR CHILDREN

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**A Pocket Guide**

**SECOND  
EDITION**

**Shelley Mulligan, PhD, OTR/L**



Wolters Kluwer | Lippincott Williams & Wilkins  
Health

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In pediatrics, occupational therapy practitioners are concerned most with positively impacting the extent to which children and their families are able to successfully and meaningfully go about their daily lives, whether it be playing, learning, working, caring for oneself or others, or socializing. Clinical decisions made throughout the evaluation process ultimately shape what and how occupational therapy practitioners deliver interventions, perhaps making the evaluation process the most important and interesting part of the service delivery process. It is the context where we first come to know and appreciate our clients and their specific situations, and discover what it is that we, as occupational therapy practitioners, can do to be of most help. While conducting efficient, occupation-based, client-centered evaluation for the clinical process is essential, such evaluations are also crucial for defining our profession. The Occupational Therapy Practice Framework: Domain and Practice, Second Edition, by the American Occupational Therapy Association<sup>1</sup> (OTPF) presents a useful process for conducting evaluations, and this book provides a more detailed guide for conducting evaluations with children, under this framework. Background information also includes occupational performance expectations of typical children of varying ages, principles of measurement for clinical and research purposes, system considerations, and an overview of legislation/policy related to the most common settings within which occupational therapists work with children.

This pocket guide was developed to provide occupational therapy students and novice practitioners with a practical book to assist in guiding their evaluations of children. This book is a companion to the book titled *Occupational Therapy Evaluation for Adults*.<sup>2</sup> This book is formatted with

many tables and boxes so that information can be accessed easily. In addition to describing a step-by-step process of evaluation that is consistent with OTPF, it includes tables listing many assessment tools and techniques, tips for conducting interviews and observations, detailed case examples, sample reports, and content to assist therapists through the challenging task of synthesizing evaluation data from multiple sources for intervention planning and goal writing. This book will also serve well as a text for occupational therapy courses that cover content related to work with children and families, assessment, and measurement. Discussion questions have been posed at the end of each chapter for more in-depth analysis and reflection of the content covered. It is assumed that students using this text have a background in normal and abnormal development, occupational therapy theory and practice, and basic measurement principles.

As an occupational therapy clinician, educator, and researcher, I am committed to the highest quality of occupational therapy services. I recognize that evaluating children is a complex process requiring strong interview skills, the ability to conduct keen observations, and the ability to select, administer, and score appropriate standardized assessment tools. However, this all must be done in a way that is fun for the child, and comfortable for caregivers. I highly value the extra time it takes to really get to know the children who are referred, and the involvement of caregivers throughout the evaluation process.

As with the first edition, this book is organized into seven chapters. The first chapter provides much of the necessary background information for conducting evaluations with children. Content includes an introduction to the second edition of the OTPF, types of clinical reasoning that are typically applied by therapists throughout the evaluation process, and information regarding the important roles of family and other team members with whom occupational therapists commonly collaborate throughout the evaluation process. The main characteristics associated with common educational, medical, and community-based settings and systems within which occupational therapy services are delivered for children are also emphasized in this chapter.

Chapter 2 might be considered the meat of the book, as it includes the step-by-step process of evaluation, including evaluation planning, implementation, and analyses for intervention planning. A top-down approach is highlighted, emphasizing the importance of first gaining an understanding of who the child is, and how the child performs their most valued occupations. This is followed by a description of evaluation methods, and tools for examining relevant performance skills, body functions, contexts, performance patterns, and activity demands. Chapter 3 provides information on normal development, and expectations for skill development and occupational performance of children of various ages. This content will help novice practitioners, in particular, in selecting age-appropriate evaluation activities and materials, in selecting the most relevant interview questions to ask of caregivers, and for interpreting evaluation data. Chapter 4 focuses on standardized testing. Information regarding how to select, score, and interpret test scores is presented, along with how to evaluate the psychometric properties of standardized assessment tools, including reliability, validity, and normative data. New to this edition is a section on the importance of evidence-based practices, including the use of standardized, occupation-based measures as outcome measures for both clinical and research purposes. The numerous tables in this chapter listing commonly used standardized assessments have been updated to include much information that has been published since the first edition. Chapter 5 provides detailed content on how to conduct nonstandardized evaluation methods, including interviews and observations. The importance of conducting naturalistic observations is highlighted, as well as ways to record observations, particularly related to play, performance of activities of daily living, and school activities. Chapter 6 focuses on the final phase of the evaluation process. The synthesis of evaluation data for intervention planning and goal writing is emphasized, along with content regarding ways of communicating evaluation results through documentation, report writing, and oral presentation.

Chapter 7 represents new content to this edition, and was added to include information for conducting occupational therapy evaluations in some select specialty areas of

occupational therapy practice with children. The purpose of adding this content was not an attempt to cover as many areas of OT practice as possible, but rather to illustrate the importance of customizing the evaluation process, tools, activities, and techniques to each unique case and situation. The content in this chapter also demonstrates how many of the principles, evaluation methods, and clinical reasoning processes discussed earlier in the book are applied within different contexts. The specialty areas selected are diverse and include evaluations of children with autism spectrum disorders, evaluations for addressing a child's assistive technology needs, occupational therapy evaluations of infants in neonatal intensive care, and evaluations for developing programs to assist adolescents with the transition to adulthood and adult roles.

Finally, new to this addition of the pocketbook, are ancillary materials provided on the Point site which includes: a) classroom integration guidelines to assist instructors in successfully incorporating chapter content into classroom instructional activities, and to explain how novice practitioners might use the Pocketbook as a professional resource in the field; b) a Resource List that provides at-a-glance, the assessment tools mentioned in the book, with web-links to additional information about the tools and/or contact information for purchase; and c) Thinking Points for each of the chapter review questions that identify key considerations or information that students should include in chapter review question responses.

## References

1. American Occupational Therapy Association. Occupational therapy practice framework: domain and process, 2nd edition. *Am J Occup Ther*. 2008;62:625–688.
2. Vroman K, Stewart B. *Occupational Therapy Evaluation for Adults: A Pocket Guide*, 2nd edition. Philadelphia, PA: Lippincott Williams & Wilkins; in press.



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# PEDIATRIC OCCUPATIONAL THERAPY EVALUATION ACROSS PRACTICE SETTINGS AND SYSTEMS

## **Introduction to the Evaluation Process**

Occupational therapy (OT) evaluation is both a set of procedures and a thought process. Although the terms “evaluation” and “assessment” are often used interchangeably, in this book they will be distinguished, consistent with definitions provided by the standards of OT practice set forth by the 2011 Accreditation Council for Occupational Therapy Education (ACOTE).<sup>1</sup> Evaluation is the process of obtaining and interpreting data necessary for intervention, whereas assessment refers to using a specific “tool,” such as a standardized test. The set of procedures involved in pediatric evaluation typically include developing an evaluation plan; administering standardized and nonstandardized developmental, occupational performance, contextual, and skill-specific assessments; interviewing; and

conducting observations of children during age-appropriate activities and in various contexts and settings. Reviewing existing data such as medical reports or school-based special education records is also considered an evaluation activity.

The thought process or professional reasoning in pediatric OT evaluation is similar to the process used by therapists in other practice areas. It involves a way of thinking about what information should be gathered, what are the most efficient and effective ways to gather the information, and how the information should be synthesized and interpreted. The process of evaluation is a mental exercise whereby therapists constantly observe and interact with clients and their families to gain a clearer picture of client problems, strengths, and priorities, and begin to hypothesize about possible intervention strategies. You will engage in the evaluation thought process or professional reasoning during evaluation procedures and during all other interactions with the children with whom you work. That is, OT practitioners are evaluating client problems, strengths, and progress during both evaluation and intervention sessions. The evaluation thought process is ongoing from the first through the last client meeting.

The process of OT evaluation described in this book is based on American Occupational Therapy Association (AOTA)'s *Occupational Therapy Practice Framework*,<sup>2</sup> and it is assumed that OT practitioners using this book as a guide are familiar with this document. One of the first decisions you will often need to make is whether an OT evaluation is warranted. Therefore, sometimes **screening**, as a preliminary step, is necessary. Screening involves gathering information for the sole purpose of determining whether an evaluation is necessary. Activities involved in screening vary, and may include conducting a telephone interview with a parent or referral source, conducting a classroom observation or examining some classroom work, reviewing medical or educational records, or administering a standardized tool designed as a screening instrument.

The remainder of this chapter focuses on four areas that provide essential background information for preparing you to conduct OT evaluations of children. First, the clinical

reasoning process that guides decision making throughout the evaluation process is discussed further. Philosophical and theoretical considerations that guide decisions regarding the identification and selection of evaluation tools, methods, and activities are also discussed as a part of professional reasoning. Second, AOTA's *Occupational Therapy Practice Framework*, 2nd edition,<sup>2</sup> is presented in relation to its application for evaluating children. Next, team models are discussed, along with the important roles of family and caregivers, and other professionals with whom occupational therapists work closely. Finally, characteristics of the most common settings and systems for pediatric OT practice are presented. Although the underlying philosophy of OT, the principles of evaluation, and the importance of considering both the child and the family remain stable across practice settings, some characteristics of practice settings are unique and affect how OT evaluations are carried out. The most common practice settings for pediatric OT include (1) early-intervention, community-based programs; (2) preschools and other school settings; (3) community mental health programs, residential programs, and outpatient clinics; and (4) inpatient hospital settings. Characteristics of these common practice settings and how they influence the OT evaluation process are presented.

## PROFESSIONAL REASONING

Professional reasoning is a multifaceted, cognitive process used by occupational therapists to plan, direct, perform, and reflect on their client services.<sup>3</sup> It is important that therapists use different types of reasoning during the evaluation process. Table 1-1 defines different types of clinical reasoning and provides examples of how each may be used during the OT evaluation process with children. Being aware of your own professional reasoning helps you gain insight into how and why you are doing what you are doing. This reflection or metacognitive process has the potential to improve your reasoning, decisions, and skills as an occupational therapist.

TABLE 1-1  
TYPES OF PROFESSIONAL REASONING USED DURING EVALUATION

Type of Professional Reasoning	Definition	Practitioner Actions	Contributions to the Evaluation Process
Narrative reasoning	Reasoning that involves gathering and applying the child's occupational story for decision making, emphasizing preferred activities, habits, roles, and priorities. It encompasses the client's and therapist's story together by identifying how they will work together to build a meaningful future for the child and family	Interviewing the child and his or her family about daily activities and routines, lifestyle and culture, school and leisure activities, life priorities, and values, and appreciating the client. It focuses on family and child goals, increasing participation, and motivation; and it helps build the child's occupational profile	Assists in creating the occupational profile; provides an understanding of the child's story, child and family goals; and how the illness/disability influences daily life. It also increases child motivation and participation
Interactive reasoning	Reasoning that considers interpersonal interactions between therapists and clients and that promotes collaborative problem solving	Therapeutic use of self throughout the evaluation process; therapist responsiveness during interactions with the client (empathy and encouragement) Therapeutic use of self, working collaboratively with children and families. It enhances child motivation and participation and child and family satisfaction. Ensures that the intervention is fun and rewarding for the child	Allows evaluation activities to be modified as needed throughout the process; builds rapport and understanding between therapist and child and family

<p>Procedural, diagnostic, and scientific reasoning</p>	<p>Reasoning involving scientific methods, knowledge of disease, and an understanding of the nature of the client's diagnosis-related problems; includes hypothesis testing, use of standardized tests, and applying standard routines of care or evaluation procedures</p>	<p>Selecting and administering assessment tools; conducting activity analysis and more formal evaluation procedures</p>	<p>Assisting in the diagnostic process; identification of client barriers to occupational performance and possible interventions for addressing the problems</p>
<p>Pragmatic</p>	<p>Practical considerations affecting service delivery such as reimbursement; therapist resources; scheduling options; clients' social and financial resources; the therapist's and/or team's values, knowledge, and abilities; and materials</p>	<p>Knowing and applying reimbursement systems; policies and regulations relevant to the practice setting; maximizing client and therapist resources in the evaluation process Identifies intervention options with collaborative decision making to select the best intervention for the given situation or setting Transition/discharge planning</p>	<p>Identifies constraints, time and resources for evaluation</p>

(continued)

**TABLE 1-1** TYPES OF PROFESSIONAL REASONING USED DURING EVALUATION (Continued)

<b>Type of Professional Reasoning</b>	<b>Definition</b>	<b>Practitioner Actions</b>	<b>Contributions to the Evaluation Process</b>
Ethical	Reasoning used to choose a morally defensible course of action with clients in the face of competing interests; a systematic approach to handling ethical dilemmas or moral conflict Identifies ethical interventions for any given client Follows evidence-based practice	Ongoing attention to the client's goals; following AOTA ethical standards	Following ethical principles and standards throughout the evaluation process
Conditional reasoning	Using a combination of reasoning approaches to respond flexibly and appropriately to revise evaluation plans and activities to meet the client needs, and to be proactive in anticipated future conditions	Revise evaluation plans and activities moment to moment to meet the client's needs; anticipate future conditions and needs	Increases client comfort and participation

Adapted from: Schell BAB. Professional reasoning in practice. In: Crepeau EB, Cohn ES, Schell BAB, eds. *Willard & Spackman's Occupational Therapy*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009: 314–327.

OT evaluations and interventions will be most effective when you use narrative reasoning first, because understanding the client's life story (family and child priorities, concerns, lifestyle, medical, and occupational history, etc.) will help you focus on what is most important. Narrative reasoning enables you to think about the child and family as unique, human individuals, rather than a set of problems. Consequently, the evaluation sequence suggested in Chapter 2 is client-centered, and applies narrative reasoning to ensure that the child's needs and priorities are being adequately addressed throughout the evaluation process. Scientific, diagnostic, and procedural reasoning occurs when you apply your foundational knowledge of body functions, disease processes, and the scientific process of investigation in the evaluation process. Evaluation protocols, and the administration of standardized tests and formal evaluation procedures, fall under these types of reasoning. Both narrative and scientific reasoning involve the consideration and application of the underlying philosophical base of OT, models of practice, and more specific frames of reference.

Pragmatic reasoning involves consideration of all the practical constraints and opportunities that you might face in your setting, and with the children you are evaluating. For example, you may need to consider your schedule (and your clients'), a child's ability to attend and participate in certain evaluation activities, physical space and time, and the clients' reimbursement policies in the planning of your evaluation. Interactive reasoning involves primarily what you do in the moment to gather information and create a positive, supportive relationship based on your interactions with the client. Ethical reasoning occurs when you are faced with an ethical dilemma or competing interests, and you need to make a moral judgment on a course of action. Finally, conditional reasoning essentially blends all forms of clinical reasoning as you consider the outcomes of the evaluation process, respond to changing conditions, and make judgments on the basis of what is predicted for the client. Each evaluation situation you find yourself in is unique, and therefore requires careful thought as the OT evaluation is planned and carried out. Effective decision making and thoughtful reflection

throughout and following the evaluation process ultimately leads to the development of quality intervention programs.

## **APPLYING AOTA'S OCCUPATIONAL THERAPY PRACTICE FRAMEWORK IN PEDIATRICS**

AOTA's *Occupational Therapy Practice Framework*<sup>2</sup> is a document that describes the domain of OT as a profession and the process of OT service delivery. Domain areas that are under the jurisdiction of OT and should therefore be considered for evaluation include one's occupations and all of the factors that might impact one's ability to perform his or her desired and necessary occupations. These include client factors such as a child's values, body functions and structures, and one's performance skills, roles and routines. Activity demands associated with one's occupations, and environmental or contextual considerations are also included, as they play an important role in determining how well one is able to perform their occupations. Details regarding the evaluation of these areas are presented in Chapter 2. In relation to the OT process, the Framework includes guidelines for conducting comprehensive evaluations, intervention planning and implementation, and for determining therapy outcomes. In this book, the process of evaluation is applied, and according to the Practice Framework, it includes two major steps: (1) creating an occupational profile and (2) an analysis of occupational performance.

The occupational profile describes the client's occupational history, patterns of daily living, interests, values, and needs, and helps to determine the occupational areas that are of concern. Information for developing a child's occupational profile is often obtained through interviews with parents, other caregivers and teachers, and the child. Conducting contextual observations of children in action—performing their self-care activities, playing at a playground, interacting with family members and peers, and engaging in school activities for school-aged children—are also helpful in developing occupational profiles. Gathering information to develop an occupational profile as a first step is consistent with

a **top-down approach** to evaluation<sup>2</sup> because your evaluation begins by gathering information to help you understand who the child and family are, and what occupations are most important to them. Concerns regarding the satisfaction and/or performance of their occupations are uncovered prior to assessing underlying client capacities and contextual factors that may be contributing to the occupational performance challenges. Occupational profiles are an essential first step towards understanding child and family priorities, what their life story is or has been, and how they perceive the events leading up to the referral for OT services. As the occupational therapist, you can then identify what occupations you need to focus on further in the evaluation process. Occupations included and defined in the Framework that should be explored are categorized in the following areas: activities of daily living, instrumental activities of daily living, sleep and rest, work, education, social participation, and play and leisure.<sup>2</sup>

The second step in the evaluation process is to generate and test hypotheses to better understand the factors that support or hinder the child's ability to engage successfully in their valued occupations. This second step has been termed an "analysis of occupational performance," and involves the gathering and synthesis of evaluation data from multiple sources.<sup>2</sup> The extent and nature of the occupational performance problems, and a detailed exploration of those areas/factors that appear to be contributing to a child's challenges in performance are addressed in this step. As noted above, these areas represent the OT domain defined by the Framework. Client factors that may need further assessment include body functions and structures, the person's values, beliefs and spirituality, and performance skills in the motor, sensory, emotional, cognitive, and communication areas. Tests of specific functions such as visual perceptual skills, sensory integration functions, social and motor skills, for example, are often considered within this step. Performance patterns including one's habits, rituals, roles, and routines are also explored. Activity demands associated with one's occupations such as required actions, space and social demands should be considered along with environmental/contextual considerations in the categories of cultural, personal, temporal, virtual,

physical, and social. This top-down approach first helps you identify the occupational performance problems of concern to the children and families referred to you. Then a thorough analysis of client factors, performance skills and patterns, activity demands, and environmental factors that are contributing to performance problems are uncovered so they can be addressed in intervention. The administration of specific assessment tools or procedures, conducting structured and unstructured observations, and interpreting evaluation data along the way all contribute to the occupational performance analyses. The final steps in the process involve the identification of potential therapy goals, areas for intervention, and targeted outcomes.

The primary contribution of OT to client care in pediatrics is the identification of barriers that prevent a child from participating in his or her valued occupations, and the subsequent implementation of intervention strategies to remove the barriers. Focusing on the most relevant barriers, whether they are child skills, characteristics of the occupations of interest, or environmental factors, allows the evaluation process to be most efficient. Nonetheless, the analysis of occupational performance is a complex process, requiring you to understand the relations among performance skills, patterns, contexts/environments, activity demands, and client factors, and how together they influence a child's ability to perform his or her valued occupations.

## **WORKING AS A MEMBER OF A TEAM**

It is rare that occupational therapists work independently in pediatrics. The evaluation process more often is conducted collaboratively with professionals from various disciplines, as a holistic approach guided by a number of individuals who bring their own skills and areas of expertise to the evaluation process, and to the child's program is most effective. Some federal legislation in the United States actually mandate that services for children involve evaluations by a team of professionals, rather than by one discipline. For example, the Individuals with Disabilities Education Act (IDEA), 2004,<sup>4</sup> states

that infants and children receiving early-intervention services and OT services in public schools must be evaluated by a team of professionals representing multiple disciplines.

Professionals who share specific goals, who are accountable to one another, and who have complementary skills organize themselves to form teams, and they develop an agreed upon working approach. There are three types of team models typically used in pediatric settings: **multidisciplinary**, **interdisciplinary**, and **transdisciplinary**.<sup>5-7</sup> These team models differ from one another primarily with respect to the extent or depth of collaboration among the team members, the degree to which they share roles, and their organizational structures and operational procedures. Table 1-2 provides a comparison of multidisciplinary, interdisciplinary, and transdisciplinary teams, which are the most common types of team models used for providing educational and health care services with children and families.

In a **multidisciplinary team**, the team members from various disciplines work with the same child but primarily on an individual basis.<sup>5</sup> Members may meet regularly, such as once a week, once a month, or on an as-needed basis, to discuss the child. On some multidisciplinary teams, members may just meet or talk informally. However, it is important that team members share information with one another to ensure that the child is receiving a comprehensive program, to share progress and other information, and to avoid duplication of services. Multidisciplinary teams work best in situations in which the child's needs are distinct from one another and when discipline-specific roles are well established. It is important that the contributions of each member are valued and that members perceive one another as having equal importance or status. As a member of a multidisciplinary team, you as the occupational therapist may need to communicate with other team members before your evaluation to ensure that you do not repeat evaluations of developmental areas unnecessarily. For example, if the speech/language pathologist has just conducted a thorough evaluation of oral-motor skills and swallowing, it may not be necessary for you to thoroughly assess these areas as a part of your feeding evaluation. Once the roles of team members are well established, then the need

TABLE 1-2

COMPARISON OF TEAM MODELS

	<b>Multidisciplinary</b>	<b>Interdisciplinary</b>	<b>Transdisciplinary</b>
Evaluation procedures	Each discipline plans and does his or her evaluation separately	Team members collaborate to develop the evaluation plan; each discipline may conduct his or her own part of the evaluation separately or with other team members	Team members collaborate to develop the evaluation plan; team conducts the evaluation together, usually with one or two members working directly with the child, while others observe
Program planning	Team meets to share findings; members develop separate plans for their disciplines	Team meets to share and synthesize findings; team collaborates to develop an intervention plan, which often includes discipline-specific interventions	Team meets to share findings; team collaborates to develop an intervention plan that is implemented by one or two individuals; all primary service provider(s) implement the plan
Communication	Informal; infrequent	Regular meetings; frequent informal contact	Frequent meetings and contact between members with the direct service provider(s) for support, supervision, sharing of knowledge and skills, and assistance with program changes as needed
Program implementation	Team members implement the part of the program that reflects their area of expertise	Team members implement parts of the program that reflects own areas of expertise; may provide cotreatment sessions and incorporate goals from other disciplines	A primary service provider is assigned to implement the program with the child and family, with ongoing support from the team members

for this initial checking may be diminished. Under this team model, occupational therapists function relatively independently during the evaluation process, and are responsible for developing a separate OT plan when intervention services are recommended. After all members of a multidisciplinary team have completed their evaluations, they may schedule a meeting to share their findings and intervention plans to allow for some coordination of services and to check that all the needs of the child and family are being addressed adequately. Ongoing communication often takes place in the form of documentation, which occurs regularly in the child's medical chart in hospital settings and within individual education plans in educational settings. It is important for team members to share with one another the child's progress in the areas they are working on, and to ensure that the child is not receiving interventions that are either counterproductive or redundant.

Similar to multidisciplinary teams, **interdisciplinary teams** consist of professionals from various disciplines. However, an interdisciplinary team model has a formal structure for interaction and sharing of information among the team members, and a higher degree of collaboration. For example, team members may conduct components of their evaluations and interventions with one another. Guranlnick<sup>7</sup> described interdisciplinary teams as having the ability to integrate and synthesize information from numerous disciplines through an interactive group decision-making process. A typical interdisciplinary team evaluation begins with data gathering (medical record review, background information, medical history, etc.) by a team coordinator. Then, a team meeting is conducted to share and discuss the background information gathered and to plan the evaluation (see Fig. 1-1). The third step consists of discipline-specific evaluations. In some cases, discipline-specific evaluations may be conducted jointly. For example, evaluations of motor performance may be conducted jointly by occupational and physical therapists. During this step, informal meetings and sharing of information among various disciplines may occur. The final step is a formal meeting to integrate and synthesize all of the information gathered by the team members. The team members, including the parents, collaborate and engage in group problem solving and decision making to identify the



**Figure 1-1** Example of an interdisciplinary team meeting consisting of a clinic coordinator, psychologist, speech pathologist, developmental pediatrician, and occupational therapist.

child's strengths, challenges, and needs; to develop intervention goals and plans; and to identify the need for further services and evaluations. One of the main differences between a multidisciplinary team and an interdisciplinary team is that the members of an interdisciplinary team must reach consensus with respect to all of the recommendations made by the team. In contrast, multidisciplinary team members typically share their own recommendations with one another but do not necessarily work together to develop consensus. Another characteristic of interdisciplinary teams is that they can apply **integrated programming** techniques. Integrated programming occurs when a professional from one discipline incorporates the goals of another discipline into his or her interventions or when team members from two different disciplines work together (cotreatment sessions) with a child.

As with multidisciplinary and interdisciplinary teams, **transdisciplinary teams** recognize the need to include specialists or disciplines with expertise in several skill areas as well as the child (when old enough) and the parents.<sup>5,6</sup> This team model is based on the assumption that services for families are most effective when the family interacts directly and

regularly with only one or two key individuals. The most distinguishing characteristic of transdisciplinary teams is that only one or two individuals are primarily responsible for carrying out the child's intervention program. In educational settings, the key individual and direct service provider is most often an educator. In other settings, the direct service provider may be a developmental specialist or an occupational therapist. Transdisciplinary teams are commonly seen in early-intervention settings.

The prefix “trans” means “across,” and it refers to the sharing of skills, responsibilities, and knowledge among team members. A key feature of the transdisciplinary team model is **role release**: the commitment of professionals to teaching, learning, and providing direct services that may not be traditionally within their discipline-specific roles. It does not, however, imply a transfer of ultimate professional responsibilities for an individual in his or her area of expertise or a dilution of high-quality services. Instead, the transdisciplinary team model stresses an integration of expertise that facilitates the development of coordinated, comprehensive programs for children. For team members other than the direct service provider, indirect methods of service delivery, including consultation, supervision, and monitoring, and ongoing support are applied. Similar to interdisciplinary teams, transdisciplinary teams are structured in a way that facilitates the use of integrated programs but at a higher level than was described in the context of an interdisciplinary team. Integrated programs are developed collaboratively by transdisciplinary team members and are comprised of carefully selected program activities or functional skills that address more than one programming goal.<sup>7,8</sup> For example, an activity of watering plants in a classroom or hospital room might be designed by team members in such a way that the activity simultaneously addresses functional mobility, upper-extremity strength and coordination, ability to follow directions, and communication skills. This activity could be easily carried out by the child under the direction of or with the assistance of a direct service provider from any number of specific disciplines.

In terms of evaluation, a transdisciplinary team model conducts what has been termed an **arena assessment**. An arena

assessment begins like an interdisciplinary team assessment in that background information is gathered by one or two individuals and then is shared among team members. Then, the evaluation process is carefully planned collaboratively. What makes an arena assessment unique is that the “hands-on” portion of the evaluation is often carried out by only one or two key individuals, while the other team members provide their expertise through consultation, and gather information primarily through observation. Arena assessments are particularly helpful when evaluating a child’s ability to perform occupations, tasks, or activities that require many underlying sensory, motor, communication, social-emotional, and cognitive skills. For example, evaluations of computer access and technology needs and of feeding skills can often be accomplished using an arena format.

Regardless of the type of team you find yourself on, there are several competencies and personal qualities that will assist you to function well as a team member. Such competencies also allow teams as a whole to function cohesively, and help to create productive, fulfilling, and pleasant working environments. **Team member competencies** are described in detail in the literature on team building and effective communication, organizational behavior, and group process. Some of the most important competencies that will allow you to be an effective team member are presented in Box 1-1.

**Discipline-specific roles** of professionals with whom occupational therapists commonly work in pediatrics are discussed next, as a shared understanding of one another’s roles and areas of expertise helps to facilitate a positive working team. The members of a child’s team largely depends on the work setting (medical versus educational), the type and severity of the child’s disability, the child’s age, and support networks. Sample evaluations illustrating the roles of team members, and team evaluation processes are provided in Appendix A.

## Parents or Caregivers and Child

Most important, the child’s **parents or caregivers** must be viewed as integral members of the team of individuals working together for the benefit of the child. When children are

## Box 1-1

## COMPETENCIES FOR BEING AN EFFECTIVE TEAM MEMBER

- Consistency with your discipline-specific roles and philosophy
- The ability to be flexible and open to new ideas
- Clear nonverbal and verbal communication; asking for clarification as needed
- Effective interpersonal and communication skills
- Being respectful of others and being a good listener
- Leadership skills, including being goal directed, visionary, and organized
- Willingness and ability to share your knowledge, skills, and resources
- Being committed to fulfilling your responsibility for meeting team goals
- The ability to effectively receive and apply feedback about your performance as a team member
- The ability to facilitate and participate in effective group problem solving and decision making

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old enough, it is important to include them as well. Caregivers know their child best and have the greatest stake in their child's well-being and future. They bring a wealth of information about their child to the evaluation process, and help guide intervention planning by sharing their priorities, and their perceptions of their child's strengths and needs. Just like establishing rapport with your client (the child), establishing rapport and trust with the child's parents (also your clients) is essential for providing effective OT services. The child's caregivers and their home environment will always have a greater impact on the child's development and ultimate occupational performance than you or any other professional involved on a temporary basis. Your recommendations will or will not be realized through the actions of family members. Therefore, the strong partnerships you create with caregivers, and your skills in empowering them to carry out their day-to-day responsibilities in ways that support the child's health,

development, and life quality, are paramount throughout the evaluation and intervention process.

In the United States, specific guidelines and requirements for including parents and guardians in the evaluation and program planning process are included in legislation for providing early-intervention services, and preschool and other school-based services (IDEA, 2004, Parts B and C).<sup>4</sup> Early-intervention services (for children from birth through 2 years, 11 months of age) described in more detail later herein, follow a family-centered model. In this model, caregivers are central team members who assist in developing all aspects of the services provided for their child. It is, however, important that you, as the occupational therapist, be sensitive to the concerns, needs, and priorities of family members regardless of your practice setting.

As a provider of information, caregivers report the child's medical history, and often complete questionnaire-type assessment tools such as behavior rating scales or ratings of level of independence with activities of daily living. It is important to gain information from the perspective of family members regarding the child's strengths and weaknesses, likes and dislikes, typical activities, and about the environments where the child's occupations take place. The concerns, priorities, hopes, and dreams for the child and for the family unit are vital pieces of information for developing the child's occupational profile, and for determining important areas for further evaluation and intervention. Therefore, caregivers provide a wealth of information throughout the evaluation.

The second role for caregivers and, sometimes, siblings is to assist during the administration of evaluation activities, particularly for infants and young children who may not perform well with strangers. Infant assessments are often designed to have test items administered by caregivers. Depending on the purpose of the evaluation, it may be important to observe parent-child play behaviors, social play with siblings, and family members engaging in certain daily activities. Third, an understanding of family functioning and of the home environment is important in consideration of the influence of the family system on a child's development. Specially designed assessment tools of family functioning may be

completed by family members, and informal observations of the home environment may be important, as well as evaluation activities designed to examine the typical interactions, roles, cultural influences, and habits of families.

Finally, client-centered practice means focusing on the needs and priorities expressed by your clients—the child and family members. Caregivers and older children may actively participate in the process of decision making by identifying other areas for further evaluation. The exchange of information throughout the evaluation process assists in establishing rapport and in gathering important information about their values and their goals for intervention. It is crucial for you to listen to their ideas, concerns, and priorities as you begin the process of intervention planning together with the family.

## General and Special Education Teachers and Teacher's Assistants

Educators are an integral part of the lives of all children as they move through the preschool and school years. **Special education teachers** have many roles with children who have been identified as requiring specialized instruction. First, they are involved in the student evaluation process and in the development of individual education programs (IEPs). Special educators are specifically trained in the administration of achievement tests and the evaluation of other behaviors important for learning and success at school. Second, they often provide direct instruction and implement portions of the IEP. They are particularly skilled in addressing cognitive development and learning styles and in instructional methods and development of curriculum for individual students with learning differences. For some students, this may mean modifying existing curriculum to assist students with academic skills such as reading and writing; for others, it may mean assisting in the development of an individualized curriculum that includes goals and objectives to promote life skills. Many special educators have expertise in the use of computer educational software and hardware. For children with severe disabilities, they are often involved in developing educational programs that consist largely of activities that address basic

life skills, including activities of daily living, communication skills, and community and vocational skills. Third, special educators often take on many leadership roles, including liaison between the school and the parents; supervisor, teacher, and supporter of general education teachers and teacher's aides; and student case manager.

**Teacher's assistants**, sometimes referred to as paraprofessionals or teacher's aides, have the important role of assisting children with their daily functioning in the classroom. They may support children during academic subjects, assist in implementing behavioral support programs, and assist with self-care activities such as feeding and toileting. These individuals often spend more direct one-on-one time with children with special needs than do any other team member and may communicate frequently with parents. Often, teacher's aides are given the responsibility of implementing many aspects of a child's education program with direction and support from the other team members, including the classroom teacher and related service providers such as occupational therapists.

Most children who require special education receive specialized instruction within the context of regular classroom activities and environments. Therefore, **general education teachers** are important team members for all of their students who receive special education. Throughout the evaluation and program planning process, the child's classroom teacher brings valuable ecologic information about the child's curriculum, classroom environment, and daily activities and about his or her own teaching style. General education teachers have a good understanding of the child's classroom behavior, learning needs, and styles of learning. Often, general education teachers are responsible for implementing portions of a child's IEP and for monitoring the effectiveness of the program.

Occupational therapists often assist educators (special and general education teachers and aides) in designing education programs and in modifying school environments, curriculum, and classroom activities to maximize a child's ability to learn, function, and participate fully. With most children with special needs being fully included in regular education classes, it is more important than ever for occupational therapists to assist and support teachers in their efforts to provide quality programs and educational experiences for all children.

## Physical Therapists

**Physical therapists** work with occupational therapists in medical, educational, and early-intervention environments, and are trained at the doctorate level. Pediatric physical therapy focuses on children's motor development or functional movement, which includes their ability to move and explore their environments, the development of fine and gross motor skills, and the performance of functional and play skills that are affected by movement disorders.<sup>9</sup> The role of physical therapists and occupational therapists overlap a great deal with respect to the evaluation of motor skills and functional skills that are affected by movement disorders. Occupational therapists work closely with physical therapists when evaluating the positioning needs of children, such as the need for wheelchairs or other specialized devices such as prone standers. For children with more severe disabilities, and those in acute care and rehabilitation programs, physical therapists have a role in pain management and respiratory functions, and may work with occupational therapists in the prevention and management of joint contractures. In school settings, physical therapists may address a child's gross motor skills and assist with physical education or adapted physical education needs. Physical therapists have an important role in addressing children's safety and independence with mobility in school environments, including the proper use of mobility devices such as wheelchairs and walkers.

## Speech-Language Pathologists

**Speech-language pathologists**, sometimes referred to as communication specialists or speech therapists, are responsible for evaluating and treating the communication abilities of children. According to the American Speech-Language-Hearing Association, they are trained at the master's level to apply theories, principles, and procedures related to the development and disorders of language and speech for the purposes of assessment and treatment.<sup>10</sup> Because there is a close anatomical and functional relationship between the structures used for speaking and those used for eating and swallowing, such specialists also assist with the management

of feeding problems and dysphagia. Speech therapists' and occupational therapists' roles overlap in the area of feeding, particularly with respect to addressing the oral-motor control and swallowing abilities of children.

Because language is a cognitive skill, speech pathologists also have a role in addressing cognitive deficits, particularly those related to the promotion of functional language and communication. Addressing a child's communication abilities may require the use of assistive technology and augmentative communication devices. Therefore, occupational therapists often work closely with speech therapists in the evaluation and selection of appropriate communication devices for children with a variety of cognitive, communication, and sensory-motor deficits. They also may share intervention goals associated with play behaviors, communication and social participation.

## Certified OT Assistants

The role of **certified OT assistants** (COTAs) is described in the accreditation standards for an associate-degree-level educational program for the OT assistant by ACOTE.<sup>1</sup> COTAs are responsible for providing OT services to assigned clients under the supervision of registered occupational therapists. They may work closely with you, as the occupational therapist, in various settings. In terms of evaluation, COTAs may assist in the data collection process of an evaluation under the supervision of registered occupational therapists. This includes the administration of standardized tests, provided that an acceptable level of competency has been demonstrated. It is important to include COTAs in the evaluation and intervention planning process for children with whom they will be working.

## Nurses

In school settings, **nurses** have an important role in the management of children who are medically fragile and have routine medical needs, such as the dispensing of medication, skin care, and first-aid needs; feeding procedures such as

tube feeding; and elimination needs such as catheterization. They may work with occupational therapists to help students develop independence with routine procedures, or to train others, such as teachers and teacher's assistants, to safely administer some of these procedures. School nurses often speak frequently with parents and can update the team on medical concerns or needs to be considered during the development and implementation of a child's IEP.

Nurses are often part of early-intervention teams.<sup>11,12</sup> They may serve a variety of roles, such as case manager; assisting in the diagnosis of health and developmental problems of children and their families; helping families access early-intervention services; and assisting in the development and implementation of individual family service plans. Nurses make up the largest segment of the health care workforce. In acute, neonatal, and rehabilitation settings, they often take on the primary caregiving role and the case manager role. In hospital settings, it is important that you, as the occupational therapist, consult the nursing staff before entering a child's room to conduct evaluation procedures. Nurses and nursing assistants provide valuable information regarding the child's medical status and any precautions that need to be implemented during your evaluation. A child's medical/health status is always top priority; therefore, your evaluation (and intervention services) may need to be postponed at times owing to scheduling of medical procedures or because the child is not feeling well enough. In hospital settings, the roles of nurses and occupational therapists often overlap with respect to the management of self-help skills such as bathing, dressing, toileting, functional mobility, and feeding.

## Psychologists

In school, preschool, and medical settings, the roles of **psychologists** are to address a child's intellectual and adaptive abilities, and psychosocial and emotional functioning.<sup>13</sup> They often provide services for evaluating and supporting a child's educational programming needs or mental health needs, and they may play a key role in diagnosing mental health conditions such as attention-deficit hyperactivity disorder

and learning disorders. Psychologists are social scientists with training usually at the doctorate level, with expertise in the areas of human behavior, cognition, and psychological health. Therefore, as a member of a team working with children with disabilities, they typically evaluate the psychosocial, emotional, and behavioral abilities and needs of children as well as areas of cognitive functioning and learning styles. Psychologists may also provide direct services such as assisting with the design, implementation, and evaluation of behavioral support plans. School psychologists may consult with regular and special education teachers, assist in the development of IEPs, and provide direct counseling services for children and their families.

## Physicians

A child's primary **physician** is usually a pediatrician or a family practitioner. Often, it is the primary physician who first identifies that a child may be at risk for developing problems or has a developmental or other concern. Therefore, physicians have an important role in referring appropriate children for evaluations and other early-intervention services. In school settings, physicians (pediatricians, pediatric neurologists, and psychiatrists) have few roles, and they rarely communicate with school personnel on a regular basis. It is, however, important for physicians to be involved when children are medically fragile, when the school team requires information on the effects of medications, or when other medical conditions affect a child's ability to participate in school activities. The school nurse or a parent may function as a liaison between a child's physician and the rest of the school team. In addition, in the United States, some states require a physician's referral for the provision of related services in schools, such as physical and occupational therapy.

In medical settings, the physician is often viewed as the leader of the team. He or she writes the referrals for other team members and manages the child's medical needs. Children with disabilities often have complex medical needs; therefore, many physicians, such as those specializing in orthopedics, psychiatry, or neurology, may consult with the team on a regular basis.

## Social Workers

**Social workers** help children and their families participate in their social environments. Depending on the needs of a family, social workers may be involved in assisting the child and family to secure necessary mental health or other resources, respite care, and financial support and services, and they may provide ongoing emotional support. According to Cook,<sup>14</sup> the role of social work with children is to assess, support, and empower the child's family so that they gain the resources, knowledge, and skills to optimize their child's growth and development. More specifically, they evaluate the needs of the family, and they may provide counseling services in various school and medical settings. Often they take the role of case manager to ensure that children and their families receive comprehensive and coordinated services.

## Other Team Members

Many professionals and individuals in addition to those mentioned above may be involved as members of a child's team. For example, dentists, nutritionists, adapted physical education specialists, assistive technology providers, recreation specialists, mental health counselors, members of clergy, family advocates, and friends are just some examples of others who may have important roles for any given child and family. Team composition depends on the desires, resources, and needs of each individual child and family. It is also important to note that some members may be involved to a lesser extent than others, again depending on the needs of the child and family.

## SETTING AND SYSTEM CONSIDERATIONS IN PEDIATRIC EVALUATION

### Early-Intervention, Family-Centered Services

Early intervention refers to supports and services provided to children from birth through age 2 years and 11 months, and their families. Federal support for early-intervention services

has been made a priority because current research indicates that early supports and services are helpful in promoting positive developmental and functional outcomes in children at risk for developmental problems, and for preparing young children to be successful as they enter their school years. Part C of the IDEA (2004)<sup>4</sup> Public Law 108–446 was developed to assist communities in implementing collaborative, multidisciplinary, interagency, early-intervention services for young children with disabilities and their families. Services are typically provided in natural settings (most often the home), and follow a family-centered approach. It is therefore important for therapists working in early-intervention settings to be familiar with the provisions and regulations of the IDEA, Part C, and how the state in which they reside has interpreted the regulations for implementation. This Act was most recently reauthorized as The Individualized Improvement Act of 2004.<sup>4</sup>

In early-intervention-practice settings, you will typically evaluate children and their families collaboratively with other professionals as a member of a team of early-intervention practitioners, who work for a state-governed agency. With a family-centered philosophy, the parents' concerns, strengths, and priorities must be accounted for throughout the evaluation process, and during the development and implementation of the child's intervention program, called the individual family services plan (IFSP). Evaluations are first conducted to determine eligibility for services, which includes assessment in all areas of development. Specific eligibility criteria are developed by individual State laws, and are based upon definitions of (1) established risk (children with a known disability such as Down's syndrome); (2) developmental delays, as measured by appropriate, standardized developmental assessment tools; and (3) risk for developmental problems, which includes environmental risk factors such as having a single, teenaged mother, and biological risk factors, such as having a low birth weight. Young children with neurodevelopmental disorders such as failure to thrive, cerebral palsy, autism spectrum disorders, and multisystem, regulatory disorders, attachment disorders, and musculoskeletal disorders, among others are typically seen in early-intervention programs. Parental mental health conditions such as a history

of substance abuse or depression may place young children at risk for developmental concerns, neglect, or abuse, and, therefore, such families may also be referred for evaluation and interventions by early-intervention teams.

Specific evaluation requirements and processes are detailed in state policies, although they must be consistent with the requirements stated in the IDEA, Part C. For example, Section 635 states that a statewide system should have a number of components, which include,

A timely comprehensive multi-disciplinary evaluation of the functioning of each infant or toddler with a disability in the State, and a family-directed identification of the needs of each family of such an infant or toddler to assist appropriately in the development of the infant or toddler. (20 USC 1435)

Section 636 details programming provisions, which include the following:

(1) a multi-disciplinary assessment of unique strengths and needs of the infant or toddler, and then identification of services appropriate to meet such needs; a family-directed assessment of the resources, priorities, concerns of the family and the identification of the supports and services necessary to enhance the family's capacity to meet the developmental needs of the infant or toddler; and (3) a written individualized family service plan developed by a multidisciplinary team, including the parents. . . (20 USC 1436)

Family-centered services are based on several important principles. It is assumed that parents know their child best and want the best for him or her. All families are diverse and special, and family members contribute unique and important perspectives during the evaluation process and throughout intervention. Early-intervention service providers, including OTs, interact with family members as equal partners, and services are based on the family's strengths, and should be culturally sensitive and flexible to meet the needs of every individual family.<sup>15,16</sup> Family-centered care has been found to be most effective in meeting the challenges that caregivers and their children with disabilities face, and in supporting

their lives in the contexts that are most meaningful: home and community.<sup>16</sup> Early-intervention teams often follow the transdisciplinary model of service delivery, and therefore members, including OTs, often provide services beyond their specific practice domain. Professional roles may overlap with one another; team members share information and skills, and support one another to efficiently and effectively address the multifaceted needs of the family.<sup>16</sup> Family members value professional cooperation and organization, and often find it is easiest to work closely or directly on a regular basis with only one or two team members. The high degree of collaboration on early-intervention teams allows families to benefit from the vast knowledge and expertise of many more team members through information sharing, as is believed that a team of professionals who bring many different perspectives is best suited to meet the complex needs of their children with disabilities.

The role of occupational therapists in early intervention is to address the occupational performance concerns of young children, which may include the areas of feeding, sleep, mobility, dressing, bathing and toileting, play, social interaction, and communication. Underlying sensory and motor skills, social, emotional, and cognitive skills are often addressed, and OTs play an important role in coaching and supporting parents in their parenting/caregiving roles, and in promoting their child's development. Because a transdisciplinary model is often used, OTs may also address areas not traditionally under their domain such as language development (with support from speech/language pathologist team member), and often function the capacity of a case manager.

Specific assessment tools used by early-intervention practitioners typically cover all areas of development, including cognitive, physical, communication, social-emotional, and adaptive functioning (self-help and other skills and behaviors). The team might designate a direct service provider, such as the occupational therapist, to administer all facets of the evaluation. More commonly, components of the evaluation are divided and conducted by different team members on the basis of their areas of expertise. Some assessment tools

that are available and used in early-intervention include the Transdisciplinary Play-based Assessment,<sup>17</sup> The Hawaii Early Learning Profile,<sup>18</sup> The Assessment, Evaluation and Programming System for Infants and Children,<sup>19</sup> and the Infant–Toddler Developmental Assessment.<sup>20</sup> To illustrate a team evaluation in early intervention, a case example is provided in Appendix A.

Although most OT services for children from birth through the second year of life are provided through federally supported, family-centered, early-intervention programs, not all services for this age group are delivered under this system. OT services for this age group are also provided within hospitals and outpatient medical clinic settings, in privately funded community programs, and in mental health community programs. Funding and services through IDEA Part C may not cover all the therapy needs of young children and families, so it is not uncommon for young children to receive therapy services from these other types of settings in conjunction with their state agency early-intervention program.

## **Educational Settings: OT as a Related Service**

In the United States, preschool and school-aged children with disabilities (or those who have been identified as requiring specialized instruction) and children who attend public schools are entitled to receive special education and related services, including OT, if it is determined necessary for providing an appropriate education program. Education legislation of concern to occupational therapists working with children in schools from 3 years to 21 years, 11 months of age is the IDEA, Part B, which is reauthorized about every 5 to 7 years. In addition to this Federal, public law, school-based OT services may be provided through Section 504 of the Rehabilitation Act of 1973, which is human rights legislation.

OT, as defined under Part B of the IDEA,<sup>4</sup> is a related service provided to students aged 3 through 21 years of age who are eligible for special education and who have been identified

as needing OT services to support their education programs. In this setting, OT evaluations are conducted for any of the following reasons: (1) to determine a child's eligibility for school-based OT services, (2) to determine the child's level of functioning (and progress) in any number of educationally relevant activities; and (3) to assist in the development of student IEPs. Occupational therapists in schools work with children with many types of physical, cognitive, behavioral, and social deficits that impact their ability to participate in and benefit from their education programs.

School occupational therapists, whether they are in pre-school programs, elementary, or high schools, work collaboratively with other education team members, such as general and special education teachers, psychologists, and speech/language pathologists, to design and carry out IEPs. As with early intervention, evaluations are often conducted collaboratively with other team members. It is important to keep in mind that OT services in schools address only those child factors and skill areas considered educationally relevant or that impact the child's ability to participate successfully in school activities. For example, in the area of self-care or self-maintenance activities, occupational therapists may evaluate a student's level of independence in the lunchroom, his or her ability to use the bathroom at school, and his or her capacity to get dressed to go outside for recess or for gym class. A student's ability to use the bathtub at home or to organize a morning self-care routine independently before school, however, may not be considered educationally relevant. Medically oriented interventions such as OT activities to increase range of motion after a hand injury or OT using sensory integration techniques in a clinic setting only (without application in the context of the educational setting) are often beneficial for school-aged children but may not be considered educationally relevant. Therefore, these interventions are carried out in medically oriented clinic settings, and are most often not offered by the educational system. Therefore, school-aged children may receive OT and other therapy services from other settings in addition to school-based services.

In addition to considering educational relevance, the IDEA stipulates that all special education services that include OT must be provided within the least restrictive environment.<sup>4</sup> This requirement supports inclusive education. To the extent possible, special education and related services such as OT are provided within the child's regular classroom environment, and in the context of typical classroom activities. It is therefore essential that you evaluate how children perform in their school environments, and include classroom observations as part of your evaluation. OT evaluations under the IDEA should also gather information for obtaining an understanding of the child's curriculum, daily routines at school, and overall demands and expectations.

As noted previously, the IDEA, Part B, mandates special education services for children from 3 through 21 years of age, which encompasses programs for children at the extreme age ranges: from preschool services up to prevocational and vocational programs or other day programming for young adults with disabilities. Services for preschool children are typically provided through special education or integrated preschool programs conducted in public elementary schools, or they may be provided in community preschool settings. Students who are 18 to 21 years, 11 months of age may continue in regular high-school settings with special education and related services, or they may be supported by school personnel in community adult day programs, supported work environments, or other adult education settings. In addition, programs outside a school district provided by for-profit and non-profit agencies are sometimes contracted by school districts to deliver services for children who reside in their districts if the home school district does not have the resources or programming options to meet a child's educational programming needs.

Under IDEA, evaluations follow a well-defined process and have requirements that include timelines, types of personnel, and areas for assessment. First, upon parental consent, an initial evaluation to determine eligibility for services occurs. This may be scheduled any time a child is approaching 3 years or older, and is suspected of having difficulties in any area of development, or for whom there are concerns or

anticipated concerns regarding school performance. Within 60 days of receipt of a referral, an initial assessment must be completed to determine if the child has an educational disability. Individual State regulations often require the administration of standardized assessment tools that provide useful diagnostic information, and standardized scores of performance upon which eligibility decisions can be made. All children receiving special education services must have a formal, comprehensive evaluation at 6 years of age, and then every 3 years thereafter. In addition, yearly evaluations are necessary, specifically for the development of IEPs. Aspects of IDEA, Part B that affect school-based evaluations are summarized in Table 1-3.

In addition to receiving special education services through the regulations set forth in the IDEA, Part B,<sup>4</sup> school-based OT services for children may be provided through civil rights legislation. The “504 plan” from the revised Rehabilitation Act of 1973 ensures that students with disabilities are given equal access to activities (such as school activities) in public and private organizations and that reasonable accommodations are made to allow students to access such activities. You may be asked to conduct OT evaluations to determine whether students can access their desired activities and, if not, to determine what accommodations would be necessary to allow access. Evaluations related to Section 504 must include contextual evaluations (i.e., assessment of the student performing the activities they need to do at school in natural settings) as well as evaluations of performance areas within those contexts. Specific characteristics of OT evaluation services under Section 504 and relevant policies are summarized in Table 1-4. Types of students who often receive service services from a 504 plan are those who benefit from the regular curriculum with more minor accommodations or supports rather than for those who require specialized instruction, or an individualized education program.

Finally, like early intervention services, there are many assessment tools that have been designed specifically for school-based OT practice; they examine aspects of a child’s functioning in school environments and in the context of school-related activities. Two examples are the *School*

TABLE 1-3

## CONSIDERATIONS REGARDING THE INDIVIDUALS WITH DISABILITIES EDUCATION ACT PART B

Issue	Description
Eligibility	A child aged 3–21 years (or through 21 years, depending on state policy) identified and coded with a disability, which may include intellectual impairment, hearing impairment, visual impairment, emotional disturbance, orthopedic impairment, autism, traumatic brain injury, other health impairment, a specific learning disability or multiple disabilities, and who, by reason thereof, needs special education and related services
OT services	OT is a related service required to assist a child with a disability benefit from special education provided by a qualified occupational therapy practitioner, and includes improving, developing, or restoring functions, and specialized services to support or implement a child's education program
Evaluation policies	In general, a state or local educational agency shall conduct a full and individual initial evaluation before the initial provision of special education and related services to a child with a disability to determine whether the child has a disability, and to identify the educational needs of the child. A local educational agency shall ensure that re-evaluations are conducted if conditions warrant reevaluation, if the child's parent or teacher requests reevaluation, or at least once every 3 years. In conducting evaluations, the local educational agency shall (1) use a variety of assessment tools and strategies to gather relevant functional and developmental information, (2) include information provided by the parent that assists in determining whether the child has a disability, (3) include information helpful in developing the child's IEP and information related to enabling the child to be involved in the general curriculum, (4) not use any single procedure as the sole criterion for determining whether a child has a disability or in determining an appropriate educational program for the child, and (5) use technically sound instruments that may assess the relative contribution of cognitive and behavioral factors in addition to physical or developmental factors

(continued)

<b>TABLE 1-3</b>	
<b>CONSIDERATIONS REGARDING THE INDIVIDUALS WITH DISABILITIES EDUCATION ACT PART B</b> <i>(Continued)</i>	
<b>Issue</b>	<b>Description</b>
Intervention programs	A written IEP developed by an educational team that includes the classroom teacher, the parent, and the child when appropriate. The IEP must include the student's current level of educational performance, annual goals and short-term measurable objectives, the special education and related services that will be provided, and the extent and location of the services, dates for initiation of and anticipated length of services, evaluation procedures and schedules to obtain data to determine whether the objectives are being met, and transition services for children 12 years and older

IEP, individual education program; OT, occupational therapy.

<b>TABLE 1-4</b>	
<b>SCHOOL-BASED SERVICES UNDER SECTION 504 OF THE VOCATIONAL REHABILITATION ACT</b>	
<b>Issue</b>	<b>Description</b>
Eligibility	An individual with a disability who requires reasonable accommodations to participate in or have equal access to major life activities (school activities and environments) provided by both the private and public sectors
OT services	May be a support or primary service required to evaluate and determine the needs of students with disabilities for accommodations to enable them to participate fully in school activities; may involve development of a 504 service plan and implementation and monitoring of the 504 plan
Policies related to evaluation	Written documentation is needed that describes the student's disability, the impact the disability has on the student's ability to perform school activities, and the accommodations needed to allow the student to fully participate in all school activities
Intervention program	A written 504 plan stating the accommodations that are necessary and how they will be provided

OT, occupational therapy.

*Assessment of Motor and Process Skills* (School AMPS),<sup>21</sup> and the *Sensory Processing Measure-School Forms*.<sup>22</sup> More information regarding assessments for evaluating the occupations associated with one's roles and skills as a student are included in Chapter 2.

## **Outpatient Community Programs, Residential Settings, and Outpatient Clinics**

As part of a children's hospital or a rehabilitation hospital, multidisciplinary outpatient clinics are sometimes available for children with specific chronic conditions, such as cerebral palsy, juvenile rheumatoid arthritis, or muscular dystrophies. Some clinics are also designed to address specialized problems, such as dysphagia (feeding and swallowing disorders) and assistive technology needs (including wheelchair evaluations, computer needs, and augmentative communication—see Chapter 7). The primary role of occupational therapists in these settings is often one of evaluation and consultation around programming needs, although direct services such as therapy sessions on a weekly basis may also be provided on a short-term basis. Sometimes, therapists with more specialized expertise who work in these clinics act as consultants for other therapists who work more regularly with the children, such as school-based occupational therapists.

Community clinics in pediatrics are also available to provide specialty interventions such as sensory integration interventions or programming for children and adolescents with psychosocial, emotional disabilities or problems. Such clinics or programs may be contracted by school agencies or early-intervention programs to provide specialized services that they cannot offer in their districts. The percentage of occupational therapists working specifically in mental health is relatively small although we have a wealth of skills to provide services in the mental health arena. Outpatient mental health services are provided through several different types of settings, such as freestanding clinics, community mental health centers, and hospital outpatient programs. Funding sources include Medicaid, federal grants, health insurance,

and private pay. In 1992, the Comprehensive Community Mental Health Services for Children and Their Families was authorized by Congress. This federal program provides funding to state agencies to organize and provide mental health services for children and families.

Residential treatment centers are another type of setting available for children with significant mental health and behavioral concerns. Residential centers do not address acute problems and provide more structure and supervision than do day programs. Lengths of stay in residential treatment programs vary tremendously from weeks to several years, with the goal being to prepare children and adolescents for successful return to the community and their families. Education programs are often provided on-site, although sometimes children may attend a private or public school that is off-site from the facility within which they are a resident. In residential settings, occupational therapists may provide related services as a part of a child's IEP (through IDEA legislation) or may provide evaluations and interventions through the medical and mental health systems.

Private practice is another option for occupational therapists. Therapists may establish their own practice and provide services for children and their families on an outpatient basis. They may also contract their services to early-intervention programs, school programs, or other community programs. Reimbursement for OT services provided for children in private pediatric clinics may be obtained through contractual agreements with agencies such as school systems or from health insurance, private pay, and Medicaid. Each of these payer sources has its own regulations and policies with respect to reimbursement guidelines and requirements. Specifically related to evaluations, some health insurance companies, for example, may require therapists to be a member of their network to bill for services, some may require preauthorization prior to rendering services, and some may reimburse for only certain kinds of diagnostic codes and evaluation procedures. The most common diagnostic codes and OT evaluation codes used for reimbursement from health insurance companies, including health maintenance organizations, for OT evaluations are listed in Table 1-5. Therefore, before conducting OT

TABLE 1-5

COMMON ICD-9 AND CPT CODES FOR BILLING PEDIATRIC OT SERVICES<sup>a</sup>

ICD-9 Codes (Diagnosis)	CPT 2012 Codes (OT Services)
299.0 Autism	96110 Developmental screening
315.4 Developmental coordination disorder	96111 Developmental testing/evaluation
314 Attention-deficit hyperactivity disorder	96150 Health and behavior intervention
315.8 Delay in development (specified)	95831–33 Muscle testing
315.9 Delay in development (unspecified)	97750 Physical performance test
348.3 Encephalopathy	97750 AT assessment
343.9 Cerebral palsy	92610 Evaluation of oral and pharyngeal swallowing function
349.9 Unspecified disorder of the nervous system	97535 Self-care/ADLs
758.0 Down's syndrome	97533 Sensory integrative techniques
768.9 Intracranial hemorrhage	97113 Aquatic therapy with therapeutic exercise
312.8 Conduct disorder	97110 Therapeutic exercise
313.81 Oppositional defiant disorder	97112 Neuromuscular reeducation
309.21 Separation anxiety disorder	97530 Therapeutic activities

ADL, activities of daily living; CPT, current procedural terminology, American Medical Association; ICD-9, International Classification of Diseases, ninth revision; OT, occupational therapy.

<sup>a</sup>This is not a complete listing; codes are periodically updated.

evaluations in outpatient clinic settings, it is essential that you familiarize yourself with relevant billing and reimbursement policies. Billing codes and policies related to the delivery of OT services are updated frequently, and influence the

type of tools and documentation that are used. It is therefore the responsibility of therapists to keep informed of policies and available resources to be able to advocate effectively on behalf of their clients for the receipt of services, and to be able to work and be reimbursed within these systems of practice.

## **Inpatient Hospital Services**

As a member of a team of professionals, occupational therapists provide services in a variety of hospital settings and programs, including neonatal intensive care units (Chapter 7) and other special care nurseries, acute care, mental health, and rehabilitation services for children. Although the most common reasons children are admitted to hospitals are for gastrointestinal and respiratory problems,<sup>23</sup> occupational therapists become involved most often with children with neurological, musculoskeletal, and/or developmental concerns. Historically, children who required rehabilitation services, for example, because of head trauma or a spinal cord injury stayed in the hospital for months and even years in some extreme cases. Today, however, school-based programs, community outpatient centers, and home-based programs have taken over much of the rehabilitative roles of therapists in hospital-based programs. Therefore, hospital programs today emphasize the more acute phases of illness or injury and the evaluation and treatment of children with more rare and complex medical conditions.<sup>23</sup>

Children referred for your services in hospital settings, therefore, are often medically fragile or unstable because of the acute nature of their medical conditions. Care must be taken during OT evaluation procedures, which may include the need to closely monitor vital signs, to follow precautions to prevent the spread of infection, and abiding by any other necessary precautions based on the child's medical needs. Before beginning your evaluation with a hospitalized child, it is necessary that you read the medical chart and speak to the child's nurse to obtain up-to-date information on the child's medical status and any precautionary procedures that need to be followed.

Hospital programs have their own set of policies and procedures to be followed with respect to OT evaluation.

For example, there may be time stipulations for how quickly evaluations must be completed from the time that a referral is received. Specific guidelines and procedures will be in place for documenting an evaluation, and often specific evaluation forms or electronic charting must be completed as part of the evaluation process. OT services in hospital-based pediatric programs are almost always initiated through physician orders. Multiple sources of data, including review of the medical records, use of standardized and nonstandardized tests, clinical and contextual observations, bedside evaluations, and interviews, are all typically conducted in the evaluation process. The main purposes of evaluations are to determine levels of functioning, to establish programming needs, and, in some cases, to obtain information to assist in the diagnostic process.

It is your responsibility as the therapist to be aware of and to follow the policies and procedures in the hospital setting within which you work. Pediatric hospital services are typically funded by health insurance carriers, including private insurance companies, health maintenance organizations, and Medicaid. Preauthorization for OT evaluation services may be necessary, and if services are recommended by OT, evidence must be provided in the evaluation regarding the medical necessity of the intervention and the predicted functional outcomes or rehabilitation potential. Common assessment tools used in hospital settings particularly in rehabilitation include the WeeFim<sup>24</sup> and Pediatric Evaluation for Disability Inventory<sup>25</sup> or its latest version the PEDI-CAT.<sup>26</sup>

## Summary

This chapter introduced OT evaluation as a client-centered, top-down process. AOTA's *Occupational Therapy Practice Framework*, 2nd edition, was introduced as the basis for the evaluation process described in this book. The process begins with data collection resulting in the development of an occupational profile of a child, or a story of the child and family. The evaluation process then moves to evaluation activities to uncover the factors that hinder or promote a child's ability

to successfully engage in daily, valued occupations, called an analysis of occupational performance. Clinical reasoning was discussed, including how different types of clinical reasoning are used by therapists for decision making throughout the evaluation process. The importance of working collaboratively as team and the roles of team members with whom OTs work were discussed. Family members, particularly parents and/or caregivers, were identified as essential members, and the important roles of family members throughout the OT evaluation process were emphasized. Finally, various practice settings and systems within which pediatric occupational therapists typically work were described. They include early intervention; educational/school-based settings; outpatient community mental health programs, residential settings, outpatient clinics, and inpatient hospitals. Specific setting and system characteristics, such as educational legislation, and issues regarding health insurance reimbursement that directly impact the evaluation process were discussed. The next chapter provides a guiding framework to help you go through the process of evaluation in a step-by-step manner, with detailed descriptions of the actions to be addressed at each step.

### Discussion Questions

1. Why is it important for OTs to apply a specific framework or model of practice throughout the service delivery process, including evaluation?
2. How might clinical reasoning and critical thinking approaches differ between novice and experienced practitioners?
3. What advantages might a top-down approach to evaluation have over a bottom-up approach?
4. Why is it important for teams working on behalf of children to identify and commit to a shared purpose and mission while having identifiable roles for individual team members?
5. What are those areas of functioning where OT practitioners commonly overlap with others in hospital and school settings?
6. How might OT evaluation activities differ in educational versus medical contexts?

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## 2

# A GUIDE TO EVALUATION

## Introduction

**Evaluation** is the process of gathering and interpreting information about children and their families. Evaluations are performed for many reasons, such as to identify a diagnosis, to evaluate the progress of a client, or for research and program evaluation purposes. This chapter focuses on the evaluation process for determining a child's eligibility and need for occupational therapy (OT) services and for program planning purposes. According to the **Occupational Therapy Practice Framework of the American Occupational Therapy Association (AOTA)**,<sup>1</sup> the evaluation process consists of two main parts: (1) development of an **occupational profile** and (2) **analysis of occupational performance**, which were discussed briefly in Chapter 1.

Language adopted by the World Health Organization to define various levels of human functioning was incorporated into the development of the OT Practice Framework. This language provides a useful, consistent system for understanding and communicating, on national and international levels, issues of importance related to the functional competencies of individuals with disabilities. The purpose of the **International Classification of Impairments, Activities, and Participation (ICIDH-2)** by the World Health Organization<sup>2</sup> is to classify human functioning at the level of the body, the whole person, and the person within their social and physical environmental contexts. The ICIDH-2's consideration of "participation" and "activities" largely reflects a top-down evaluation process that begins with the construction of the child's occupational profile. Data are then gathered about the child's skills and performance of their occupations and about the relevant environments and contexts within which children participate in their meaningful occupations. Evaluation of "body functions" and "body structure," as defined by the ICIDH-2, comprises the client factors that may be considered important for further evaluation during an analysis of occupational performance. Specific definitions for the main concepts of the ICIDH-2, and the relationships among the ICIDH-2 terminology, and the terminology used in the AOTA's Practice Framework are included in Table 2-1, and more information regarding current terminology can be found at [www.who.int/icidh](http://www.who.int/icidh).

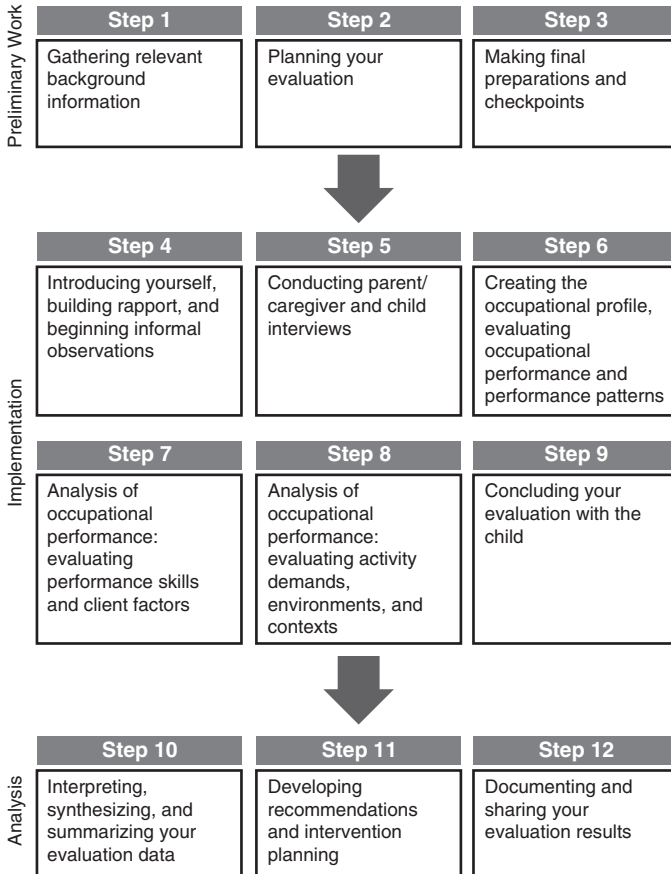
Figure 2-1 depicts the steps that you will go through in conducting your evaluations after a referral is received. The

<b>TABLE 2-1</b> COMPARISON OF THE OT PRACTICE FRAMEWORK AND THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY, AND HEALTH LANGUAGE		
	<b>AOTA OT Practice Framework<sup>1</sup></b>	<b>International Classification of Functioning, Disability and Health<sup>2</sup></b>
Occupational performance	Accomplishing an activity or occupation that results from the dynamic transaction among the client, context, and activity	Major life areas, community, social and civic life, activities and participation

**TABLE 2-1**

**COMPARISON OF THE OT PRACTICE FRAMEWORK AND THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY, AND HEALTH LANGUAGE**  
(Continued)

	<b>AOTA OT Practice Framework<sup>1</sup></b>	<b>International Classification of Functioning, Disability and Health<sup>2</sup></b>
Activity participation	Activities are goal-directed human actions; participation is involvement in a life situation	Activity is the execution of a task or action by an individual; participation is involvement in a life situation
Function	Used in relation to body function (see below)	Composite of one's body function, activity performance, and participation
Body functions	Client factors referring to the physiological function of the body systems; capacities that reside within the body	The physiological functions of the body systems, including psychological functions; capacities that reside within the body; personal factors
Body structures	Client factors referring to the anatomical parts of the body such as the organs, limbs, muscles and joints; support capacities that reside within the body	Anatomical parts of the body such as the organs, limbs, and their components; support capacities that reside within the body; personal factors
Performance skills	A person's demonstrated motor and praxis, sensory-perceptual, emotional regulation, cognitive, communication and social skills	Not used
Context/environment	A variety of interrelated conditions within and surrounding the client that influence performance, including cultural, personal, temporal, physical, social, and virtual contexts	Environmental factors that make up the physical, social, and attitudinal environment in which people live, and conduct their lives. The factors external to individual
Impairments	Not used	Problems with body functions or body structures
Occupational performance problems or deficits	May result from any combination of client factor problems, deficits with performance skills, or performance patterns, activity demands, context/environmental factors	Deficits are activity limitations, or participation restrictions



**Figure 2-1** The 12-step occupational therapy evaluation process.

remainder of the content in this chapter provides detailed information regarding each of the steps.

## STEPS IN THE EVALUATION PROCESS

### Step 1: Gathering Relevant Background Information

The amount and type of available background information will vary tremendously from setting to setting. For example, in hospital settings you will have the medical record to review,

and in school settings you may have a special education file to review if the student previously received special education services. The amount of information provided by the referral source will also vary. For example, you may receive a referral in a hospital setting that just states, “occupational therapy evaluation and treatment,” with only the child’s name, age, gender, diagnosis, and room number. In a school setting, you may receive a referral that states, “occupational therapy evaluation and treatment of fine motor difficulties; child is currently receiving special education for a learning disability.” If the nature of the child’s problems or reason for the referral is unclear, then it is important for you to obtain clarification from the referring source. At the very least, you should feel knowledgeable about the reasons for the referral, and be aware of the main presenting problems that triggered the referral. This clarification often requires a telephone interview with the referral source (a parent, teacher, or physician). Obtaining this background information may also be considered part of a **screening** to determine whether the referral for an OT evaluation is appropriate and necessary.

A specific diagnosis or educational coding provides some initial assessment information as there may be common problems associated with a particular diagnosis or condition. Review of previous records is also helpful because knowing what assessment tools have already been administered and what information is available avoids unnecessary gathering of information, and maximizes efficiency of the evaluation process. Information about a young child’s ability to separate from their caregivers or to perform for strangers, about a child’s likes and dislikes, or about a child’s ability to sit at a table and follow directions (required for administering many standardized assessment tools) is very useful for planning your evaluation activities.

Common sources of **preevaluation information** include (1) medical records, (2) school records, (3) reports from other professionals (medical or educational personnel) who have seen the child, (4) interviews with parents or other caregivers, and (5) interviews with the referral source, teacher, or physician. Gathering information about the child’s diagnosis, presenting problems, and reasons for referral is essential before seeing the child. More detailed information regarding the child’s medical history, birth history, timing of developmental milestones

(such as sitting up and walking), and involvement with any past or current medical or special education services and programs is also important to gather at some point early in the evaluation process. Interviews to gather such evaluation data may be conducted before seeing the child, during the evaluation session, or after evaluation of the child. Chapter 5 provides more detailed information about conducting client interviews.

## **Step 2: Planning Your Evaluation**

Planning your evaluation involves scheduling a time to see the child and selecting the assessment tools, materials, and activities that you will use during your evaluation. It is important for you to schedule a time that will be comfortable for the child and for other individuals who are affected by or contribute to the evaluation. These “others” may include nursing staff, teachers, and, of course, parents. It is important to be sensitive to the time of day, child/family schedules, and so forth, when finding a time that is convenient for all parties involved and that will help elicit the most meaningful and reliable evaluation information. There may also be legal or institutional guidelines that dictate how soon your OT evaluation should take place after a referral is received.

Selecting the most useful assessment activities, tools, and materials requires a great deal of clinical reasoning, and is one of the more difficult aspects of the evaluation process because you need to consider so many factors (e.g., child and family characteristics, the purpose of the evaluation, your skills, and the environment) when creating your evaluation plan. Three types of evaluation procedures are available: (1) administration of standardized assessment tools; (2) nonstandardized but formal procedures, observations, and interviews; and (3) informal observations, including naturalistic observations. For most evaluations, you will probably use all three of these procedures. Detailed information about evaluating, selecting, and using standardized, norm-referenced, and criterion-referenced assessment tools is provided in Chapter 4. Chapter 5 covers nonstandardized assessment procedures in more depth, including interviewing and conducting formal and informal clinical and naturalistic observations.

Information on normal development is also important to consider in the evaluation planning process (see Chapter 3). This information helps you (1) form appropriate and relevant interview questions, (2) select appropriate toys and activities for the evaluation, (3) gain insight into effective ways to approach children of various ages and developmental levels, and (4) interpret the evaluation data.

You will consider many different factors as you engage in the clinical reasoning process throughout the planning and preparation steps of your evaluation. Examples of evaluation plans that may be used with children of various ages and with certain diagnosis or referring problems in different practice settings are included in Tables 2-2 to 2-5. However, it is important for you to understand that every child referred to you comes with a unique combination of individual and contextual characteristics that will affect your decisions as you plan your evaluation activities. Sometimes you will need to conduct your evaluation activities in more than one session, and often in more than one setting. A perfect set of evaluation activities that will work for all children with a specific diagnosis or set of challenges does not exist. Therefore, careful planning, and sound clinical reasoning and critical thinking are crucial for making quality decisions in this step of the evaluation process.

### Step 3: Making Final Preparations and Checkpoints

Some **last-minute preparations** or considerations are necessary before your evaluation, and these preparations will vary depending on your setting and specific situation. In all cases, you will need to gather assessment materials and forms. In a clinic setting, you may need to prepare the testing environment and set up testing materials. If your client is hospitalized, you should check with nursing staff, read recent notes in the medical chart to make sure that the child can be seen, and read any signs posted in the client's environment regarding medical precautions or care procedures. If you are doing the evaluation in the home, then it's best to call ahead to let the parents know that you are on your way. Finally, you need

TABLE 2-2 SAMPLE EVALUATION PLANS FOR INPATIENT HOSPITAL SETTINGS

Setting, Age, Diagnosis	Standardized Assessments	Nonstandardized Procedures
Neonatal intensive care unit, 31 weeks gestation, prematurity, bronchopulmonary dysplasia	Neurological Assessment of the Preterm and Full-term Infant <sup>4</sup>	Medical history, including maternal prenatal history; infant's birth history; medical status (equipment, feeding, medications, homeostasis, precautions); interview nursing; observe state regulation, level of arousal, auditory and visual orientation, cry, and consolability; feeding, muscle tone, posture, movement patterns, and select reflexes; interview parents; observe infant-parent interactions
Rehabilitation unit/5 years old/traumatic brain injury; alert	MVPT-3; <sup>4</sup> Wee-FIM; <sup>5</sup> Rancho Los Amigos Levels of Cognitive Function-Revised <sup>6</sup>	Interview nursing, parents, and child; gather information about child's interests, activities, and school program; assess ADL tasks such as bathing, grooming, dressing; assess neuromuscular functions- muscle tone, movement patterns, strength, balance, coordination; assess fine and gross motor skills, cognitive, and communication skills including global and specific mental functions, and social-emotional and adaptive behavior
Rehabilitation unit/17 years old/C5-6 spinal cord injury	COPM <sup>7</sup>	Interview child and parent; evaluate formally sensory functions, functional movement, range of motion, and muscle strength; observe client performance of ADLs; evaluate need for assistive technology such as need for a power wheelchair, and other adaptive devices to assist with ADLs, and for participation in desired occupations in role of student; assess psychosocial and emotional functioning
Mental health unit/14 years old/anorexia nervosa	Adolescent Role Assessment; <sup>8</sup> AMPS <sup>9</sup>	Interview child and parents; evaluate psychosocial-emotional factors such as self-esteem, self-identity, self-control; administer expressive person drawing task; time management and activity log; conduct observations during social and leisure activities and during meals

AMPS, Assessment of Motor and Process Skills; COPM, Canadian Occupational Performance Measure; ADL, activities of daily living; MVPT-3, Motor Free Visual Perception Test-3; Wee-FIM, Functional Independence Measure for Children.

**TABLE 2-3** SAMPLE EVALUATION PLANS FOR OUTPATIENT CLINIC SETTINGS

<b>Setting, Age, Diagnosis</b>	<b>Standardized Assessments</b>	<b>Nonstandardized Procedures</b>
Private pediatric clinic/7 years old/developmental coordination disorder	Sensory Integration and Praxis Tests, <sup>10</sup> Sensory Profile, <sup>11</sup> TVMS-R <sup>12</sup>	Caregiver, teacher, and child interviews emphasizing the child's occupational performance, the child's interests, and parent/child priorities; observe fine and gross motor skills during play and school-related activities; formal observations of postural control, muscle tone, balance, and coordination
Child development clinic/4 years old/Down's syndrome	PDMS-2, <sup>13</sup> VABS, <sup>14</sup> Sensory Profile <sup>11</sup>	Caregiver interview; observations of the child's motor, cognitive, sensory/perceptual, psychosocial, and communication skills during feeding, dressing, and play; observe parent and child interactions during play
Cerebral palsy clinic/16 years old/spastic quadriplegia, seizure disorder, intellectual impairment	Canadian Occupational Performance Measure, <sup>7</sup> Person-Environment Fit Scale <sup>15</sup>	Caregiver and teacher interviews; review of medical records and current programs; assess motor skills through clinical observations of functional mobility, joint range of motion, muscle strength, sitting posture, transfers, upper limb coordination, and functional use of upper extremities; assess cognitive, sensory/perceptual, and communication skills through observations of grooming tasks and feeding; assess need for assistive technology related to seating, computer use, communication, and performing self-care tasks
Community mental health program/15 years old/substance abuse	Adolescent Role Assessment, <sup>8</sup> Piers-Harris Children's Self-Concept Scale <sup>16</sup>	Parent and child interviews; assess psychosocial, cognitive skills and communication skills during structured group activities

PDMS-2, Peabody developmental motor scales-2; TVMS-R, Test of visual-motor skills-Revised; VABS, Vineland adaptive behavior scales.

**TABLE 2-4** SAMPLE EVALUATION PLANS FOR EARLY INTERVENTION AND PRESCHOOL SETTINGS

<b>Setting, Age, Diagnosis</b>	<b>Standardized Assessments</b>	<b>Nonstandardized Procedures</b>
Early intervention/9 months old/ fetal alcohol syndrome	Bayley Scales of Infant Development-II; <sup>17</sup> Test of Sensory Functions in Infants; <sup>18</sup> HOME-R <sup>19</sup>	Caregiver interview; observations of caregiver and infant interactions during interactive play; observations of the infant's motor, cognitive, and psychosocial and emotional skills during play and feeding
Early intervention/2.5 years old/ autism	PDMS-2; <sup>13</sup> Knox Preschool Play Scale-revised; <sup>20</sup> Hawaii Early Learning Profile <sup>21</sup>	Caregiver interview; observe caregiver-child interactions; observe motor, cognitive, and communication skills during play and activities of daily living such as feeding, dressing
Preschool/4 years old/cerebral palsy spastic hemiplegia	PEDI-CAT; <sup>22</sup> Classroom Observation Guide <sup>23</sup>	Parent and teacher interviews; observe child engaged in classroom and playground activities; assess fine and gross motor skills, and factors including muscle tone, strength, range of motion, balance, motor coordination, bilateral hand use; observe play skills
Preschool/5 years old/ developmental delay	School Function Assessment; <sup>24</sup> Sensory Integration and Praxis Tests <sup>10</sup>	Parent and teacher interviews; observe child engaged in classroom and playground activities; assess sensory and motor skills and factors including tone, muscle strength, balance, and motor coordination; bilateral hand use; observations of play skills

HOME-R, Home Observation for the Measurement of the Environment-Revised; PDMS-2, Peabody Developmental Motor Scales-2; PEDI-CAT, Pediatric Evaluation of Disability Inventory-Computer Adaptive Test.

**TABLE 2-5** SAMPLE EVALUATION PLANS FOR ELEMENTARY, MIDDLE, AND HIGH SCHOOL SETTINGS

<b>Setting, Age, Diagnosis</b>	<b>Standardized Assessments</b>	<b>Nonstandardized Procedures</b>
Fourth grade/9 years old/ learning disorder and attention-deficit hyperactivity disorder	Bruininks-Oseretsky Test of Motor Proficiency-2; <sup>25</sup> ETCH; <sup>26</sup> School AMPS <sup>27</sup>	Child, parent, and teacher interviews; sensory processing history; classroom observations; review of classroom written and other work; clinical observations of sensory motor functions, including muscle tone, movement patterns, postural control, balance, strength, and coordination
Sixth grade/11 years old/ cerebral palsy, spastic diplegia, poor handwriting	School AMPS; <sup>27</sup> Test of Visual-motor Skills; <sup>12</sup> Test of Visual Perceptual Skills-Revised (nonmotor) <sup>28</sup>	Child, parent, and teacher interviews; observations in school environments, with particular attention to functional mobility and written work; clinical observations of sensory motor functions, including postural tone, movement patterns, balance, strength and coordination
Eleventh grade/17 years old/spinal muscular atrophy, type II	Canadian Occupational Performance Measure <sup>7</sup>	Child, parent, and teacher interviews, including a discussion of transition plans; observations of performance in personal and instrumental ADLs, school-related, work and leisure activities; evaluation of technology needs; evaluation of feeding, and motor skills including postural tone, balance, range of motion, strength, physical endurance, and coordination
Ninth grade/15 years old/ moderate intellectual impairment, and aggressive behavior	Sensory Profile, adolescent/adult <sup>29</sup>	Child, parent, and teacher interviews; observations in school environments during school-related activities and during child's participation in relevant ADLs and vocational and leisure activities

ETCH, Evaluation tool of children's handwriting; School AMPS, School version of the Assessment of Motor and Process Skills; ADL, Activities of daily living.

to clear your head and be ready to focus on the child and others involved in the evaluation, such as the parent or caregiver. Your keen, **informal observations** will probably be the most powerful and useful evaluation data. With your attention focused, you will truly be able to be there with the client during the evaluation.

#### **Step 4: Introducing Yourself, Building Rapport, and Beginning Informal Observations**

As you begin your evaluation, your first goal is to **establish rapport** with your clients (usually the child and a parent; in a school environment, this may be the teacher and child), and it is essential that you make them feel comfortable and that you are respectful. Some actions on your part that will help you accomplish this are as follows:

- knocking before entering the client's space (home, hospital room, or classroom)
- introducing yourself and explaining the purpose of your visit to both the child and the parent using language appropriate to the child's developmental level
- asking how the client would like to be addressed and not addressing adults by their first name unless given permission to do so
- collaborating with the parent or teacher to determine the extent of their participation, roles, and presence in the evaluation process
- interacting or playing with the child in fun ways that make him or her feel successful and relaxed

From the moment you enter the child's space or environment (e.g., home or classroom), take note of any specific characteristics that may have the potential to enhance or hinder the child's performance. For example, are spaces cluttered or do they allow children to move freely? What materials, toys, and activities are accessible and available? Begin to make informal observations of the child's behavior, such as attention, affect, language use, activity level, and reactions to

you as a stranger. Also, be attentive to the needs of the child and parent(s), read body language, and adjust your behavior to maximize their comfort level with the evaluation process. Sometimes this means joining in and doing whatever the child was already doing before initiating the new activities that you have planned.

## Step 5: Conducting Parent/Caregiver and Child Interviews

**Informal interviews** with the child (children older than 3 or 4 years) and his or her parent(s) are helpful to gain information about the child's interests, strengths, and challenges and will help you uncover **child and family priorities**. They also give you an opportunity to establish rapport with your clients, and to explain what you hope to accomplish throughout the evaluation process. Interviews are useful for gathering initial information about many domains defined by the OT Practice Framework,<sup>1</sup> including the child's occupational performance, and performance patterns which are emphasized in Step 6 of the evaluation process. Child and family values, beliefs, and spirituality, which are included as client factors, are also commonly explored through interviews. Interviews should play out more like a conversation than a question-and-answer period. You should ask questions that are largely based on what your client has just told you. Using this method of asking questions ensures that you have **listened carefully** to the client. Your questions should be open-ended so that they require more than a simple yes or no answer and should not be biased in the way in which they are worded. Specific techniques and example interview questions are provided in Chapter 5, and some standardized assessment tools that follow structured interview formats are included in Chapter 4.

It is almost always necessary that you interview the caregivers as well as older children, and scheduling such interviews may be challenging. For example, parents may not want to talk to you about their child's difficulties with the child present, and they may not have someone else to watch the child during an interview. If the child is present, parents may not be able to relax and focus during an interview because

they are distracted by their child. It is important, therefore, that you are thoughtful in your evaluation planning about when and where these interviews take place. Some suggestions for managing challenging situations are as follows:

- Interview the child during the context of a play situation and while you are making informal observations.
- Consider a telephone interview with the parent either before the evaluation or shortly after (before is better because you may gain insights into important factors or areas to focus on with the child during the evaluation).
- Set up the child with favorite toys near you and the parent(s) either at the end or the beginning of the evaluation session while you speak with the parent(s).
- Talk with the parents while you work with the child (this works sometimes with very young infants); however, it is not highly recommended because it is difficult to establish a relationship with the child when you are talking with the caregiver, and it is very difficult (if not impossible) to gather information from the parent and the child simultaneously.
- Explain to the parent ahead of time that you would like time to talk to them about their main concerns and priorities, and have them problem solve with you about how this can take place; sometimes another adult can be present at the evaluation to watch the child while the interview takes place.

## **Step 6: Creating the Occupational Profile, Evaluating Occupational Performance and Performance Patterns**

When using a **top-down approach** to evaluation, you begin by gathering information about the child's ability to perform successfully in the roles and activities that are meaningful to him or her. **Areas of occupation** that you may want to address are listed in the AOTA's Practice Framework<sup>1</sup> and include activities of daily living (ADL) such as feeding and bathing, instrumental ADLs, which for children may include activities related to the care of pets, homemaking, chores, and money

management. Other areas of occupation include education/school-related activities, work activities (for older children), play, leisure, and social participation. Information about abilities to perform in valued areas of occupation may already be gathered from your interviews with the child and caregivers. Information about the child's performance can also be acquired effectively through informal observations, particularly naturalistic observations. For example, if a child has feeding difficulties, observing him or her eat a meal or a snack is often helpful. Breaking down an activity into smaller components also assists in identifying where problems are occurring. For example, in observing feeding, consider use of utensils, ability to bring the spoon to the mouth, finger feeding, cup drinking, ability to demonstrate appropriate manners in accordance with cultural expectations, management of different types of food textures, etc. If the child has difficulty following a classroom routine, then it would be important for you to do a classroom observation, particularly at a time when the child must make transitions from one activity to the next. Consider the demands of the activity and how the environment appears to be supporting or hindering the child's performance. If a mother is concerned about her infant's social interactions while they play, then it would be important for you to observe them playing together.

While making observations of a child's performance, you should be answering several questions: How does the child perform the task? How much and what type of assistance does the child require? Is the child effectively compensating for body function deficits during skill performance? What kinds of compensations are being made by the child? What specific performance components or child factors (e.g., sensory, motor, cognitive, and emotional) seem to be hindering the child's performance? What task demands or environmental factors are affecting the child's ability to perform the activity? Is the child happy, comfortable or appear stressed during the activity?

Common terminology used by occupational therapists to **describe the amount of assistance** required, or the level of independence of a child ranges from being totally dependent, requiring varying degrees of help, to being fully independent.

Terms are also used to describe the types of assistant required such as needing verbal or physical cues. This terminology is described in detail in Box 2-1.

Various standardized assessment tools are also available for gathering evaluation data regarding a child's functional abilities or occupational performance (see Table 2-6). Commonly used **pediatric functional assessment tools** or **occupational performance measures** include the School Function Assessment,<sup>24</sup> the Vineland Adaptive Behavior Scales-revised,<sup>14</sup> the Pediatric Evaluation Disability Inventory-Computerized

## Box 2-1

### TERMINOLOGY USED TO DESCRIBE LEVELS AND TYPES OF ASSISTANCE

#### LEVELS OF ASSISTANCE

- Dependent:** Requires assistance with >75% of the task or is unable to perform any aspects of the task.
- Maximal assist:** Requires assistance with 50%–75% of the task.
- Moderate assist:** Requires assistance with 25%–50% of the task
- Minimal assist:** Requires assistance with up to 25% of the task.
- No assist/Independent:** Requires no assistance

#### TYPES OF ASSISTANCE

- With verbal cues:** Child performs task when given verbal cues.
- With non-verbal cues:** Child completes tasks with non-verbal cues such as touch cues
- Supervision:** Child performs the task independently but requires supervision for safety
- Task set up:** Child performs the task independently when necessary environmental factors or materials are set up.
- Independent with assistive devices:** Child is independent when using appropriate assistive devices or technology.
- Totally independent:** Child is independent with all aspects of the task without the use of adaptive equipment or techniques.

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Contributions from: Rogers JC, Holm MB. The occupational therapy process. In: Crepeau E, Cohn E, Schell BAB. *Willard & Spackman's Occupational Therapy*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009: 478–518.

**TABLE 2-6** OCCUPATIONAL PERFORMANCE ASSESSMENTS FOR CHILDREN

<b>Assessment Tool</b>	<b>Age Range</b>	<b>Areas Assessed</b>	<b>Contact and Purchasing Information</b>
Pediatric Evaluation of Disability Inventory—Computer Adaptive Test <sup>22</sup>	6 months to adulthood	New revised version of the Pediatric Evaluation of Disability Inventory; assesses self-care, functional mobility, and social functioning through structured interview and/or observation; considers level of responsibility for performing the task, caregiver assistance	CRE Care: Boston University Health and Disabilities Research Institute; Boston, MA. <a href="http://pedicat.com/category/home/">http://pedicat.com/category/home/</a>
School Function Assessment <sup>24</sup>	Kindergarten to sixth grade	Criterion-referenced tool for evaluating child performance, level of participation, and need for assistance in school activities, including both physical and cognitive/behavioral tasks	Harcourt Assessment Inc., P.O. Box 599700, San Antonio, TX 78259
Assessment of Motor and Processing Skills <sup>9</sup>	3 years to adulthood	The child is asked to perform 5–6 tasks from a list of 56 calibrated ADL tasks. The tool measures process and motor skills as they relate to task performance, provides information about how the child is performing in a given context, and is used to predict performance in ADL areas	Three Star Press, Fort Collins, CO <a href="http://www.ampsintl.com">http://www.ampsintl.com</a>
School Assessment of Motor and Process Skills <sup>27</sup>	School-aged children	Child is observed performing 2–3 school-related tasks in context and measures motor and process skills supporting school performance	Three Star Press, Fort Collins, CO <a href="http://www.ampsintl.com">http://www.ampsintl.com</a>

(continued)

**TABLE 2-6** OCCUPATIONAL PERFORMANCE ASSESSMENTS FOR CHILDREN (Continued)

<b>Assessment Tool</b>	<b>Age Range</b>	<b>Areas Assessed</b>	<b>Contact and Purchasing Information</b>
Vineland Adaptive Behavior Scales-revised <sup>14</sup>	Birth through 18 years	Measures communication, daily living skills, socialization, and motor skills; uses a behavior rating scale completed through a structured parent interview	American Guidance Service Inc., Publisher's Building, Circle Pines, MN 55014
Canadian Occupational Performance Measure <sup>7</sup>	7 years through adulthood	Structured interview with parent for younger child, or child's; measures perception of the child's performance and satisfaction with self-care, leisure, and work occupations; helpful for prioritizing intervention goals and for measuring occupational performance outcomes	Canadian Association of Occupational Therapists <a href="http://www.caot.ca/copm/index.htm">http://www.caot.ca/copm/index.htm</a>
Self-Assessment of Occupational Functioning <sup>31</sup>	14 years and older	Self-report measure to be completed during a structured interview; based on the Model of Human Occupation; addresses strengths and weaknesses related to volition, habituation, performance skills	American Occupational Therapy Products <a href="http://www.aota.org">www.aota.org</a> ; <a href="http://www.moho.uic.edu">www.moho.uic.edu</a>
Wee-FIM <sup>5</sup>	Child version-6 mo to 7 years	Universal tool designed to measure rehabilitation outcomes related to self-care, mobility, sphincter control, communication, and social cognition	Uniform Data System for Medical Rehabilitation, 270 Northpointe Parkway, Suite 300, Amherst NY 14228 <a href="mailto:info@udsmr.org">info@udsmr.org</a>
Adaptive Behavior for Assessment System—2nd edition <sup>32</sup>	Birth through adulthood	A behavior rating scale measuring conceptual, social and practical skills (self-care, home school and community living, work, health and safety)	Western Psychological Services, 625 Alaska Ave., Torrance, CA 90503-5124 <a href="http://www.wpspublish.com">www.wpspublish.com</a>

Wee-FIM, Functional Independence Measure for Children.

Adaptive Test,<sup>22</sup> the Assessment of Motor and Process Skills,<sup>9</sup> and school version,<sup>27</sup> the WEE-FIM<sup>5</sup> and the Canadian Occupational Performance Measure, third edition.<sup>7</sup> Using standardized assessment tools is particularly helpful when it is important for you to obtain objective data on the child's ability to perform self-care skills, school-related activities, work, and play, and to be able to objectively document change in performance over time. Standardized assessment tools also help direct your attention to the occupational areas giving a child the most difficulty, and the administration of these tools often initiate important discussions about the specific skills, tasks and occupations most valued by the child or the caregivers.

In addition to examining occupational performance early in the evaluation process, it is important to gain an understanding of the child's performance patterns, which refer to habits, routines, roles and rituals. As defined in the Practice Framework,<sup>1</sup> habits are automatic behaviors that assist an individual to function efficiently on a daily basis. They may be useful, while sometimes they may be impoverished or destructive. Routines are regular patterns of behavior that may occur during a child's day, such as one's bedtime routine, morning routine, or preschool classroom routines. They may also refer to weekly routines, and are embedded the child's context of daily life and environments. Rituals refer to symbolic actions that are often associated one's cultural practices, and celebrations, and they reflect the child and family's unique identity, values and beliefs. Finally, performance patterns also include roles, defined as "a set of behaviors expected by society, shaped by culture" (p. 643). Information regarding performance patterns is typically gathered through contextual observations and caregiver interviews, as discussed in the Step 5. However, when performance patterns present as a possible significant concern, a more detailed analysis of this area is recommended. Some specific assessment tools that address performance patterns in more depth and that you may want to consider administering, include the Adolescent Role Assessment,<sup>8</sup> Occupational Circumstances Assessment-Interview Rating Scale (OCAIRS) for adolescents,<sup>33</sup> and the OT Psychosocial Assessment of Learning (OT PAL).<sup>34</sup>

By the end of this step, you should have ample evaluation data to begin to formulate an occupational profile of the child you are evaluating. This includes an understanding of who the child and family are (the client's story), the areas of occupation, and performance patterns that are of concern or that require further exploration, and child and family priorities, values, and beliefs. Synthesis of evaluation data for developing and writing up the occupational profile is discussed more in Step 10, and sample occupational profiles are included in Boxes 2-2 to 2-4. Finally, you should be ready to develop hypotheses about the many possible factors that are hindering or facilitating the child's ability to engage successfully in his or her valued occupations which helps to prioritize areas for further assessment.

Box 2-2SAMPLE OCCUPATIONAL PROFILE OF AN  
ELEMENTARY SCHOOL-AGED CHILD

Aaron is a 6-year-old boy who was recently diagnosed with autism spectrum disorder. He lives with his parents and 2-year-old sister. His medical and birth histories are unremarkable, although he does get frequent upper respiratory tract infections. Developmental milestones were reported to be achieved within the age-appropriate ranges, including walking at 13 months of age and saying his first words at 16 months. Toilet training was challenging and was completed when he was 4 years of age. Aaron attends a regular half-day kindergarten program, and he is currently being evaluated to determine whether he requires special education services. He was referred for an occupational therapy evaluation because of difficulties with fine motor skills, social play skills, and suspected sensory processing problems. His parents and teacher are concerned regarding Aaron's inability to adapt to change, with the frequency and intensity of his temper outbursts, and with his emotional reactivity. They also report that his play behaviors and social skills are immature. Aaron likes to play with dinosaur action figures and computers, and he is an avid fan of Nickelodeon TV shows. He is enrolled in swimming lessons, and he has many children to play with in his neighborhood, although he usually chooses to play on his own. Both parents work outside the home, and Aaron's grandmother cares for him and his sister while they are at work.

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## Box 2-3

SAMPLE OCCUPATIONAL PROFILE  
OF AN ADOLESCENT

Ray is an 18-year-old senior in high school. He lives with his 12-year-old brother and his parents in a rural community. Ray is an excellent student and an active member of the National Honor Society; he has been accepted to attend university in the Fall on a full scholarship in computer technologies. Ray has type II spinal muscular atrophy. His disease process has been slowly progressive. He has little active movement or strength in his lower extremities, and he currently uses a power wheelchair as his means of mobility. He has a custom lap tray he uses on his chair for his computer, and other needs. Ray requires maximal assistance for all transfers, and for dressing, bathing, and toileting. He can do most simple grooming activities and can eat independently with setup. Ray needs help with positioning at night, and he requires oxygen at night. At school, he manages his coursework well, and he uses a laptop computer for taking notes. Outside of school, Ray has a part-time job as a Web page designer, and he volunteers at a retirement community where he helps residents learn how to use computers. He is an avid soccer fan, and he likes to read. Ray has a very supportive family, and reports being satisfied with his social life. He is excited about leaving home and going off to college in the near future.

## Box 2-4

SAMPLE OCCUPATIONAL PROFILE  
OF AN INFANT

Molly is a 3-month-old infant (chronologic age) with a corrected age of 1 month, who has been referred for an evaluation through her Early Supports and Services agency. She was born prematurely at 32 weeks' gestation, largely as a result of maternal drug abuse. Molly was hospitalized for 6 weeks after she was born. Results of infant and mother urinalysis for perinatal cocaine were positive. Her birth weight was 1,600 g, and her Apgar scores were 5 and 7 at 1 and 5 minutes, respectively. While hospitalized, she developed respiratory distress syndrome, experienced feeding difficulties, and failure to thrive. She also had behavioral

*(continued)*

## Box 2-4

SAMPLE OCCUPATIONAL  
PROFILE OF AN INFANT (*Continued*)

regulation problems characterized by diffuse sleep, and frequent agitation when awake. These problems have gradually decreased. At hospital discharge, Molly was drinking adequately from the bottle, although she continued to be irritable and difficult to calm. Molly lives with her mother and maternal grandmother, who both receive social assistance, and neither work outside of the home. Molly has two sisters, 5 and 6 years of age, who also reside in the home. All the children have different fathers, and only the eldest has regular contact with her father. Molly's mother is being treated as an outpatient for substance abuse, and she has a history of bipolar disorder. Her grandmother assumes the role of primary caregiver for all of the children. Molly's mother is very involved in her care, is working on her parenting skills, and wishes to take on more of the responsibility for her care. They live in a small home with plenty of toys.

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### **Step 7: Analysis of Occupational Performance: Evaluating Performance Skills and Client Factors**

There is no one best order for evaluating specific, relevant **performance skills** and **client factors**. However, it is important that you consider the child's physical endurance, attention span, and emotional well-being when making decisions about the order with which to administer assessments of performance skills and client factors. Also, an understanding of family and child priorities and ways of approaching the child and family in culturally sensitive ways should be considered as you proceed. Therefore, it is suggested that you begin by considering the client factors of values, spirituality and beliefs, if in the previous steps you have not gathered sufficient information in these areas through preliminary data sources, and parent interviews. There are some assessment tools that are designed specifically to examine values, beliefs and spirituality such as the Pediatric Volitional Questionnaire 2.0<sup>35</sup> and the Spiritual Well-being Scale.<sup>36</sup>

Performance skills are observable, goal-directed, behaviors that are necessary to engage successfully in one's occupations, and they categorized by AOTA's Practice Framework<sup>1</sup> as follows: (1) **motor and praxis skills**, such as bending, carrying, walking, sequencing and planning movements, manipulating objects; (2) **sensory and perceptual skills**, such as recognizing familiar people, identifying a quarter by feeling in one's coat pocket, hearing and understanding verbal directions, responding appropriately to a familiar sound, identifying food preferences based on taste; (3) **emotional regulation skills** such as persisting when challenged, responding appropriately to the feelings of others, showing appropriate feelings of sadness or happiness, controlling anger, using calming strategies when stressed; (4) **cognitive skills** such as organizing and prioritizing work, selecting necessary tools or materials for a task, using sound judgment, having adequate general knowledge; maintaining the necessary mental energy and focus to initiate and complete a task; and (5) **communication and social skills**, including carrying on a conversation, developing a friendship, talking turns, sharing, and exchanging information. Not all performance skills need to be evaluated; only those that are hypothesized as interfering with the child's ability to perform his or her desired occupations. Also, the referral source may have stated specifically some areas for you to pay attention to in your evaluation, such as fine motor or social interaction skills, and then particular attention to these areas would be needed.

Performance skills refer to behaviors, that is, what an individual "does," whereas client factors refer to what a client "has." Client factors in addition to one's values, beliefs and spirituality, include body functions and structures that support or contribute to one's ability to engage in the various performance skill areas.<sup>1</sup> Body functions refer to the physiological and psychological functions of the human body such as respiratory, cardiovascular, sensory and cognitive functions. Body structures refer to the anatomical parts of the body such as bones, blood vessels, lungs, and the brain. In the motor area for example, body structures include joints and muscles, body functions include muscle strength, and joint range of motion (ROM), and motor skills include reaching

for and carrying objects, standing, and walking. Evaluation techniques used by occupational therapists are presented below for each of the performance skill areas defined by the Practice Framework, along with the main client factors associated with each of the skill areas.

### **Evaluation of Motor and Praxis Skills**

It is important to observe the child's ability to perform age-appropriate, meaningful fine motor, gross motor, praxis, visual-motor, and oral-motor skills in the context of play or leisure activities, ADL, preschool/school-related activities, and work activities (for older children) (see Chapter 3). Chapter 3 provides information regarding the normal expectations for the development of motor and praxis skills. Several standardized assessment tools are available and can be administered to evaluate these skill areas (see Chapter 4) in children of various ages, and these tools along with nonstandardized procedures are summarized Table 2-7. Client factors contributing to one's ability to perform motor skills include body functions and structures related to sensory, neuromuscular, musculoskeletal functions. Therefore, evaluation procedures related to each of these areas are also presented in this section.

In the **gross motor area**, OTs evaluate skills such as reaching, bending, walking, sitting upright, running, climbing, jumping, lifting, gross motor play skills, ball skills, and sports skills. It is most useful to observe such motor skills among others, as they are being performed in the context of daily occupations. A child's motor skills develop very rapidly especially throughout the first two years of life, so a thorough understanding of normal and abnormal motor development is essential. A young child's ability to walk or take his or her first steps, typically achieved between 10 and 15 months of age, is viewed as a major gross motor milestone and provides exciting new opportunities for the child to explore the environment and gain some independence. For preschool children, gross motor play includes competencies and safety negotiating playground climbers, slides, and swings and mastering the pedaling of a tricycle. Children also develop skills to enable them to negotiate around obstacles in their home, and preschool environments, climb stairs, balance when

TABLE 2-7

## PROCEDURES FOR EVALUATING GROSS AND FINE MOTOR SKILLS, OCULOMOTOR SKILLS AND PRAXIS

Specific Skill Area	Nonstandardized Procedures	Standardized Assessments
Gross motor skills	Observe and document the child's ability to perform age-appropriate gross motor skills (walking, running, jumping, climbing, hopping, skipping, playing on playground equipment, and playing ball; also see Chapter 3); during play and functional tasks such as dressing, observe child's ability to reach for and carry objects, move around obstacles, over uneven ground; observe balance, strength and endurance, agility and range of movement, coordination, and bilateral integration; ask the child or caregivers about the child's ability to ride a bike, swim, perform in physical education class, and about participation and interest in sports activities	M-FUN <sup>37</sup> ; Motor Assessment for Infants; <sup>38</sup> PDMS-2; <sup>13</sup> BOT-2; <sup>25</sup> AIMS; <sup>39</sup> TIME; <sup>40</sup> GMFM <sup>41</sup>
Motor planning or praxis	Observe the child's ability to perform novel motor tasks, to play with objects in different ways, to be creative in play, and to maneuver through obstacle courses; observe the child perform motor sequences or patterns following verbal directions and then in response to demonstration (imitation of postures games like Simon Says); note the child's ability to perform multi-step functional tasks, such as simple meal preparation, playing sports games, dressing, watering plants, and building with construction toys	SIPT <sup>10</sup>
Fine motor skills	Observe the child's ability to perform age-appropriate fine motor skills (reaching, grasping, and releasing objects; pencil skills; stacking blocks; stringing beads; using scissors; lacing, and doing up clothing fasteners; opening packages; self-feeding; using a computer (see Chapter 3); note the child's grasp patterns, dexterity, and in-hand manipulation skills, bilateral hand use, hand preference, and any postural control and sensory factors that appear to be influencing fine motor function	PDMS-2; <sup>13</sup> BOT-2; <sup>25</sup> Erhardt Developmental Prehension Assessment; <sup>42</sup> Quality of Upper Extremity Skills Test <sup>43</sup>

(continued)

TABLE 2-7

PROCEDURES FOR EVALUATING GROSS AND FINE MOTOR SKILLS, OCULOMOTOR SKILLS, AND PRAXIS (Continued)

Specific Skill Area	Nonstandardized Procedures	Standardized Assessments
Visual-motor skills	Observe the child's ability to perform age-appropriate visual-motor activities, such as play with shape sorters, putting puzzles together of varying difficulty, using scissors; coloring, tracing, design copy, handwriting; and ability to manipulate the computer mouse, and use a keyboard	TVMS-r; <sup>12</sup> Beery VMI; <sup>44</sup> BOT-2; <sup>25</sup> PDMS-2 <sup>13</sup>
Visual tracking and oculomotor	Have the child follow your finger or an interesting object as you move slowly across the visual fields from left to right, straight up and down, and diagonally; note smoothness of eye pursuits, ability to separate eye movements from head movements, ability to follow the moving target with the eyes, saccadic movements, accuracy, and ability to cross the midline smoothly	

M-FUN, Miller function and participation scales; AIMS, Alberta infant motor scale; BOTMP, Bruininks-Oseretsky Test of Motor Proficiency; GMFM, Gross motor function measure; MAI, Movement assessment of infants; PDMS-2, Peabody developmental motor scales-2; SIPT, Sensory Integration and Praxis Tests; TIME, Toddler and infant motor evaluation.

getting dressed, and to keep up when walking with others on outings so that they no longer need to be pushed in a stroller. Between 4 and 6 years of age, children learn many specific gross motor skills that further enhance their social play with others, such as swimming, skating, riding a bike, catching, tossing and kicking a ball. In the elementary years, participation in sports activities, physical education, and unstructured gross motor play such as roller blading or ball play are important occupations for most children. For adolescence, physical fitness, participation in physical education, sports, and physically demanding leisure and work pursuits, and instrumental ADL all involve competencies with gross motor skills.

In addition to conducting informal clinical observations of gross motor skills in context, child and caregiver interviews, and more structured observations of select gross motor activities yield useful evaluation data. When evaluating

children with significant movement disorders, specific areas to examine include their means of and level of independence with mobility and their ability to access the environments that are important to them in their everyday life. In addition, it is important to determine whether they have opportunities to experience and participate in desired sports and other gross motor leisure pursuits, even if modifications are necessary. The application of assistive technology to compensate for motor skill deficits is an important area for occupational therapists and when applicable may also involve specific evaluation procedures (see Chapter 7). Standardized assessments such as the Assessment of Motor and Process Skills,<sup>9</sup> Bruininks-Oseretsky Test of Motor Proficiency-2,<sup>25</sup> Peabody Developmental Motor Scales-2,<sup>13</sup> and Miller Function and Participation Scales<sup>37</sup> are also useful for measuring gross motor skills.

Skill-based assessments identify the motor skills that children have and do not have, how a child's motor skills affect his or her occupational performance, and help to determine the motor developmental levels of children. They also provide insights into the quality of the child's movement, and amount of assistance required to perform certain motor tasks. However, to assist with your intervention planning, you must delve even further to figure out *why* the child is having motor problems, as part of your occupational analyses. In the gross motor area, this involves the evaluation of client factors associated with gross motor performance, including balance, muscle strength, motor coordination, physical endurance, agility or ROM, and motor planning. These client factors are associated with the **neuromuscular and musculoskeletal functions** of the body, and **body structures** such as bones and muscles. It is important to note here that when examining client factors related to gross motor skills and movement, the roles of occupational therapists overlap with those of physical therapists. Therefore, it is important to be aware of evaluation data collected by physical therapists involved with the child, to avoid duplication of services, thereby maximizing the efficiency of the evaluation process.

Evaluation of neuro-musculoskeletal components includes assessment of muscle tone, reflexes, postural control and alignment, ROM, strength, and endurance.

Procedures to evaluate muscle tone and postural control are included in Table 2-11, as they relate to vestibular function, and primitive reflex patterns are discussed in more detail in Chapter 3. Unlike evaluations for adults, formal procedures for evaluating ROM with a goniometer and manual muscle testing to evaluate muscle strength are rarely necessary in an OT pediatric evaluation. More commonly, these motor components are observed informally, and their impact on functional skill performance is noted. However, some children do require formal testing of ROM, such as those with limited ROM owing to an orthopedic injury like a hand injury, those with cerebral palsy or traumatic brain injury who are at risk for joint contractures, or those with juvenile rheumatoid arthritis. Formal testing is important when it is believed that the child's ROM may improve with intervention or when a child may be at risk for losing ROM. Information on conducting formal evaluations of ROM can be found in numerous other sources and therefore is not included herein.<sup>45,46</sup>

Gross muscle testing evaluates the strength of muscle groups that perform specific movements at each joint, whereas manual muscle testing evaluates the strength of individual muscles. Gross muscle testing might involve observing the child perform sit-ups, push-ups, and knee bends; noting their postural control during gross motor play; or asking the child to move his or her limbs or trunk against resistance. Some standardized assessment tools can also be used, such as Bruininks-Oseretsky Test of Motor Proficiency-2<sup>25</sup> which includes a subtest score for muscle strength. Evaluations of children with certain diagnoses, such as spinal cord injury, neuromuscular dystrophies, and peripheral nerve injuries, may necessitate specific manual muscle testing. To perform muscle testing, you must know the muscles of the body and their functions, the anatomic positions and directions of the muscle fibers, and the angle of pull of the joints. Muscle testing cannot be conducted with children who have abnormal muscle tone. Procedures for conducting manual muscle testing can be found in numerous other sources and therefore are not included herein.<sup>45,46</sup>

Physical endurance may be evaluated by noting a child's physical tolerance for performing desired or necessary tasks, and it is usually measured by the duration of time a child is able to perform the activity. Endurance is also evaluated by noting the child's postural control over time during activity, considering heart and respiratory rates, by the distance a child can walk, or run without needing a rest, and by more general reports of fatigue, or need for sleep/rest. As noted earlier, the roles of physical therapists overlap with those of occupational therapists in the evaluation of neuro-musculoskeletal functions and motor control, and sometimes they may evaluate neuro-musculoskeletal child factors together.

OT evaluation of **fine motor and visual-motor skills** is very important because upper extremity function and hand use greatly impacts one's capacity to complete their daily activities and occupations. Fine motor skills such as reaching, grasping, holding, manipulating, stirring, opening packages, and coordinating both hands together, are needed to perform most self-help skills, such as feeding, dressing, and grooming, and homemaking tasks such as cooking and cleaning. School activities require many fine motor skills such as handwriting, using a computer mouse, texting and typing, and using scissors, glue and other manipulatives for completing arts and crafts projects. As with gross motor skills, one of the most effective ways to collect evaluation data on fine motor skills, is by making relevant observations while a child performs the activities and occupations he or she does routinely, that require fine motor skills. Standardized assessments such as the Assessment of Motor and Process Skills,<sup>9</sup> Bruininks-Oseretsky Test of Motor Proficiency-2,<sup>25</sup> Peabody Developmental Motor Scales-2,<sup>13</sup> and Miller Function and Participation Scale<sup>37</sup> are also available for measuring fine motor skills. Standardized testing assists you by determining the aspects of fine motor performance or upper extremity functioning (client factors) that are most problematic (e.g., dexterity, visual-motor integration, eye-hand coordination, bilateral hand use, hand strength) and commonly provides you with a measure of the child's performance in comparison with other children of the same or a similar age. Client factors associated with fine motor skills include hand muscle strength, grip and

pinch strength, dexterity, muscle tone, joint ROM, bilateral coordination, and visual-motor integration.

**Visual-motor integration** refers to how the eyes and hands work together, and this function supports skills such as tracing, writing, using a computer, copying from a blackboard, using the hands for construction tasks like building with blocks, sewing, doing up buttons etc. Administering tests of nonmotor visual perception and of fine motor dexterity and coordination will assist in determining whether skill performance deficits in this area are related more to difficulties with visual perception (see below) or with fine motor dexterity. Clinical observations and standardized tests used to measure visual-motor skills and fine motor skills are included in Table 2-7.

**Motor planning or praxis** skills involve being able to formulate a plan or idea on how to do something, sequencing, and then executing the goal-directed action. Despite no apparent neuro-musculoskeletal, or sensory abnormalities, children with motor planning problems or dyspraxia often appear clumsy. They are often slow to position themselves correctly for motor play, may experience difficulty initiating and playing with novel materials, and they may have trouble adapting to changes in routine, and sometimes lack creativity in their play. To evaluate motor planning abilities, observations of how a child engages in novel activities are important. Motor imitation of simple and gradually more complex body postures and motor sequences can also be conducted. There are also standardized tests, such as the Sensory Integration and Praxis Tests<sup>10</sup> for measuring areas of praxis (see Table 2-7). This test is ideal in that it breaks down praxis into many different types so that more specific information about the kinds of praxis problems a child may have can be determined. Client factors that are believed to impact praxis abilities include cognition (ideation, planning, and sequencing), somatosensory, proprioceptive and vestibular sensory processing (discussed below), and neuro-musculoskeletal functions.

The evaluation of **oral-motor skills**, particularly as they relate to feeding abilities, falls within the realm of OT, although you will often collaborate with speech/language pathologists when evaluating and intervening in this area. Specific oral-motor skills to observe during feeding include opening the

mouth in anticipation of food, lip closure, chewing, tongue mobility, cup drinking, sucking from a straw, and swallowing. Ideally, these skills should be assessed in context (i.e., during the child's typical mealtime or snack time). In addition, caregivers (and the child when applicable) should be questioned regarding the child's oral-motor skills, diet, body weight and nutritional concerns, food preferences, and ability to tolerate and manage various food textures and consistencies. To protect you and the child you touch, wearing gloves is considered best practice when conducting an oral-motor/feeding evaluation because it involves contact with a mucous membrane. Feeding and swallowing can be a life-threatening activity, and it is essential that the parents or caregivers of the child be very involved in the evaluation of feeding.

In addition to conducting observations and other assessment procedures of oral-motor skills, client factors that support oral-motor skills should be evaluated when feeding is identified as an area of concern. Functions including swallowing, oral sensitivity, oral-motor reflexes, oral-motor control and coordination, strength of the muscles around the face, and mouth should be evaluated along with tongue movements. Postural control factors such as muscle tone, trunk stability, head control, neck and trunk stability and movements, and sitting posture should be assessed because these factors influence oral-motor control. Finally, a comprehensive oral-motor evaluation should include assessment of oral structures, including the teeth, lips, gums, tongue, and soft and hard palates.

An understanding of the anatomy of the mouth and pharynx and of the normal process of swallowing is essential for therapists working in the area of feeding and oral-motor functioning.<sup>47</sup> Dysphagia is defined as difficulty in swallowing. Swallowing, which generally takes <2 seconds, includes a voluntary component called the oral phase and two involuntary components called the pharyngeal and esophageal phases.<sup>48</sup> The oral phase involves breaking up food placed in the mouth into a small bolus in preparation for swallowing and includes chewing and moving the food to the back of the tongue, which initiates the swallow reflex. The pharyngeal phase is initiated with the swallow reflex and involves the

following three events: (1) the soft palate elevates and the posterior pharyngeal wall constricts to close the nasal cavity; (2) the larynx elevates and the epiglottis folds downward to cover the open airway (the vocal cords also contract to protect the airway), and the bolus moves through the pharynx; and (3) the bolus moves past the closed airway and the cricopharyngeus muscle relaxes and opens to allow the bolus to pass into the esophagus. During the esophageal phase, the bolus passes through the esophagus to the stomach via peristalsis.<sup>48</sup>

Specific standardized and nonstandardized procedures for evaluation of oral-motor function are presented in Table 2-8. If it is determined that a child is experiencing swallowing difficulties and is at risk for aspiration, further evaluation of swallowing abilities via videofluoroscopy or modified barium swallow should be considered.<sup>49</sup> If a videofluoroscopy has already been done, then the results of the evaluation need to be reviewed and considered as part of your oral-motor evaluation.

### **Evaluation of Sensory-Perceptual Skills**

Sensory-perceptual skills are defined in the OT Practice Framework<sup>1</sup> as “actions or behaviors a client uses to locate, identify, and respond to sensations and to select, interpret, associate, organize and remember sensory events based on discriminating experiences through a variety of sensations that include visual, auditory, proprioceptive, tactile, olfactory, gustatory and vestibular” (p. 640). Therefore, unlike the physiological functions of the sensory systems, sensory-perceptual skills involve the ways we use our sensory systems to feel, learn, hear and listen, see, recognize and locate things in our environment. These skills are obviously very closely associated with the actual sensory body functions such as our vision, hearing, taste, and smell. Therefore, assessment techniques to elicit information about how a child receives, modulates, and processes information from the sensory systems also address relevant skills and body functions as they are defined in the Practice Framework.

First, all child evaluations should include at least a sensory screening, whereby parents are asked whether there are any concerns about vision and hearing, and whether the child has had his or her vision and hearing evaluated. If sensory

TABLE 2-8

## PROCEDURES FOR THE EVALUATION OF ORAL-MOTOR SKILLS AND FEEDING

Skill, Structure, or Function	Nonstandardized Procedures
Oral-motor structures	Visually inspect the oral structures, including lips, jaw, tongue, teeth, gums, and soft and hard palate, and note any abnormalities
Oral-motor control, swallowing, and reflexes	Evaluate sucking, rooting, and tonic bite reflexes; note oral-motor movements during feeding, including chewing ability, lip closure on a spoon and cup, tongue movements, jaw control, initiation of the swallow reflex, and signs of aspirations; note ability to safely manage different food textures; note articulation difficulties
Oral praxis	Note the child's ability to imitate various mouth and tongue movements and movement sequences, blow kisses, whistle
Oral-motor sensitivity	Observe the child's response to touch inside and outside the mouth; ask about the child's food taste and texture preferences
Feeding history	Parents (and older child) should be questioned regarding the child's diet, body weight, and nutritional concerns; food preferences; and ability to tolerate and manage various food textures and consistencies

Adapted from Morris SE & Klein.<sup>47</sup>

processing concerns have been identified as a problem or may be suspected, there are a number of standardized sensory history questionnaires available that can assist you in gathering and organizing information about sensory processing including the various forms of the Sensory Profile,<sup>11,29</sup> The Sensory Processing Measure,<sup>50</sup> the Sensory Rating Scale,<sup>51</sup> and the Sensory Assessment.<sup>52</sup> You may also want to consider administration of the Sensory Integration and Praxis Tests,<sup>10</sup> which is a performance-based test of sensory integration functions. In examining skills, OT evaluations should determine how sensory deficits may be impacting the child's ability to carry out his or her daily occupations through informal observations of how the child is using the senses during play and

other meaningful occupations. More specific techniques for evaluating each sensory system are discussed next.

**Visual processing**, the dominant sense or system used by humans to interact effectively in their environments, is critical to consider in the evaluation process. It is first important to ask caregivers if their child has a history of visual problems or if the child has had a vision evaluation. Review of reports from professionals who specialize in the evaluation and treatment of disorders related to vision and visual perception, such as optometrists, ophthalmologists, and psychologists are helpful if available. Although many aspects of vision assessment are outside the realm and expertise of occupational therapists, some aspects of visual processing and visual perception are evaluated by occupational therapists. In addition to understanding how children use vision to complete functional activities, screening for visual problems should always be part of the evaluation process, and procedures for doing so are included in Table 2-9.

Many standardized tests have been designed to evaluate nonmotor visual perceptual skills (e.g., form constancy, visual memory, visual and figure ground discrimination, visual closure, and spatial relations), such as the Test of Visual Perceptual Skills–Revised<sup>28</sup> and the Motor Free Visual Perception Test–3.<sup>4</sup> Portions of other standardized tests, such as the Sensory Integration and Praxis Tests,<sup>10</sup> and the Miller Assessment for Preschoolers,<sup>54</sup> also have some nonmotor visual perceptual items (see Chapter 4). Educational and neuro-psychologists also routinely evaluate aspects of visual processing, therefore, reviewing assessment data from these professionals is important when applicable. Clinical observations of visual perceptual skills can be conducted by watching a child engage in carefully selected play or self-care activities such as creating block and pegboard designs, building with Legos, drawing and writing, dressing, playing computer games, ball play, and doing puzzles.

Oculomotor skills, including ocular fixation, visual tracking, and scanning abilities are evaluated by occupational therapists when it is suspected that such problems are interfering with the child's ability to engage successfully in their desired occupations. It is important to note that the

TABLE 2-9

## PROCEDURES FOR EVALUATING SENSORY AND PERCEPTUAL SKILLS AND FUNCTIONS

Sensory Skill and Function	Nonstandardized Procedures	Standardized Procedures
Visual processing	Interview caregiver about child's most recent visual examination, and any concerns about the child's vision; Observe the child during tasks requiring vision, such as puzzles, reading, sorting colors and shapes, locating items on a book page and in the environment, copying from the blackboard, computer use/play, ability to move through a space with obstacles, and finding objects in a busy background (such as locating items in full refrigerator, or an eraser in a junk drawer); observe the child's ability to visually track, localize, and visually focus on objects	Motor-Free Visual Perception Test-3; <sup>4</sup> Sensory Integration and Praxis Tests; <sup>10</sup> Test of Visual Perceptual Skills-revised <sup>28</sup>
Auditory processing	Observe the child's ability to locate sound, orient towards a person when his/her name is called, follow simple directions; inquire whether any testing has been done in this area by an audiologist, or psychologist	Sensory Profile; <sup>11,29</sup> Sensory Processing Measure <sup>50</sup>
Modulation and sensitivity to visual, auditory, vestibular and tactile stimuli	Interview caregiver about how the child responds to bright lights or sunlight, and whether the child is over or under-responsive to visual, vestibular (movement), and auditory stimuli; ask about the child's responses to touch such as hugs; comfort level with grooming activities such as bathing, brushing hair, and teeth, clothing of various textiles, and different food textures; ask if the child is aware when getting bumps and bruises; note child's response during activities heavily loaded with tactile stimulation (sensory tables, finger paint, play dough); to physical handling or touch; and loud noises; note child's tolerance or fear of movement, responses to being on raised, unstable surfaces like a platform swing or sitting on a large therapy ball; note the child's responses to fast vestibular input (spinning, swinging, jumping) and slow vestibular input (gentle rocking), and movement preferences	Sensory Profile; <sup>11,29</sup> Touch Inventory for School-Aged Children; <sup>53</sup> Sensory Processing Measure <sup>51</sup>

(continued)

TABLE 2-9 PROCEDURES FOR EVALUATING SENSORY AND PERCEPTUAL SKILLS AND FUNCTIONS (Continued)		
Sensory Skill and Function	Nonstandardized Procedures	Standardized Procedures
Primary somatic functions: light touch, pain, temperature	Apply light touch stimuli with the fingertip or cotton swab proximal to distal, on the dorsal and ventral surfaces of the arms with the child's vision occluded, and ask the child to point to where he or she was touched; pain stimuli can be applied similarly with a safety pin using one sharp and one blunt end, and the child is asked to indicate whether the touch was sharp or dull; to evaluate temperature, fill one test tube, capped with hot tap water and another with cold water; randomly place the tubes in contact with the skin for about 1 sec and ask the child to indicate whether the stimulus was hot or cold	
Tactile discrimination	With the child's vision occluded, touch the child lightly on the hands or arms with your finger tip asking the child to identify where you touched him or her; examine stereognosis by determining whether the child can identify tiny objects (coins, paper clips, marbles, various-shaped blocks) in his or her hands with vision occluded; observe fine motor dexterity and in-hand manipulation of small objects, with and without vision	Miller Assessment for Preschoolers; <sup>54</sup> Sensory Integration and Praxis Tests <sup>10</sup>

vestibular system plays a role in voluntary eye movements by controlling eye movements in response to head movement, and in assisting with one's orientation in space. For example, vestibular-ocular pathways help the eyes remain focused on an object while the head and body move. Clinical observations for evaluating oculomotor skills are included in Table 2-9. Standardized vision assessments that may be used include the Sensorimotor Performance Analysis,<sup>55</sup> which measures visual tracking, visual avoidance, visual processing, and eye-hand coordination; the Erhardt Developmental Vision Assessment,<sup>56</sup> which measures reflexive and voluntary eye movements; and the Pediatric Clinical Vision Screening

for Occupational Therapists,<sup>57</sup> which screens for accommodation, binocular vision, and ocular mobility.

Occupational therapists have less of a role with auditory processing (than visual), but it is important to screen for auditory processing problems, so that if a specific problem is suspected, a referral can be made to a specialist such as an audiologist or neuropsychologist. You should observe and note the child's ability to respond to simple and more complex verbal directions (without the use of visual cues). Note whether young children orient their heads and/or body toward your voice or other noisy objects such as a bell or squeaky toy. Responses to auditory information can also be examined by asking caregivers or teachers how a child responds to verbal directions, and loud noises, and how distractible they are in noisy environments. As with visual processing, the sensory processing questionnaires and self-report measures are useful for identifying auditory reception, processing, and modulation differences.

The evaluation of **somatosensory processing** (response to touch input) includes assessing the discriminative system (perceiving and locating light touch and deep pressure touch, stereognosis, and two-point discrimination), the protective system (sharp versus dull touch, perceiving hot and cold), and tactile modulation including hyper- or hypo-responsivity. Tactile receptors are found throughout the skin and are activated through touch input received external to the body. A complete evaluation of somatosensory functions may be warranted for children with neurologic diagnoses such as spinal cord injury, peripheral nerve damage, or head injury (see Table 2-10). More subtle problems with somatosensory processing may be identified in children with sensory integration problems. For example, poor tactile discrimination is thought to be associated with the development of body scheme and motor planning abilities and is believed to contribute to the development of fine motor skill.<sup>58</sup> Children with tactile defensiveness (hypersensitivity or overresponsivity to touch input) tend to avoid activities heavily loaded with tactile stimuli, such as grooming tasks, playing with art materials, wearing certain fabrics, and may avoid contact with others or feel stressed when in close proximity with others. These more subtle problems with tactile processing can be evaluated through interviews with caregivers, and by using

standardized self-report or caregiver questionnaires. Clinical observations of children involved in activities heavily loaded with tactile stimuli such as playing at sensory tables, or with play dough are also helpful in assessing tactile modulation differences. Specific procedures for evaluating somatosensory processing are included in Table 2-9.

The **vestibular system** includes neural receptors that are located in the semicircular canals, the utricle, and the saccule of the inner ear. This system is stimulated by movement of the head and is influenced by gravity. Vestibular functioning plays an important role in awareness of body position and movement in space, and postural control, which includes muscle tone, equilibrium reactions and balance functions, and in stabilizing the eyes during head movements.<sup>61</sup> Evaluation of vestibular processing should therefore include assessment of postural control factors, including righting, equilibrium, and protective reactions, muscle tone, and balance skills. Refer to Chapter 3 for a description of normal development of these reactions and other neuromotor functions. The evaluation of postural control factors depends on the age of the child. In infants and young children, as well as older children with significant motor impairments (such as those with cerebral palsy), the focus is on whether they have achieved appropriate developmental motor milestones, the development of antigravity postures, the development of postural reactions, and integration of primitive reflex patterns. In older children (those ambulating well), your evaluation will involve assessing the child's postural control and proficiency during gross motor play and functional skills that require balance, such as riding a bike, going up and down stairs, playing hopscotch, walking on a balance beam, and getting dressed.

Proprioceptive processing refers to the functioning of specialized receptors located in the muscles and joints, and stimulated through active movement. Proprioception gives us information about the spatial orientation of our body, the rate and timing of our movements, the amount of muscle force being exerted, and how fast and how much a muscle is being stretched.<sup>61,62</sup> Proprioception plays an important role in the development of one's body awareness, motor planning skills, and in the accuracy of one's motor movements.<sup>63</sup> Because it

is often difficult to separate the contributions of the vestibular system from those of the proprioceptive system during movement activities, assessment of these systems often occurs simultaneously. In addition to examining postural control factors related to vestibular and proprioceptive processing, it is also important to evaluate the child's response to or modulation of vestibular and proprioceptive sensory stimuli. Children may be overly sensitive to certain types of movement activities and may crave others. For example, some children may fear heights and avoid climbing on playground equipment, whereas others may crave spinning, or be constantly jumping or have trouble sitting still. Others may become overly excited by gross motor play. Vestibular and proprioceptive sensory stimuli affect our levels of arousal or activity. Therefore, it is important to observe closely how a child responds to certain forms of vestibular and proprioceptive sensory information. More specific procedures for evaluating vestibular and proprioceptive processing are included in Table 2-10.

### **Evaluation of Cognitive Skills**

Cognitive skills are defined in the OT Practice Framework<sup>1</sup> as “actions or behaviors a client uses to plan and manage the performance of an activity” (p. 640), such as being alert and aware of one's surroundings, organizing and prioritizing work, and for selecting necessary tools or materials for a task. Does a child use sound judgment and have adequate knowledge for decision making? Can a child initiate, sequence, and complete a task in a timely manner, and solve problems? Can he or she maintain the necessary mental energy and focus to complete a task? Cognitive skills are used to plan, initiate, organize, manage, monitor, and modify our actions to complete our daily activities, and to allow us to multi-task. These skills also contribute to a child's ability to perform activities related to school or education, and work. Cognitive skills may be evaluated informally through observations of children completing their daily activities and during play. You may observe whether children are aware of their surroundings, what they pay most attention to, how they are making decisions, how materials are gathered, and organized. Do they go about their play in a logical, organized manner? How

**TABLE 2-10** PROCEDURES FOR THE EVALUATION OF PROPRIOCEPTIVE AND VESTIBULAR PROCESSING

<b>Specific Area</b>	<b>Nonstandardized Procedures</b>	<b>Standardized Assessments</b>
Vestibular: Postural control and balance	Evaluation of righting, equilibrium, and protective reactions (see Table 3.6); assessment of antigravity postures, including ability to assume and maintain prone extension and supine flexion postures; observations of play activities requiring balance, such as walking on a line or balance beam; standing on tip-toes, playing on suspended equipment/swings; hopscotch, or riding a bike	MAI; <sup>38</sup> BOT-2; <sup>25</sup> SIPT; <sup>10</sup> TIME; <sup>40</sup> Pediatric-CTSIB <sup>59,60</sup>
Muscle tone	Note the amount of resistance felt when muscles are manually lengthened; note the relative softness (low tone) or tension (high tone) in the muscle bellies at rest (usually tested on upper extremities); note any lack of joint mobility (high tone) or hypermobility (low tone), commonly with shoulder flexion/extension, wrist and elbow flexion/extension, hip adduction/abduction, ankle plantar/dorsiflexion	MAI; <sup>38</sup> TIME <sup>40</sup>
Proprioception	Note whether the child can imitate simple postures and movements; with eyes closed and arms outstretched, test whether the child can bring his or her index finger in to touch his or her nose alternatively with each hand; with eyes closed, move the child's arm in a certain direction and ask the child to replicate the movement with the other arm; note how much the child uses his or her vision to navigate in play and maintain balance	SIPT; <sup>10</sup> The Sensory Processing Measure <sup>50</sup>
Modulation of vestibular and proprioceptive stimuli	Note the response to heavy pushing and pulling activity (proprioceptive stimuli) swinging, spinning, jumping and climbing.	Sensory Profile; <sup>11,29</sup> The Sensory Rating Scale <sup>51</sup>

CTSIB, Clinical test of sensory interaction for balance; BOTMP, Bruininks-Oseretsky Test of Motor Proficiency; MAI, Movement assessment of infants; SIPT, Sensory Integration and Praxis Tests; TIME, Toddler and infant motor evaluation.

do they solve problems, and do they go about their tasks efficiently and safely? The Assessment of Motor and Process Skills<sup>9</sup> and its School version<sup>27</sup> are examples of standardized assessment tools specifically designed to evaluate cognitive or process skills in the context of meaningful occupational engagement.

Client factors that contribute to one's ability to perform cognitive skills include brain functions and thought processes. They are categorized as mental functions in the OT Practice Framework, and include both specific and global mental functions. Specific mental functions include attention, memory, perception, thought processes, sequencing and higher-level cognitive skills such as judgment, concept formation, cognitive flexibility, meta-cognition and insight. Emotions, perception, one's self-concept, and coping skills are also included as specific mental functions and are discussed later as part of emotional regulation skills. Global mental functions include consciousness/levels of arousal and awareness, orientation to person, place time and reality, temperament, emotional stability, personality, energy, motivation and drive, and the physiological process of sleep. Prior to presenting more detailed evaluation information related to specific and global mental functions, it is important to acknowledge special education teachers, educational psychologists, psychiatrists, and speech/language pathologists who are professionals with whom you may work, who also often perform evaluations of cognitive functioning. Psychologists administer tests of intellectual functioning, learning skills and styles, and verbal and non-verbal cognitive skills. Educators may administer tests related to academic skills and achievement, and speech and language pathologists may focus on communication and language, and related cognitive skills. As occupational therapists, it is important to be aware of the normal development of cognitive skills which is covered in Chapter 3. In particular, during the evaluation process, acquiring an understanding of how cognitive deficits are impacting the child's ability to play, learn and perform desired skills and occupations is essential. More information and strategies for evaluating specific and global functions related to cognitive skills are provided below.

Evaluation of factors related to **specific mental functions** of infants and very young children can be obtained by observing their abilities to recognize familiar versus unfamiliar people and objects, and by observing their play with age-appropriate toys that require cognitive skills. Through play with objects, note the child's understanding of simple cause-effect relations, object permanence, spatial concepts, and problem solving. Toys such as "push the button" electronic toys, pop-up toys, simple puzzles, shape sorters, and simple construction toys provide opportunities to observe specific mental functions. Cognitive deficits in preschool children often contribute to difficulties with language acquisition and comprehension, and challenges with play activities that require matching, sorting, and classifying. Preschool children with cognitive deficits may also have motor planning and sequencing difficulties, poor safety judgment, and a general lack of awareness of objects and others in their environment. For example, they may need close supervision or physical assistance to be safe on playground equipment, and they may experience difficulty in learning concepts such as colors, shapes, and numbers and in figuring out ways to play with novel toys or activities. Many developmental screening tools used by occupational therapists (and other developmental specialists) include cognitive test items such as the Miller Assessment for Preschoolers<sup>54</sup> and the Mullen Scales of Early Learning<sup>64</sup>. The Bayley Scales of Infant Development-3<sup>17</sup> includes a comprehensive scale for measuring mental functions in infants and young toddlers.

Attention, judgment, and problem-solving abilities can be assessed informally by observing children perform age-appropriate functional tasks or play, or school-related activities. It is important to ask teachers of school-aged children about their academic abilities in reading, math, and writing, and for you to be aware of the results of any cognitive testing that has been done by other professionals. Methods for informally assessing cognitive functions of children are included in Tables 2-11 and 2-12.

OT evaluation of client factors related to **global mental functions** relate mostly to emotional regulation skills which are addressed in the next section, with the exception of levels of consciousness and orientation which are discussed here as

**TABLE 2-11** INFORMAL EVALUATION METHODS FOR ASSESSING COGNITIVE SKILLS IN INFANTS AND YOUNG CHILDREN

<b>Cognitive Skill</b>	<b>Informal Evaluation Methods</b>
Ability to recognize familiar vs. new or novel items or persons	Note the child's response (facial expression, reaching behavior) to parents vs. strangers; note the child's interest level with novel vs. familiar toys
Attention/level of arousal/mental energy	Note behavioral cues of alertness such as facial expressions, eye focus and visual tracking during play and interactions; note the length of time the child engages in a particular activity; inquire about the child's typical sleep/awake patterns; note the child's ability to persist when challenged
Object permanence	Note whether the child will look for a desired object when it is presented to the child, and then hidden
Cause-effect relationships	During play, note the child's ability to activate cause-effect toys, and use a computer touch screen to make choices
Adaptation	During play-based and functional activities, note anticipatory behavior, ability to learn from errors, and ability to adjust behavior according to environmental cues and feedback
Temporal organization	Note the child's ability to sort shapes, colors and like objects such as animals vs. pieces of clothing; note the child's ability to initiate and sequence steps of a task
General knowledge and knowledge of basic concepts	Note the ability of preschool-aged children to identify shapes, colors, and numbers, and their understanding of size concepts. Can the child stack stacking toys? Note their ability to use objects for their intended purpose; note safety judgment and ability to express a desire for assistance; ask child to give name, age, town/city where they live
Expressive and receptive language	Note the child's ability to recognize own name, follow simple and multi-step directions; note use of expressive language such as the length of his/her sentences, ability to express wants, ability to respond appropriately to simple questions; ask parents about the child's use of language

**TABLE 2-12** EVALUATION METHODS FOR ASSESSING COGNITIVE SKILLS IN SCHOOL-AGED CHILDREN AND ADOLESCENTS

<b>Cognitive Skill</b>	<b>Informal Evaluation Methods</b>
Orientation to person, place, time	Ask child his/her name, where they are, date and time; note any disorientation or confusion
Energy level and attention	During play, self-care or school-related activity, note the child's ability to attend to and focus on the task at hand; note the length of time the child is engaged in a specific activity, the child's ability to persist when challenged, and the child awareness of what is going on around him or her
Memory	Note the child's ability to recall or recognize people or events, and to perform tasks that have previously been learned; note the child's ability for new learning by presenting/teaching the child a novel task, such as a computer or card game; ask the child to tell you what he/she did earlier in the day
Planning, organizing, and sequencing	Note the child's ability to map out a logical, step-by-step approach to tasks and to perform multi-step functional activities such as his or her morning self-care routine; ask about child's ability to complete homework, keep his or her desk at school organized, keep bedroom tidy; ask about the child's ability to learn and play games with multiple steps and rules
Math and reading skills	Ask the child's teacher or parent how the child is performing in academic subjects such as math and reading; ask the child to read a paragraph and complete simple addition and subtraction math problems
Judgment and problem solving	Ask caregiver about the child's safety around the stove, strangers, crossing the street, on playground equipment etc.; note the child's ability to solve problems, learn new skills independently, and learn from errors; note the child's ability to play safe

supporting cognitive skills. In infants, problems with global mental functions are often associated with a lack of interest in exploring the environment or apathy, and with difficulty with sleep and emotional regulation. They may sleep too much with only short periods of active-alert time, or they may experience difficulty falling asleep, with excessive periods of agitation. Such infants may have difficulty calming down when upset and may cry excessively (see Chapter 7, OT role in the neonatal intensive care units). Assessment tools aimed at measuring behavioral regulation including sleep-wake cycles are helpful in uncovering global mental impairments in infants and very young children. Children with acquired brain injuries, or severe and profound intellectual impairments require more formal evaluations of global mental functions. The Modified Glasgow Coma Scale for Infants and Children<sup>65</sup> and Ranchos Levels of Cognitive Functioning<sup>66</sup> are common assessment tools used to evaluate levels of consciousness/arousal, orientation, and attention in children with acquired brain injuries. The Dynamic OT Cognitive Assessment<sup>66</sup> is a standardized test that measures orientation, spatial perception, praxis, visuomotor organization and thinking operations that can be used with children with acquired brain injuries, as well as with those with learning or other intellectual impairments.

## Evaluation of Emotional Regulation

**Emotional regulation skills** are defined in the OT Practice Framework<sup>1</sup> as “actions or behaviors a client uses to identify, manage, and express feelings while engaging in activities or interacting with others” (p. 640). For children, this includes being able to persist at a task when challenged, responding appropriately to the feelings of others, showing appropriate feelings and emotion in a given situation, controlling anger, using calming strategies when stressed, and being able to recover from being hurt or disappointed. As with the cognitive area, psychologists, psychiatrists and councilors play a vital role in supporting children with emotional regulation, and behavior challenges. Regardless of the setting in which you work, you will see children with psychosocial, and other emotional and behavioral difficulties. Such children may

have a documented mental disorder such as attention-deficit hyperactivity disorder, depression, or anxiety disorder, or they may be experiencing psychosocial or emotional difficulties in conjunction with other physical, neurodevelopmental, or learning disorders. You may be asked to evaluate a child to assist in determining whether he or she fits the diagnostic criteria for a mental disorder, as OT evaluations are valuable sources of information that contribute to the diagnostic process. As discussed in Chapter 1, occupational therapists work in community health centers, children's psychiatric hospitals, facilities, or residential settings, where the primary concerns of the children seen those settings are related to their mental health, social-emotional development, and behavior. According to the Practice Framework, body functions related to emotional regulation skills are categorized under specific mental functions (emotions, self-concept and self-esteem), and global mental functions (orientation, temperament and personality, energy and drive, and emotional regulation). The evaluation techniques discussed below address these client factor, body functions, as well as emotional regulation performance skills.

In preparing for your evaluation of a child with suspected problems in the emotional regulation performance skill area, it is important to determine whether any precautions are necessary, or whether specific activities or approaches would be ineffective or counterproductive in your evaluation. When evaluating children and adolescents with a history of behavioral problems, it is important to have some idea of how to approach the child to avoid or minimize difficult or dangerous situations, such as temper outbursts, aggressive behavior, or emotional upset, and to be able to elicit the child's best performance. Common procedures used to evaluate emotional regulation skills include (1) observations of behavior, particularly naturalistic observations; (2) interviews and unstructured play with the child; (3) caregiver interviews; (4) standardized testing, which typically includes questionnaire-type assessment tools and behavior rating scales completed by the child, teacher, or a caregiver; and (5) projective techniques or expressive media.

For infants and toddlers with suspected emotional regulation concerns, OT evaluations should address coping skills, such as the ability to self-soothe or be calmed by others, the child's affect, level of interest in objects, and engagement with others. The development of healthy attachment behaviors with parents or caregivers should be explored, as well as the child's ability to express oneself. The evaluation of self-regulatory behaviors, temperament, level of interest and engagement in social interactions, self-expression, interests, and self-concept in infants and young children can largely be accomplished through informal observations of the child's play and through caregiver interviews. This evaluation includes observing their interactions with and interest in playing with age-appropriate toys, how they socially interact with you, and their interactions with their parents and others during play or other activities. Parents provide a wealth of information about their child, including his or her temperament, sleep/wake patterns, attachment behaviors, and ability to cope with stress. Some ways to evaluate attachment behaviors are discussed by Hirshberg<sup>67</sup> and standardized assessment tools for measuring infant psychosocial and emotional development are included in Chapter 4 (see Table 4-6).

For preschool and school-aged children, it is important for you to determine how the child's psychosocial and emotional functioning impacts his or her ability to function in important, everyday tasks and activities. These activities include play, being able to form and maintain healthy peer and family relationships, and to be able to follow the routines at child care, preschool or other school settings. In addition, it is important to understand the extent to which the child is developing a positive self-image, and their overall level of happiness or contentment with their daily lives. Naturalistic observations are very helpful in evaluating behaviors associated with a child's social and emotional development, and behavior. This may include classroom observations, and observation of play, and of interactions with peers, parents and other caregivers. It is important to gain information regarding the child's likes and dislikes, behavior in structured and non-structured situations, and how the child typically responds to direct requests and challenges, especially when

asked to do something he or she does not wish to do. Noting the child's interaction style with peers, family members, and persons of authority, and coping skills is also important. Parent interviews, as well as interviews with others who care for or see the child on a regular basis (such as teachers), and child interviews are an important part of the evaluation. Interviews with children older than 10 years of age are particularly helpful for gaining information about the child's values, interests and self-concept, social and interpersonal skills, coping skills, and self-control. Interviews with children also provide information about their mental status, thought processes, and affect. You may need to refer the child for a more comprehensive and in-depth evaluation by a psychologist or other behavioral specialist when significant concerns are identified. Some standardized assessment tools for evaluating psychosocial skills, behavior, and emotional development in preschool- and elementary school-aged children are included in Chapter 4 (see Table 4-5).

As with younger children, the evaluation of psychological, psychosocial, and emotional functioning in adolescents includes observations of behaviors and consideration of important environmental factors such as the family system, school life, and relationships with family members, peers, and other important persons in their lives. Observations may be conducted in structured settings, such as during therapeutic group sessions, or in unstructured settings, for example, during a free study period at school. It is important to note how psychosocial, emotional, and other psychological factors are affecting the adolescent's thought processes, feelings about oneself, and ability to relate to others, as well as their ability to perform self-care, school, social, and leisure activities. Some standardized assessment tools to examine the psychosocial-emotional area in adolescents are included in Chapter 4.

Incidents like the shootings at Columbine High School in Littleton, Colorado, in 1999 by two troubled high school students which resulted in the deaths of students and teachers, brought to the forefront the need to determine the potential of individuals to do harm to themselves or others. Bullying has also been a topic that has received more attention

in the past ten years, due to the negative impact it has on child safety, and on the emotional health and well-being of children. Interviews with adolescents that include mental status examinations are extremely valuable for extracting information about the student's fears, concerns, coping skills, and feelings about himself or herself, and others, as well as information about their interests, and hopes and dreams for the future. When individuals have difficulty expressing themselves in words or have suppressed thoughts and feelings, the use of projective techniques or expressive media is often useful<sup>68</sup>. Expressive techniques may be used to gain information about self-concept, self-awareness, feelings, and emotions. Drawing, painting, use of clay/pottery, creative writing, dance, drama and simply creative forms of play are examples of expressive media that occupational therapists might consider using as part of the evaluation process.

## Evaluation of Communication and Social Skills

**Communication and social skills** are defined in the OT Practice Framework<sup>1</sup> as “actions or behaviors a person uses to communicate and interact with others in an interactive environment” (p. 641). These include skills such as the ability to initiate and carrying on a conversation, maintain acceptable physical space when interacting with others, developing friendships, taking turns, sharing, and exchanging information through verbal exchanges, and being able to use appropriate facial expressions and gestures. Speech/language pathologists have expertise in these areas and should be consulted for in-depth evaluations when problems with communication are identified. It is, however, important for you to determine how a child's communication influences his or her ability to participate successfully in daily occupations, and socially interact with others. Normal development of communication abilities and language is described in Chapter 3. This information should be consulted to determine whether infants and children of various ages are achieving major communication, social, and language milestones at the appropriate ages.

Most developmental screening and evaluation tools, such as the Miller Assessment for Preschoolers,<sup>54</sup> the Vineland Adaptive Behavior Scales,<sup>14</sup> the Mullen Scales of Early Learning,<sup>63</sup> and Bayley Scales of Infant Development, 3rd edition<sup>17</sup>

include test items, and/or separate scales that assess and measure communication, language, and social skills. A sample of standardized assessment tools for evaluating social skills is included in Chapter 4 (see Table 4-6). The Pediatric Evaluation of Disability Inventory: Computer Adaptive Test<sup>22</sup> has a separate scale for measuring social skills, and the Evaluation of Social Interaction<sup>69</sup> is an excellent, performance-based tool which addresses this area.

When screening an infant's or toddler's communication and social skills, it is important to note eye contact when interacting with others, whether they look up when their name is called, whether they can follow simple directions, and whether they are able to express their needs and wants. For children not yet talking, note spontaneous verbalizations or sounds, and their use of communicative gestures (such as pointing, and waving bye-bye), and their ability to imitate sounds and simple words. For children who are speaking, note how easy it is to understand what they are saying (articulation), how many words they typically string together to construct phrases or sentences, and gather a general sense of their vocabulary. Also, determine the functional purposes of the language used, such as to get needs met, to share information and comment, to ask questions, etc. In relation to social behavior, observe young children's attachment behaviors with their primary caregivers, and for their comfort level, interest in, and preference for interacting with caregivers and peers. Bonding with caregivers is essential for the child's social and emotional growth and development, and is largely dependent on the caregiver's ability to read their infant's cues, and the infant's ability to respond to their caregiver's effort to soothe or interact with him or her. If possible, observing a child interacting with peers in natural contexts such as preschools, a play group, or on the playground is useful to gather information about how the child relates to others, their interest in forming relationships others, the ability to follow the social cues of others, share, and take turns.

For children who use or may benefit from the use of augmentative communication devices, it is important for occupational therapists to analyze the demands (motor and cognitive) of operating a particular device and to determine

whether the child has the necessary abilities to use the device practically and functionally. Evaluations conducted for selecting or determining the feasibility of using augmentative and assistive communication devices is typically a team process, and the OT role in this specialized area of evaluation is covered in more detail in Chapter 7.

Communication and social performance skills may be affected by a number of underlying client factors (body functions and structures) which when explored in the evaluation process assist in determining “why” a child may be experiencing skill deficits in this area. An understanding of the impact of relevant body functions also assists with program planning. Body functions in the cognitive area, such as memory and conceptual understanding, support language development. Sensory functions such as hearing, and motor functions such as muscle tone, motor coordination and strength of the muscles that support speaking, and oral praxis, all play a role in communication, and the ability to speak, learn and use language. Problems with social interaction skills may stem from immature social-emotional development, behavioral or psychological problems. If suspected that these body functions are contributing, then further assessment of these motor and mental functions should be conducted. Most body structures that support communication also support feeding (mouth, tongue, lips, respiration). Other structures are directly involved in voice production such as the vocal cords. Information regarding these body functions and structures should therefore also be gathered when it is suspected that these structures are interfering with the performance and development of communication and social skills.

In summary, this step in the evaluation process addressed techniques for gathering information regarding the five performance skill areas included in OT Practice Framework; motor and praxis skills, cognitive skills, sensory-perceptual skills, emotional regulation skills, and communication/social skills. The assessments of client factors including body functions and structures that support or hinder the performance of these skills were also discussed. In conducting evaluation activities related to client factors and performance skills, it is important that you never lose sight of the child’s performance

of his or her desired occupations. This step helps you to analyze how occupational performance is impacted by the performance skills, and client factor problem areas that you evaluate, identify and ultimately address when necessary. Desired outcomes of OT intervention should always be directed to the child's ability to perform their desired and necessary occupations, and a thorough understanding of the performance skills and client factors that influence occupational performance is an important step towards achieving successful occupational performance outcomes.

### **Step 8: Analysis of Occupational Performance: Evaluating Activity Demands, Environments, and Contexts**

The analysis of occupational performance is a complex process that requires the consideration of **activity demands, environments, and contexts** in addition to the client factors, performance patterns, and performance skills previously discussed. Although evaluation of activity demands, environments, and contexts are presented here as a separate step after the analysis of performance skills and client factors, evaluation of these factors is an ongoing process that can be conducted at any time during Steps 4 to 9.

Activity demands are defined in the OT Practice Framework<sup>1</sup> as the “the aspects of an activity which include the objects and their properties, space, social demands, sequencing or timing, required actions or skills, and the required underlying body functions and structures needed to carry out the activity,” p. 638. More simply put, this is the part of your evaluation where you may perform a detailed activity analysis on specific tasks and activities associated with the occupations of the child you are evaluating. Usually, you direct your attention to the activity demands of the tasks and activities where he or she is experiencing the most difficulty. Sometimes activity demands can be easily modified to assist a child in being more capable of performing the activity or occupation. Therefore, considering interventions related to task modification or compensation as an approach may be most effective. Activity demands are evaluated and identified most efficiently by observing the child performing the activity in

context, and addressing the following questions: What are the characteristics of the activity and the steps involved in performing it? What is it about the activity itself that makes it easy or difficult for the child to be successful in performing the activity? What are the motor, social and cognitive skills necessary to complete the activity? Can the activity be done in other ways? How might the activity be modified, or some of the demands eliminated altogether, so that the child could be more successful? Can the activity be broken down into a sequence of steps? If yes, which of the steps are presenting the most problems for the child? Comprehensive processes for conducting activity analyses are provided in most OT textbooks, such as Willard and Spackman's OT, 11th edition.<sup>70</sup> A complete understanding of the activity and associated tasks will help you determine whether the child's skills and abilities are sufficient in allowing him or her to perform the occupation successfully. The components of an activity analysis are listed in Box 2-5.

Context and environment are viewed together as one component in the OT Practice Framework,<sup>1</sup> and include

### Box 2-5

#### COMPONENTS OF AN ACTIVITY ANALYSIS

- Brief description of the activity
- Objects used and their properties
- Space demands
- Social demands
- Sequencing, timing and patterns
- Required skills/observable actions
- Required body structures and functions
- Safety hazards
- Ways to adapt the activity
- Ways to grade the activity

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Contributions from: Crepeau EB, Schell BB. Analyzing occupations and activity. In: Crepeau EB, Cohn ES, Schell BAB, eds. *Willard & Spackman's Occupational Therapy*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009: 359–374.

the cultural, personal, temporal, virtual, physical and social conditions within and surrounding the client that impact their occupational performance. As with activity demands, context/environments are important evaluation components because these factors are often the most easily addressed or modified as part of the intervention process to promote occupational performance.

Contextual/environmental evaluations are sometimes referred to more broadly as ecological evaluations. Ecological evaluations examine the interaction patterns, and fit between individuals and their respective environments, with consideration of physical, social, and cultural influences. In your work settings, and where your clients engage in their occupations, it is important for you to gain an understanding of the physical and social aspects of environments, the activities performed within those environments, as well underlying philosophies of the people, along with their cultural values and characteristics.

Evaluation of context/environment is first addressed in preliminary data collection, through your interviews, and initial observations as you gather information about the child's home and family, culture, school, child care setting if applicable, and other places where the child spends time. Several assessment tools can be used to uncover this information (see Chapter 4, Table 4-6). In examining cultural contexts, aim to gain an understanding of behavior standards, activity patterns, and customs in the places where the child engages in his or her occupations. Cultural contexts not only reflect one's ethnic background, but values, norms, and expectations for behavior, such as a teacher's classroom rules. In working with children and families, routines around feeding, bedtime, and other child-rearing practices are very culturally determined, and therefore need to be explored so that you have an understanding of what is valued and most important to the family. The physical environment includes accessibility factors such as obstacles in the environment that may hinder a child's functional mobility, or limit maneuverability of assistive mobility devices, such as wheelchairs and walkers. In the home, safety factors such as the need for child-proofing a home, cleanliness, and the child's ability to access their belongings, or toys easily and safely should be examined.

The amount and type of visual, auditory, and tactile sensory stimulation or distractions that are apparent in the settings where the child is expected to concentrate and learn, should be noted.

In examining preschool and other school, or work settings, take note of how furniture is laid out, and how materials are organized and can be accessed. Preschool settings for example, should have a variety of toys for fine motor and gross motor play, imaginative play, and sensory exploration. A preschool classroom may be divided physically into various areas for specific types of activities such as snack, rest, group activities, table top fine motor play activities, and literacy activities with books and computers. Classroom and child care environments should be clean, and relatively uncluttered, with child-sized tables and chairs. Evaluation of the social context and environment is addressed by noting the number and characteristics of the people in the setting. Expectations for socially relating to others, communicating, sharing, and developing and fostering relationships with others should also be determined through the collection of interview and observation data.

In examining context, inquire about the child's scheduling of activities within the many contexts they experience regularly throughout their daily life. For school-aged children, gain an understanding of the child's teacher's instructional philosophy and teaching approaches. It may be that a child is not succeeding because there is a mismatch between the teacher's style, and teaching approaches, and how a child learns most optimally. Environments/contexts that have clear expectations for behavior, some structure, are nurturing and safe, and provide ample opportunities for all kinds of play, exploration, and social interactions are ideal for young children.

In summary, as an important part of the evaluation process, attending to the context/environment uncovers important factors that may be supporting or hindering a child's ability to successfully perform their occupations. Like activity demands, environmental characteristics can often be fairly easily modified (particularly physical and social aspects), providing effective intervention options. Finally, consideration of natural context provides the most direct, and practical information regarding how a child goes about their daily occupations, and how the quality of their performance is viewed by others.

## **Step 9: Concluding Your Evaluation with the Child**

As your evaluation session comes to a close, you need to decide what you intend to do next, and let the child and family members, nursing staff, or teacher know of your plans. Depending on your practice setting and how the initial evaluation session went, this might include scheduling another appointment to complete the evaluation if you could not gather all the necessary information. Another next step to consider is that you may want to schedule a time to go over the evaluation results with the parent, or if appropriate to your setting, you may plan to have a team meeting with others who have also completed evaluations with the child. In some settings, you may be ready to discuss the evaluation results, develop an intervention plan, and set up an appointment to begin intervention. More often than not, you will need more time to review all of the evaluation information you have gathered, to score and interpret any standardized tests, and to synthesize the evaluation data together to begin the intervention planning process. With young children, it is always nice if there is time to allow the child an opportunity to play for a few minutes with their favorite toys/activity prior to leaving. Be sure to thank the child and others who were involved in the evaluation, and commend them on all of their good work. You will need to pick up all your assessment materials, and spend some time making notes as it is important that you document your observations and any other information that you believe is important. Writing down plenty of notes is critical so that you do not forget important information.


## **Step 10: Interpreting, Synthesizing, and Summarizing Your Evaluation Data**

After your initial evaluation is complete, and you have scored and interpreted the standardized assessment tools that were administered (see Chapter 4 for guidelines on how to score and interpret standardized tests), you need to synthesize and summarize all of your evaluation data. For many occupational therapists, this step is the most complex and challenging

portion of the evaluation process. Begin this step by reminding yourself of the purpose of the evaluation, the specific referral questions that were asked of you, and what you learned about child and parent priorities as part of the occupational profile. You want to be sure that you clearly address the referral questions with data to support your findings, and that you are well-prepared to begin the intervention planning process.

The synthesis of evaluation data from multiple sources specifically for intervention planning is somewhat similar to analyzing data from a research study. The process involves gaining an understanding of the child and family, and of the child's ability to participate in his or her valued occupations, as well as a detailed analysis of "why" the child is experiencing difficulty in the activities and occupations identified as being of concern. Then, this information is used in conjunction with factors associated with your specific service delivery system and setting, your skill set and preferences, and other practical and program considerations to formulate an appropriate intervention plan. More often than not, when working with children you will also collaborate with other team members during the intervention planning phase, so you need also to consider your unique role and the roles of others in the intervention planning process. The interpretation and synthesis process is broken down further for you into a four-step process outlined in Box 2-6, and requires you to apply all types of clinical reasoning discussed in Chapter 1. Each of these four steps is discussed in more detail in the following subsections. Although this process is presented as a series of sequential steps, it is important to note that the last two steps are often carried out simultaneously.

**a) Formulation of the Occupational Profile:** You begin the interpretation, synthesis, and summarization of all of your evaluation data by formulating a brief narrative about the child, an occupational profile. The occupational profile as noted in Step 6 describes who the child is and includes key information such as the child's age, areas of concern for OT; relevant medical or diagnostic information, characteristics of family, school, or child care programs; a summary of the interests and main activities/occupations of the child; and child and family

Box 2-6

## SYNTHESIZING EVALUATION DATA FOR INTERVENTION PLANNING

**Step One: Formulation of the occupational profile.** Who is this child and what are important family characteristics? What are the main presenting problems? What are the primary occupations, including the child's school program and extracurricular activities and interests?

**Step Two: Identification of the child's occupational strengths and challenges.** What areas of occupation (e.g., activities of daily living, education, work, social participation, and play) are presenting challenges for this child? What does this child excel at?

**Step Three: Identification of performance skills and child factors influencing occupational performance.** What specific skills, body functions, and structures are interfering with or supporting the child's ability to perform valued activities? Are you confident that the results of standardized tests reflect the child's true abilities? How does your client's performance compare with that of typical children or children with the same diagnostic condition? How does the child's performance compare with his or her performance in previous evaluations?

**Step Four: Identification of contextual factors and activity demands influencing occupational performance.** How and where is the child expected to perform his or her daily activities, and under what conditions? What objects, skills, and actions are required for the child to perform his or her valued activities? What socio-cultural factors impact the child's occupational performance? What aspects of the physical environment support or hinder the child's abilities?

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strengths, challenges, and priorities. The occupational profiles provided in Boxes 2-2 to 2-4 illustrate ways of writing the narrative concisely, but with enough information for the reader or listener to develop a basic understanding of the child, and why he or she is being seen by OT. Most information included in the narrative is gained through the data obtained from parent

interviews, review of medical and educational records, and informal observations of the child.

**b) Identification of the Child's Occupational Strengths and Challenges:** Using a top-down approach to evaluation, begin by summarizing the child's ability to perform his or her valued occupations such as personal and instrumental ADL, social participation, play, and school activities. What are the skills and activities presenting the child with the greatest challenges? What can the child do well? The OT Practice Framework<sup>1</sup> will assist you in identifying the areas or types of occupation to include. Results from functional or occupation-based assessment tools such as the Pediatric Evaluation of Disability Inventory—Computerized Adaptive Test<sup>22</sup> and the School Function Assessment<sup>24</sup> are helpful when summarizing a child's ability to perform valued and necessary occupations and associated functional activities. Consider the priorities discussed by the child, the child's parents, and other significant individuals (e.g., the child's teacher). What are the most important roles and activities the child is involved in that are posing problems? Are there challenges with performance patterns and daily routines? This information help you determine the important areas to address with intervention, and in developing the child's long-term intervention goals and desired occupation-based outcomes.

**c) Identification and Interpretation of Performance Skills and Child Factors Influencing Occupational Performance:** The results of tests/assessments designed to measure specific child factors and performance skills provide information about why a child may or may not be able to engage successfully in their occupations. In this step, you analyze the data collected regarding relevant motor and praxis skills, sensory-perceptual skills, emotional regulation, cognitive skills, communication, and social skills that are impacting the child's occupational performance. For example, results from assessment tools and observations examining cognitive skills and mental functions may help answer if underlying memory or organizational difficulties are contributing to the child's difficulty with making transitions between classes at school. Specific evaluations of

motor function may help determine whether the child has neuromuscular problems, such as decreased joint mobility, abnormal muscle tone, or muscle weakness, that affect his or her gross motor play. Recall that your decision to administer assessment tools measuring performance skills and specific client factors was based on your hypothesis that some of these child factors and performance skills were probably contributing to the child's difficulty in performing occupations. Therefore, results of standardized tests help identify some of the underlying factors or "why" a child is experiencing difficulty with a particular type of task. Scores from norm-referenced tests also provide a comparison of your client's underlying skills with that of typical children of the same or a similar age, and can elicit information about the degree or severity of a child's problem.

When interpreting the results of standardized tests, it is important to consider how valid you believe the child's scores are. Did you administer the test in the standardized way in which it was intended to be administered? Was the child able to understand the directions? How valid and reliable is the assessment tool itself? Did the child put forth his or her best effort? It is important to include a statement about your confidence with respect to the extent to which test scores reflect the child's true abilities. Were the test results consistent with parent reports of performance and with your informal observations?

Next, consider evaluation information gained from formal and informal observations. Apply your knowledge of normal child development and what you expect of children at various ages. Begin to identify how the children's strengths, challenges, or deficit areas seem to influence their abilities to perform valued activities or occupations, such as self-care skills, school-related activities, or play activities. This is particularly important in school settings, where legislation (Individuals with Disabilities Education Improvement Act [2004]<sup>71</sup>) requires that related service providers such as occupational therapists demonstrate how children's areas of difficulty and intervention goals relate directly to their ability to perform school-related activities.

This part of the interpretation process ends by identifying and describing the extent to which, and how specific

performance skills and child factors are contributing to the child's difficulties in performing his or her daily occupations. These skills and child factors are often the areas that are addressed in the child's OT intervention program. Some of these areas may also be addressed by other team members, and other factors may not be addressed at all if it is believed that they cannot be significantly altered, or when there are other more effective means by which the child can learn to successfully engage in their occupations, despite the impairment. In most settings, many of these child factors/deficits areas are included within a problem list, or list of challenges, which, as noted previously, reflects areas that are addressed in intervention. Finally, it is important to note the child factors and skills that represent the child's strengths, because strengths need to be considered, and capitalized on throughout the intervention process.

**d) Identification and Interpretation of Contextual/ Environmental Factors, and Activity Demands Influencing Occupational Performance:** Concurrently with the interpretation of information related to child factors, you will identify the context/environmental factors, and activity demands that are most salient in supporting or hindering the child's ability to engage successfully in his or her daily occupations. As you attempt to uncover the reasons why a child is or is not experiencing success, consider the opportunities the child has had to develop certain skills. What are the sociocultural expectations, values, and priorities that have been influential in the child's development and that continue to be an integral part of their lives? For occupational therapists to assist children in interacting successfully with individuals and objects in their environments and meeting the everyday demands placed on them, it is important that such contextual factors are identified and reported. For example, when evaluating a school-aged child with academic problems, you need to consider and interpret data collected about the child's curriculum, the physical classroom environment; the teacher's style, teaching philosophy, and expectations of children in the classroom, and parental attitudes toward school achievement, because these factors contribute to the child's challenges and

successes. How do the activity demands placed on the child during various types of school-related tasks and activities match the child's skills and abilities? The analyses of contexts and activity demands involves the synthesis of information primarily from ecological assessment tools; data describing the social and physical environments, interviews, activity analyses, and data gathered through observations of the child performing activities in natural contexts. Finally, contextual information is vital to consider as you formulate your intervention plans to ensure that programming suggestions make sense to the children and families that you are working with, that they are practical and/or feasible, and that they address the areas that are most valued.

## **Step 11: Developing Recommendations and Intervention Planning**

Following the synthesis of evaluation data, and identification of the child's strengths, challenges and areas that would benefit from intervention, you will develop recommendations and begin to develop an OT intervention plan when appropriate. Typically, an intervention plan is not necessary when the purpose of the evaluation was consultative in nature (conducted to provide recommendations around a specific problem area) or when the evaluation yielded results indicating that the child does not require OT intervention. In both cases, however, recommendations should still be provided, including helpful suggestions for enhancing the child's ability to successfully engage in his or her daily occupations. In addition, referrals for other services or evaluations may be suggested when appropriate.

Developing an intervention plan considers the synthesis of your evaluation data, with setting, service delivery system and program factors, and other practical considerations. As noted earlier, it is rare that you would create an OT intervention program in isolation. Instead, you would collaborate with the child, parents or caregivers, teachers, and other members of the child's team. Sometimes your program planning efforts will be used to create one interdisciplinary or trans-disciplinary, educational, rehabilitation, or family-centered services program. Other times, depending on your setting,

you may create your own individual OT program. However, even when creating a separate OT intervention plan, it is best practice to gain a general understanding of the other services a child is receiving to avoid unnecessary duplication of services, and to facilitate consistent approaches when it would be helpful to do so.

The intervention planning process includes the development of long-term goals and short-term, measurable objectives. You have the complex task of selecting from various specific frames of reference and intervention techniques available to occupational therapists. You also may have several service delivery options (indirect versus direct services; working with a certified occupational therapist assistant or rehabilitation aide) available to you from which to draw upon. Some factors other than your assessment data that you will need to consider as you begin to make intervention planning decisions are the level of research evidence supporting the interventions that you are considering, client preferences, available equipment and materials, and your own skill level. You will be drawing on all aspects of clinical reasoning in making intervention decisions. In addition to writing intervention goals and objectives, your intervention plan must include a schedule indicating when and for how long intervention sessions will occur, and the projected functional, occupation-based, desired outcomes of your interventions need to be identified. This book does not go into detail with respect to OT intervention services. However, the intervention planning process is covered in more detail in Chapter 6, including information and specific examples on how to write intervention goals and objectives.

## **Step 12: Documenting and Sharing Your Evaluation Results**

The final step in the evaluation process includes documenting your evaluation, and sharing the information. After each evaluation session you have with a client, it is important for you to document at a minimum the time you spent with the client, a summary of the evaluation activities that you completed, and your next plan of action. In a medical setting, this

kind of note is typically entered in the progress note section of the medical chart. In school- or community-based settings, you may have your own client files that you keep, and a note would be entered in that file.

A sample outline for writing pediatric OT evaluation reports is provided in Chapter 6, Box 6-7, and examples of OT evaluation reports are included in Appendix A. As you will see, individual styles and preferences are applied to the writing of reports, and there is no one standard format followed by all occupational therapists. However, it is important that you check with your supervisor, and are aware of expectations, and acceptable formats for report writing at your setting. At minimum, the following information should be included in all OT evaluations of children:

- Demographic data (child's name, date of birth, age, parents' names, address, and telephone number)
- School information, when applicable (grade, school program, and teacher)
- Referring information (referral source, reasons for referral, child's primary physician)
- A description of the evaluation methods and tests used
- An occupational profile which should include relevant background information and medical history, the child's occupations, interests, and valued activities, a description of family and other important relationships, and a brief description of school-related and extracurricular, play/leisure and work activities
- A description of the child's behavior during the evaluation such as the child's mood, affect, ability to follow directions, attention, activity level, activity preferences, and effort. Also include a comment regarding how valid you feel standard test scores are in consideration of child behavior during the administration
- Evaluation results, including test scores and a summary of clinical and naturalistic observations, and interview data. Evaluation data should also be interpreted including how the child's ability to perform his or her daily occupations is influenced by performance skills and patterns, client factors, activity demands, and contextual/environmental factors

- An evaluation summary and overall impressions which list the child's strengths, challenges, and problems areas that would benefit from OT intervention, and any other concerns that may require referral to other services and professionals
- Recommendations (intervention plans, referrals, etc.)
- Your name, signature, and qualifications, and the date of the evaluation

In addition to communicating your evaluation results in written format, you will need to share your results with other professionals who work with the child, the referral source, and the parents and, when applicable, the child. It is important that you use appropriate language for your audience so that your evaluation results are easily understood and can be verbally presented in a concise and clear manner.

## **FINAL THOUGHTS AND HELPFUL HINTS TO CONSIDER THROUGHOUT THE EVALUATION PROCESS**

When following a client-centered practice model, it is always necessary to put the clients' needs ahead of your own. There will be times when you cannot complete your planned evaluation activities owing to unforeseen scheduling conflicts, family or child illness, or child behavioral concerns. Sometimes you may administer only part of a standardized test before needing to stop because the child being evaluated is uncomfortable or is experiencing difficulty following the directions. Do not panic. You have gained a lot of information about the child by attempting to administer the test, and getting test scores is not the most important part of your evaluation. Remember that your role is to help your clients, and sometimes that may mean foregoing most of your well-thought-out evaluation plan and being flexible enough to adapt, sometimes "on the spot," to the needs of the child and family. It is not always possible to anticipate exactly what you will need to do and what materials and equipment you will need. Thinking about a "backup plan" ahead of time is a helpful practice.

Second, be aware of the reliability, validity and the strengths and limitations of the assessment tools and procedures you are using. You want to select the most helpful, and

research-based evaluation methods and assessments tools, and complete your evaluation efficiently and in the way that is least taxing on all of the individuals that you will involve in the evaluation process. Efficiency is significantly enhanced when preliminary activities (such as record reviews and interviews) are thorough and when information gathered from other professionals is shared (avoiding duplication). Also prepare yourself well by practicing and knowing well the assessment tools you are using so you can move through the test items quickly and effortlessly. The child you are evaluating will quickly lose interest and your attention if required to wait while you organize yourself and review administration directions.

Third, be careful not to confuse your direct observations of behavior with your interpretations of behavior as you synthesize evaluation data and document your evaluation. This is a common mistake made by professionals. Be clear to distinguish in your documentation what you “saw” or how the child “scored” on a test from your interpretations of the score or the behavior. This process is covered in more depth in Chapter 5.

Finally, be timely in getting your evaluation results interpreted and your report delivered to the necessary individuals. The results of your evaluation are important to the child and family, and the referral source, and often will have direct implications on the kinds of programming and interventions that a child will receive or is receiving.

## Summary

The purpose of this chapter was to take you through a 12-step OT evaluation process for children by directly applying the OT Practice Framework, 2nd edition, adopted by the AOTA in 2008. The evaluation process described follows a top-down approach and includes the development of an occupational profile of the child you are evaluating, followed by a detailed analysis of the child’s occupational performance. The analysis of occupational performance includes an evaluation of client factors including values, beliefs and spirituality, body functions and structures, and performance skills such as motor and cognitive. Also as part of the occupational analyses, performance patterns, activity demands associated with the

child's occupations, and contextual/environmental factors are evaluated. The importance of relating all of these factors to the child's ability to successfully perform his or her valued occupations has been emphasized, as this is the most important way that your OT evaluation is distinguishable from the evaluations conducted by professionals from other disciplines.

Chapters 3 provides an overview of normal development and is included as supplemental resource information to assist you in selecting appropriate evaluation materials, toys, and activities for children of various ages and to guide you in interpreting your informal observations. The remaining chapters provide detailed information and practical examples to assist you in completing the more complex steps of this evaluation process.

## Chapter Review Questions

1. How can you facilitate the roles and comfort level of caregivers in the evaluation process?
2. What information would be important to include in an occupational profile of you?
3. The occupational analyses portion of the evaluation process is the lengthiest and most complex portion. How might you break up the occupational analyses of a child into more manageable portions or steps?
4. How might you evaluate a child's occupational performance and participation in a hospital setting?
5. What is the difference between evaluations of performance skills versus body functions?
6. Which of the 12 steps of the evaluation process discussed would most challenge you and why?
7. Why is it important to identify a child's strengths as well as his or her challenges?

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# 3

## TYPICAL CHILD DEVELOPMENT

### **Introduction**

The purpose of this chapter is to provide you with information regarding normal or typical child development. Knowledge of current concepts and theories related to child development is essential for your competence as an occupational therapist in conducting evaluations of children. This background information helps you decide what occupations and skills are needed to address with children of different ages, helps you interpret the evaluation data that you have collected, and also will assist you in developing appropriate intervention plans for children.

The chapter begins by introducing you to some basic theories, processes, and stages related to normal human development. Second, the most common occupations of children

are examined with an emphasis on when and how children of various ages typically experience or engage in these everyday occupations. The occupations discussed include play and leisure skills, instrumental and personal activities of daily living, school/educational activities, work, and social participation. Third, the performance skills, and underlying body functions acquired by infants and children at various ages in several developmental areas, are presented as these skills and functions provide the foundation upon which children learn and perform developmentally appropriate tasks, activities, and occupations. The developmental areas discussed are organized by the performance skill areas described in the Occupational Therapy (OT) Practice Framework<sup>1</sup> and include (1) motor and praxis skills, (2) sensory and perceptual skills, (3) emotional regulation skills, (4) cognitive skills, and (5) communication and social skills.

## **DEVELOPMENTAL PRINCIPLES AND THEORIES**

Background knowledge in theories of child development will help you make decisions as you formulate your evaluation and intervention plans for children. **Developmental theories** help to describe and organize the ways child behavior can be viewed and to provide insights from which one can make predictions of behavior, growth, and development. Theories of development attempt to explain the qualitative changes, both physical and psychological, experienced by children as they move from infancy through childhood to adulthood. Some theories are global, whereas others focus on explaining changes that occur over time in specific areas of development, such as cognition or social-emotional. In addition, theories help to explain important concepts related to development, such as **nature versus nurture, resiliency and vulnerability, individual differences,** and the **relationships among various domains of development.** Different theories are not discussed in this chapter in depth. Therefore, you will need to refer to other resources

for more detailed and thorough discussions of the various theories presented in this chapter. Basic principles regarding development that are universally accepted are presented in Box 3-1. Table 3-1 describes some of the most prominent developmental theories and theorists that you should be familiar with.



### Box 3-1

#### GENERAL DEVELOPMENTAL PRINCIPLES

1. Development depends on the interaction of three main factors: (1) genetic predisposition; (2) the individual's own role in his or her development, including previous experience or developmental history; and (3) environmental factors (family and sociocultural). The relative importance of each of these factors and how they interact with one another to influence development are controversial among theorists.
2. The areas of development (e.g., motor and language) are interdependent. However, the nature of the interaction among areas of development is poorly understood.
3. Most aspects of development progress toward greater complexity or advancement via a gradual, continuous process. Some aspects of development are believed to progress through specific stages in which there are periods of rapid growth during transitions between stages, followed by more stable periods when little change occurs.
4. Sensitive or critical periods exist for some areas of development. These are brief periods during which the neonate or developing child is particularly vulnerable or highly responsive to specific kinds of environmental experiences or stimuli.
5. Development progresses toward a state of homeostasis or balance via a process of adaptation to challenge or stress.

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Contribution From: Angoff W. The nature–nurture debate, aptitude and group differences. *Am Psych*. 1988;43:713–720; Gormly A, Brodzinsky D. *Lifespan Human Development*. 5th ed. Fort Worth, TX: Harcourt Brace Jovanovich; 1993; DeHart G, Sroufe LA, Cooper R. *Child Development: Its Nature and Course*. 5th ed. New York, NY: McGraw-Hill; 2004; Bukatko D, Daehler M. *Child Development: A Thematic Approach*. 6th ed. Boston, MA: Houghton Mifflin Co; 2011.

TABLE 3-1

THEORETICAL PERSPECTIVES ON DEVELOPMENT

Theory	Description	Founders and Theorists
Behavioral theories	Emphasize social and emotional development; learning is believed to occur through observation and then imitation of behavior (modeling) and through experience with positive and negative consequences; includes behaviorist approaches such as applied behavioral analysis and social learning theories	Skinner, <sup>6</sup> Bandura, <sup>7</sup> Watson, <sup>8</sup> Lovaas <sup>9</sup>
Psychoanalytic, psychodynamic, and psychosocial theory	These theories focus on personality, social, and emotional development; Freudian theory includes five psychosexual stages and supports the notion that behavior is largely influenced by inner primitive drives and instincts; Erikson's theory modified Freudian principles by emphasizing the psychological issues that need to be addressed at each of eight stages of psychosocial development	Freud, <sup>10</sup> Erikson <sup>11</sup>
Cognitive theories and information processing	Emphasize how children of different ages think, adapt to, organize, and interpret their experiences; generally assumes that healthy children have similar mental, social, and emotional capacities; information processing models emphasizes the development of attention, memory, thinking skills, and problem-solving abilities. also includes motor learning theory	Piaget, <sup>12</sup> Seigler, <sup>13</sup> Krantz, <sup>14</sup> Massaro and Cowan <sup>15</sup>
Humanistic theories	Maslow developed a hierarchy of human needs, proposing that the most basic needs such as food and shelter must be met before intellectual or emotional, self-fulfilling needs can be met. These theories emphasize motivation, self-direction, and self-actualization	Maslow, <sup>16</sup> Rogers, <sup>17</sup> Csikszentmihalyi <sup>18</sup>

TABLE 3-1

THEORETICAL PERSPECTIVES ON DEVELOPMENT  
(Continued)

Theory	Description	Founders and Theorists
Ecocultural theories	These theories emphasize the influences of sociocultural factors such as beliefs, values, and shared practices on development, and how physical environmental, political, economic, historical, and spiritual contexts influence development and shape a child's daily routines. These theories include ecologic systems perspectives, dynamic systems theory, and sociohistorical theory	Gallimore and Lopez, <sup>19</sup> Vygotsky, <sup>20</sup> Bronfenbrenner <sup>21</sup>

For your OT evaluations to be consistent with the philosophy, values, and domains of concern of our profession, they should be based on an **occupation-based practice model** such as the Model of Human Occupation by Kielhofner,<sup>22</sup> and the Person-Environment-Performance Model by Christiansen and Baum.<sup>23</sup> The application of the American Occupational Therapy Association's (AOTA's) OT Practice Framework,<sup>1</sup> which uses a top-down approach for evaluation, encourages you to first evaluate the performance of children in their valued roles and occupations. The occupations of a child largely define who he or she is and include play and leisure activities; instrumental and personal activities of daily living; school activities; social participation; and, for older children, work-related activities. Common roles of children are that of friend, sibling, son or daughter, student, player, worker, musician, or athlete. Throughout the OT evaluation process, information on normal development assists you in selecting appropriate assessment tools and activities, formulating important and relevant interview questions for teachers and caregivers, and in guiding your informal observations (i.e., what you should be looking for in children of certain ages).

## OCCUPATIONS OF CHILDHOOD

### Play and Leisure

Play refers to activities that are carried out for pleasure or entertainment, while leisure refers to activities that are non-obligatory and mostly intrinsically motivating. Since most of child's leisure time is spent playing, this section focuses most on play. It is primarily through play that infants and young children learn and practice new skills and refine others, experiment with social roles, experience emotions, and develop friendships. Children are intrinsically motivated to play, and they spend most of their time "playing." They naturally are inclined to explore their environments and to create play situations (see Figs. 3-1 to 3-6). Play is also the most common therapeutic intervention tool used by pediatric occupational therapists.

There are many definitions of play and ways of categorizing play behaviors and skills. However, basic common elements help to define an activity or occupation as play and help to distinguish play from other types of occupations



**Figure 3-1** Toddler enjoying riding her rocking horse.



**Figure 3-2** Friends creating new ways to swing.



**Figure 3-3** Cousins sitting together on a playground riding toy.



**Figure 3-4** This infant, engaged in exploratory, sensorimotor play is very curious. He enjoys looking at and feeling the large ball.

or activity.<sup>24–26</sup> Common characteristics of play include the following:

- Play is fun, joyous.
- Play involves doing or participating, whether the play is sedentary (like knitting) or active (like swimming).
- Play involves free choice, is nonobligatory, and is intrinsically motivating; children always “play” because they want to, and never because they have to. If they are playing involuntarily, then, they really are not playing.
- Play allows the “player” to guide the play situation and be relatively free from rules.
- Play is focused more on the process or the means, rather than on the outcome.
- Play often involves pretending or using one’s imagination and is not bound by reality.



**Figure 3-5** Preschoolers, dressing up like kings and queens, are engaged in symbolic play.



**Figure 3-6** Children aged 7 to 9 years play an organized game of soccer, which provides opportunities to learn about cooperation and competition.

Piaget believed that the ways children played progressed on the basis of cognitive maturity<sup>5</sup> (cited by Bukatko and Daehler). The first type, **sensorimotor play**, extends into the second year of life and is characterized by the infant's repeated motor movements and the infant's pleasure simply from the experience of seeing, hearing, touching, and holding. The next stage, **symbolic play**, extends from 2 to 6 years of age, as the child begins to interpret the world in terms of images and symbols and has the capacity to use language and to pretend. A third type of play is games with rules, which typically begins around 5 years of age. This type of **interactive play** is more organized and structured, and it integrates the concepts of cooperation and competition with others.

Another way to categorize and describe play is by the level of social interaction or participation.<sup>26</sup> For example, **solitary play** is when a child plays alone. **Parallel play** occurs when children play comfortably next to one another, possibly sharing materials and conversing, but their play agendas and activities are separate. **Social play** involves play activities that are shared and requires children to interact directly with one another during play. Social play involves cooperation, mutually agreed-on roles or rules, social interchange, and sometimes competition.

Despite the common characteristics of play described previously, the quantity and quality of play behavior and the reasons why people engage in play change as they develop and move from infancy through childhood to adulthood. The salient play characteristics typical of children of various ages are described in Table 3-2. This information can be used as guide for determining the types of play observations and behaviors you can expect to see of children of various ages. Also, this information will help you select appropriate play activities for children of various ages and levels of development. From this table, you can see that infants and young children engage in a great deal of exploratory and sensory motor play. Through play, children learn about their physical environments and other contexts; derive great pleasure and excitement, experiment with adult roles; develop cognitive, social-emotional, and motor skills; and build meaningful

TABLE 3-2

## DEVELOPMENT OF PLAY SKILLS AND PLAY BEHAVIORS

Age	Play Behaviors, Skills, and Common Favorite Toys/Activities
0–3 months	Engages in exploratory and sensorimotor play; explores by listening, looking, reaching for, touching, holding, and shaking objects such as rattles; visually tracks objects and interested in human faces; may enjoy supported sitting in an infant swing or infant seat/activity center; plays on the floor usually supine, or in a caregiver's lap; may become irritable with too much stimulation; alert, attentive play periods are relatively short (10–15 minute at a time); eye contact, visual following during play assists in developing attachment behaviors; smiles at 3 months; plays with rattles, enjoys looking at bright moving objects, making sounds, watching human faces, infant swings, overhead activity centers that attach to an infant seat, crib mobiles
4–8 months	Primarily engages in exploratory and sensorimotor play; able to reach, grasp, hold, shake, and bang objects; pushes buttons and transfer objects from one hand to the other; puts objects in a bucket and dumps bucket; on floor moves limbs and brings feet to hands when supine; pivots and plays in a sitting position; scoots on tummy; throws objects; release of objects is poorly controlled; mouths objects; uses simple cause-effect toys, activity mats, shape sorters, overhead play gyms (child is supine and reaches over head for hanging toys); begins simple social play like peek-a-boo; may coo, squeal, laugh, and communicate through cries and facial expressions; notices other children; preferred play activities often include rolling a ball, push-button toys that light up, make noise or music, bouncing in a jumper; activity play centers/infant gyms; playing peek-a-boo

*(continued)*

TABLE 3-2 DEVELOPMENT OF PLAY SKILLS AND PLAY BEHAVIORS (Continued)

Age	Play Behaviors, Skills, and Common Favorite Toys/Activities
9–12 months	<p>Continues with exploratory and sensorimotor play; begins to use toys according to their purpose (e.g., hammers with toy hammer, feeds baby doll a bottle; pushes train along a track); more hand manipulation of objects; points, rolls ball, releases toys into container, stacks a few blocks, throws, and mouths objects; crawls or walks to explore the environment; may show separation anxiety, may interact briefly with other infants by touching, observing, and simple imitation; preferred play activities often include cause-effect toys like push-button noisy toys, activity centers, and pop-up toys; also enjoy gross motor toys like push riding toys, jumpers; likes to climb. Fine motor play may include shape sorters, large soft blocks, large insert puzzles; pretend play may begin with play with dolls, trucks, cars, trains, pretend food; enjoys simple social play like peek-a-boo</p>
1–2 years	<p>Often engages in gross motor play such as chasing games, climbing, using push riding toys and pull toys; often runs, jumps, and climbs without regard to safety factors; fine motor play may include sorting objects, inserting large puzzle pieces, stacking, and pulling apart objects; likes to throw, and put toys in a bucket and then dump them out; social play begins to emerge; interested in watching others play with limited pretend and social play; may be possessive of toys with tendencies for parallel play; likes all kinds of toys, including dolls and action figures, play animals, pretend food, cars, trucks, and trains, simple construction toys; likes looking at picture books with adults and pointing at pictures, playing on toddler playground equipment (swings, slides), playing with balls, riding toys; may enjoy play dough and large crayons for scribbling</p>

2–3 years	<p>With increased use of language, children engage more in symbolic and pretend play; begin to shift from parallel play to more interactive forms of play; talks to self during play and begins to use language when playing with others; shows a variety of emotions during play and likes to role-play adult roles; may enjoy action figures, dolls, and other pretend people; may continue to be possessive of toys; likes to imitate; gross motor play includes using playground equipment with some assistance, riding a tricycle, jumping with both feet clearing the ground together, simple ball play (e.g., kicking and tossing a medium-sized ball), and running around, climbing, and dancing; fine motor play includes painting and scribbling; construction toys and insert puzzles and more complex cause-effect toys that introduce preschool concepts such as colors, shapes, letters, and numbers; continues to be interested in picture books; enjoys sensory play like play dough, water, and sand play</p>
3–5 years	<p>Engages in creative and group play, and associative play dominates by 4 years as children learn to share and take turns; is interested in being with friends; enjoys role-playing and dressing up, and creating elaborate pretend play situations; may begin to play simple board games, such as checkers or Candyland. With respect to gross motor play, children become proficient on playground equipment, including pumping a playground swing, may ride a bike with training wheels; and participate in more structured recreational or sports activities, such as swimming, roller blading, basketball/ ball play, dancing, and skiing; fine motor play skills include painting and coloring, simple drawings, copying basic shapes and some letters, scissor use and simple craft activities, construction toys, and computer play; begins to develop an interest in the finished product of construction play; may become more interested in television and may begin to play video or computer games</p>
5–7 years	<p>Able to play games with rules, such as board games; becomes more involved in organized sports and recreation in the community; learns specific skills such as swimming, skating, and bike riding or playing a musical instrument; preferences for certain play activities are developed; plays well with others and enjoys social interaction with an understanding of the concepts of cooperation and competition; the importance of friendships increases; independence during play increases with the extension into neighborhoods and the homes of peers; sedentary play activities such as watching television, reading, and playing computer games or videogames may increase; children enjoy playground equipment, ball play, pretend play, crafts, puzzles, and construction toys like Legos</p>

(continued)

TABLE 3-2

DEVELOPMENT OF PLAY SKILLS AND PLAY BEHAVIORS (Continued)

Age	<b>Play Behaviors, Skills, and Common Favorite Toys/Activities</b>
7–11 years	Further development of leisure/play interests; typical activities include participation in organized and recreational sports activities, listening to or playing music, craft activities, playing computer games or video games, watching television and movies, and reading; peer relations and social competencies are important, and time spent with friends increases dramatically; a child's self-identity and self-perceptions are largely influenced by participation with certain peers and by their play interests
12–18 years	Further development of leisure/play interests; typical activities include organized and recreational sports, music, crafts and hobbies, computer use and videogames, television, and movies; adolescents most often make their own decisions regarding their use of leisure time, and most prefer to spend it with peers, often just hanging out and talking on the phone; peer acceptance and peer group norms and values are influential in how adolescents spend their leisure/play time

Contributions from: Parham D. Play and occupational therapy. In: Parham LD, Fazio LS, eds. *Play in Occupational Therapy*. St Louis, MO: Mosby-Year Book Inc; 2008: 3–39; Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56–83. Knox,<sup>26</sup>

relationships with caregivers, other family members, and peers. Infants, toddlers, and preschool children spend most of their waking hours playing. A child's access to a variety of play materials, opportunities to make play choices, and to engage in play with other children as well as adults all play a role in facilitating their growth and development.

In the elementary school years, play tends to become more structured and social, with the introduction of activities such as organized sports, summer camp programs, and participation in youth clubs or organizations like Boy or Girl Scouts. School-aged children spend more time in group activities or dyads, than alone, and show a clear preference for play with same-sex peers. Sedentary activities such as watching TV, talking with friends, use of social media, reading, and playing videogames and board games are also common play occupations of school-aged children. Depending on the physical environment, or neighborhood, children older than 5 or 6 years often venture outside to play with other neighborhood children with limited supervision. They may ride bikes or scooters; organize and play a game of basketball, hide and seek, or street hockey; or just “hang out” (Figs. 3-7 and 3-8). School-aged children get much enjoyment from spending



**Figure 3-7** A neighborhood game of street hockey. Although this social play has organization and rules, the structure and format were developed by the children.



**Figure 3-8** Friends just “hanging out.” Conversing with friends is one of the most frequent pastimes of older, school-aged children.

time playing in the homes of their friends or having friends play at their house.

The amount of time spent in play for school-aged children decreases from the preschool period, with the introduction of school activities, and an increase in organized, structured time such as music lessons or team sports. School-aged children also take on more responsibility for completing personal self-care tasks and engaging household chores. Nonetheless, play remains an important occupation. Play interests, choices, skills, and experiences and “who” a child plays with are important factors that begin to shape a child’s self-perception, activity preferences, and abilities. A child’s active engagement in play within their families and communities is also important to foster a sense of belonging, to provide joy, and to help cultivate a child’s respect for life.

In the adolescent years, play as an occupation becomes more established as the adolescent develops a stronger sense of self, a desire to develop their own, individual, interests and skills, and a desire to belong to a specific peer group. During adolescence, the issues of self-identity, sexuality, and

independence are brought to the forefront. Adolescents, for the most part, have much more control over their use of leisure time, and they tend to “play” alongside their peers rather than alone or with family members. They may challenge the scope and domains of parental authority, particularly with respect to the use of their free time. Most of their leisure time is spent socializing with peers, either on the telephone, hanging out with friends or through the use of social media. Other leisure time is commonly spent participating in competitive or recreational sports activities and games, listening to music, watching TV or movies, reading, doing arts or hobbies, and playing videogames. As adolescents struggle to claim their independence, identities, and social acceptance, vulnerabilities related to antisocial and mental health problems increases.<sup>28</sup> Drug and alcohol abuse, risky sexual behavior, depression, eating disorders, and violence, including gang-related activity, are among the common problems seen in adolescents. Quality family relations, including engagement in some family leisure time, and consistent parenting, characterized by a balance of supervision and rule imposition with freedom, independence, and responsibility, are some factors that may encourage healthy uses of leisure of time.

### **Participation in Personal and Instrumental Activities of Daily Living and Vocational/Work Activities**

Performing **personal activities of daily living** (bathing, toileting, dressing, eating, and functional mobility) are some of the most important skills children learn as they mature. Not only must children learn to take care of their personal care needs and general health and well-being, but they are required to perform self-care activities in ways that are consistent with societal and cultural norms (see Fig. 3-9). Cultural factors and parenting styles are influential in a child's development of self-care skills, and therefore need to be considered during your evaluations. Sociocultural factors and family values influence when and how a child develops and performs self-care skills, and the extent to which parents promote their children's level of independence or competencies



**Figure 3-9** This 18-month-old is eating breakfast and is learning how to use a spoon.

with certain skills. The typical progression of skills and levels of independence that can be expected of children of various ages in the areas of bathing and grooming, dressing, and toileting are presented in Table 3-3. The development of feeding skills alongside oral-motor skills is presented in Table 3-4. However, these timelines are presented as general guidelines, as noted above, the learning, and performance of personal self-care skills are heavily culturally dependent.

In addition to self-care skills, children develop and perform **daily living, home management, and community living skills** in preparation for adulthood. These are referred to as instrumental activities of daily living in the OT Practice Framework<sup>1</sup> and are simply defined as activities supporting

TABLE 3-3

DEVELOPMENT OF PERSONAL ACTIVITIES OF DAILY LIVING

Age	Toileting	Dressing	Bathing, Grooming
1–2 years	Indicates when wet or soiled; tolerates diaper change; has fairly regular bowel movements	Assists by pushing arm through sleeve, finding arm hole; removes socks, shoes, and hat; holds leg out to assist in pulling pants on; helps pull down pants enjoys bathing; shows some interest in assisting to wash face, hands, and body parts; may resist grooming activities	Tolerates bathing, diaper changing, and grooming activities by caregiver
2–3 years	Develops daytime control with few accidents; needs help to wipe self and manage clothing; needs reminders and diapers at night	Removes coat, simple pajamas, elastic waist pants, socks and shoes; puts on front-button shirt or coat; can unzip and undo large buttons; requires assistance to put on pullover garments like T-shirts	Participates actively in washing self in the tub with assistance; wipes face with cloth, and washes hands at the sink with supervision, cues; assists in brushing teeth; may resist grooming activities
4–5 years	Daytime and nighttime control; independent except may need help to wipe self and manage clothing fasteners	Can undress upper- and lower-body garments; puts on pullover garments with occasional assistance to orient correctly and straighten; puts on pants except fasteners; can undo and do up large buttons and zip up jacket when zipper is engaged; puts on shoes and socks; unable to tie shoes	Requires supervision for grooming, brushing teeth; minimal to moderate assistance with bathing to manage watter, wash hair, wash body thoroughly, and for safety

*(continued)*

**TABLE 3-3** DEVELOPMENT OF PERSONAL ACTIVITIES OF DAILY LIVING (Continued)

Age	Toileting	Dressing	Bathing, Grooming
5–6 years	Fully independent	Independent except with clothing selection; occasional help needed with difficult fasteners such as belts and back zippers	Requires supervision only for grooming and tooth brushing, with reminders; bathes self with help to set up water and wash hair and supervision for safety
7–10 years		Cues sometimes required to select appropriate clothing for weather, specific activity/occasions	Independent with bathing and grooming; may need cues to initiate and be thorough
11–17 years		Assists in purchasing and selecting own clothes; becomes more particular about type and style of clothing	Becomes more interested in appearance with more care and interest in grooming activities; may begin to shower daily, and apply deodorant; girls develop an interest in makeup; shaving

Contributions from: Shepherd J. Self-care: a primary occupation. In: Lane S, Bundy A, eds. *Kids can be Kids: A Childhood Occupations Approach*. Philadelphia, PA: FA Davis Co; 2012: 125–152. Shepherd J. Activities of daily living. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 474–517.

TABLE 3-4

DEVELOPMENT OF ORAL-MOTOR  
AND FEEDING SKILLS

Age	Oral-motor Skills	Feeding Skills
0–6 months	Has rooting and sucking reflexes; learns to coordinate suck-swallow breathe patterns at 2–4 months; suction on nipple is strong by 4 months	Nursing or bottle-fed formula
6–12 months	Develops strong up and down tongue movements during sucking without any fluid loss; has up and down munching jaw movements with solid foods, which progresses to some diagonal jaw movements during chewing around 7–8 months; lateral tongue movement develops; rotary chewing develops at approximately 12 months; imitates sounds	Sitting posture and head and trunk control improve and contribute to ability to self-feed; holds own bottle 6–7 months; uses spoon by 11–12 months (but messy); may transition from bottle to cup at 12 months; many continue to drink formula from the bottle or nurse; may drink from Sippy cup (cup with lid and spout) around 8 months; eats soft baby foods at 5–7 months; finger feeds self by 7–8 months
1–2 years	Rotary chewing becomes proficient, and the child can manage soft meat and a variety of table foods cut into small pieces; lip closure around cup develops; oral-motor movements become refined as speech develops	Uses a spoon to scoop and feed self, with some spilling; holds cup with lid well and drinks without difficulty; may begin to drink from small cup without a lid at 2 years; tolerates a variety of food textures and eats typical adult foods provided they are cut in small pieces

(continued)

TABLE 3-4 DEVELOPMENT OF ORAL-MOTOR AND FEEDING SKILLS (Continued)		
Age	Oral-motor Skills	Feeding Skills
2–5 years	Eats regular food; tough meats need to be cut in small pieces; gradually becomes neater with self-feeding; articulation becomes clear when speaking	Becomes proficient in using a spoon and fork and a cup without a lid, with occasional spilling; manages soup with spoon at 4–5 years; drinks from fountain; spreads soft food with a knife
5–10 years	Self-feeds independently; whistles	Learns to open food packages and to spread with a knife; cuts meat at 5–8 years; follows table manners

Contributions from: Schuberth L, Amirault L, Case-Smith J. Feeding intervention. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 446–473.

daily life in the home and community. Children begin to show an interest in helping others by imitating simple household tasks like wiping the table and vacuuming as early as 2 years of age (Fig. 3-10). Children are able to help with simple tasks like putting away their toys, wiping spills, and putting dirty clothes in the laundry by 3 to 4 years of age. Providing elementary-aged children with regularly scheduled, simple chores, such as setting the dinner table, emptying the garbage, and tidying up teaches them responsibility and helps them feel like they are important, contributing members of their family. By the time children are 11 years of age, they may be able to do some instrumental daily living skills, including preparing simple meals, feeding a pet, using a cell phone appropriately to take a message, sweeping or vacuuming, making their bed, tidying up their bedroom, washing and drying dishes, and folding clean clothes and putting them away. With instruction, teens can learn to use machines like a washer and dryer, and dishwasher. In the context of OT



**Figure 3-10** Toddlers enjoy “helping.” Seen here making muffins, each child is busy helping in his or her own way.

evaluations, attention to a child’s participation in, and performance of instrumental activities is helpful when considering their daily roles and routines. Children generally like schedules, which provide clear expectations for their behavior. It is important to explore how their participation in chores is balanced with other kinds of activities such as school and leisure, or work. Consideration of activity patterns will help to determine whether schedules are manageable and well-balanced for overall health and well-being.

As with the performance of personal activities of daily living, sociocultural factors, and family needs and priorities greatly influence a child’s level of skill and participation in instrumental activities of daily living. Family expectations, needs and priorities, opportunities, and cultural norms all influence the extent to which, and type of, skills that are practiced and learned in these areas. For example, large families with limited resources may expect their older children to help more with household chores, and may give them child

caregiving responsibilities. Peer influences can also positively or negatively influence a child's willingness to participate in such activities, particularly in the adolescent years. OT evaluations should therefore identify the instrumental activities of daily living a child is expected to perform, how well they can perform them, and how satisfied they (or their caregivers) are with their performance. Examples of household chores that parents might consider assigning to children of various ages are included in Table 3-5.

In terms of **work** activities, most teenagers experience some degree of participation in part-time work, volunteer work activities, or summer employment outside of the home, although the age at which they begin is quite variable. Empirical studies, for the most part, are supportive of adolescent employment, particularly when work experiences are coordinated with school curricula.<sup>32</sup> Gottfredson<sup>32</sup> suggested that part-time jobs during the high school years help adolescents prepare for adulthood and may decrease dropout rates. According to Brown<sup>33</sup> studies have suggested that teen employment is associated with both positive and negative consequences. On the positive side, work activities may promote responsibility, ability to work with others, time

TABLE 3-5

HOUSEHOLD CHORE SUGGESTIONS FOR CHILDREN

Age	Chore Suggestions
2-3 years	Pick up their belongings/toys and put away in a designated place, help feed pets, help wipe up spills
4-6 years	Clear and set table for mealtimes, pick up belongings, help make a bed, bring dirty clothes to wash machine, feed pets, put cutlery in drawer, retrieve mail, wheel garbage can to curb, mop, sweep, vacuum with help
7-10 years	Help prepare simple meals, mop, sweep, vacuum, wash and dry dishes, fold and put away laundry, clean own room
11+	Can do most chores if they have been taught; meal preparation, unload groceries and put them away; wash the car, housecleaning, laundry, work machines like dishwasher, clothes washer and dryer

management skills, independence, and self-esteem. Work experiences are also helpful for securing employment, or higher wages post high school.<sup>33</sup> Negative consequences typically result when teens work more than 20 hours per week. Long work hours for teens have been associated with fatigue, poor school performance, and higher levels of emotional distress. State and Federal labor laws in the United States are aimed at protecting children from inappropriate or unhealthy work expectations. For example, in most cases children must be 14 or 16 years of age to work (depending on the type of employment), and State laws limit the number of hours minors are permitted to work on school days. OT evaluations of teens should explore engagement in work activities and whether there are any challenges or barriers affecting performance in this area.

As adolescents prepare to make the **transition from high school** to the workforce or college, one of the most difficult tasks they face is choosing a career or an area of study in college. This is much truer today than ever before because of the large number of available career choices and options for postsecondary education. For adolescents with disabilities, the transition may be more challenging. In addition to vocational activities, transition planning includes determining possible living arrangements and knowledge of the level of supervision or assistance required for community living and participation. As a specialty area of practice, OT evaluation related specifically to transition planning is covered in Chapter 7 and includes addressing personal and instrumental activities of daily living, and work-related activities.

## Participation in School Activities

In the United States, as well as most in other countries, children are legally required to attend school. In the United States, children 5 or 6 years of age typically spend about 6 hours a day at school, 5 days a week, 10 months of the year (Fig. 3-11), making school activities one of life's major occupations. The ultimate aim of formal education is to provide children with the necessary skills to function successfully and independently as responsible, and to become contributing members



**Figure 3-11** Children being picked up for school and riding the school bus.

of society.<sup>5</sup> However, given the amount of time children spend in school, their school experiences have a profound impact on many aspects of their development, including social and emotional skills, self-concept and self-esteem, and overall psychological well-being.

Special education legislation, as outlined in Chapter 1, mandates and guides the delivery of special education and related services so that all children receive appropriate education programs in the least restrictive environment possible. Whether you work as an occupational therapist in a school setting or another practice setting, it is essential to include as a part of your evaluations of school-aged children, an analysis of performance and participation in school activities.

It is important to find out how the children you are evaluating do in school academically, as well as socially. It is important to determine what they like and/or dislike about school; whether they are challenged by any curricular, school related tasks, and extracurricular school activities that they need or want to do. As with the other areas of occupation, a child's participation and performance in school is influenced by contextual factors, task demand factors, performance patterns, and child factors. Your role in supporting the child's ability to participate and benefit from their educational program involves learning about the child's skills and abilities, academic strengths and challenges, and school activity preferences. Equally important is consideration of the child's educational contexts, including physical spaces, seating, his or her teacher's teaching style and the program's educational philosophy, the ratio of adults to children, and the main curricular components and expectations.

An understanding of the typical expectations of children and learning milestones throughout the school years is essential for therapists who assume the role of supporting a child's educational experience. Typical expectations of students are for example, that they attend and concentrate, follow directions and classroom routines, participate in small group and large group discussions, complete classroom work that is assigned, and manage and organize their belongings. Examples of learning milestones might be printing one's name (by age 4–5), reading (1st–3rd grade), or mastering multiplication facts/tables (by 3rd–4th grade). In addition to academic subjects, most school programs include art, music, and physical education, as well as extra curricular activities, clubs and sports programs that foster a child's interests, and provide opportunities for specific skill development, enjoyment, and social interaction. It is important for occupational therapists to consider all of these kinds of activities as fitting within a child's role as student.

## Social Participation

AOTA's OT Practice Framework<sup>1</sup> includes **social participation** as an area of human occupation referring to organized

patterns of behavior that are expected of an individual within a social system. Social participation includes activities involving engagement with family, community, and peers. The development and acquisition of social competencies for infants and children of all ages play an important role in the extent and quality of social participation, as does the functioning of families and communities which yield opportunities for peer interaction.

Social participation of a child begins first within the family unit. Family relationships are the most stable or enduring relationships throughout an individual's life, and they impact all facets of one's development. The concept of "family" today has many definitions, and family constitution or membership varies tremendously within the same culture and across different cultures and ethnic communities. According to Jaffe, Humphry and Case-Smith,<sup>34</sup> families influence their children in many ways. They provide a sociocultural foundation for learning, and provide and foster affection and emotional support which helps to develop a child's sense of identity and emotional well-being. Families socialize members for participating in occupations within and outside the family, provide recreational opportunities, and promote health and independence in basic activities of daily living. Finally, families prepare children for formal education and employment, enabling them to assume productive roles as community members, and members of society.

Families are unique not only in membership but in the ways that they construct shared and individual roles, responsibilities, and routines. Viewing the family from a systems or ecological perspective emphasizes the idea that changes in any part of the system (new job for a parent; a new sibling; a sick grandparent) impacts every member of that family system in some way. Regardless of the methods or processes by which families operate, the adults and children go about completing their daily occupations in ways that are perceived to be most efficient and that promote homeostasis. Family functioning is measured by variables such as the amount of time family members spend with one another, their communication and interaction patterns, economic stability, the general physical and emotional health of

the family members, stress factors, and internal and external resources.

Understanding what being a family member means for a particular child is essential in your evaluation process, as is noting the nature of the caregiving, parent–child relationship. There are many sources of diversity among families. They include family membership and structure (single parents, grandparents as primary caregivers, same-sex parents, etc.), ethnic and cultural background and traditions, socioeconomic status, parental educational backgrounds and occupations, social support networks (including extended family and friends), and parenting styles, abilities and practices. These sources of diversity shape the roles, responsibilities, and activities that a particular child might be expected to assume, or participate in as a family member. Children’s occupations related to family relationships and participation may involve engaging in leisure, play, and recreational activities with family members, for example, spending an afternoon on the family boat or playing a traditional touch football game on Thanksgiving Day. Other important family activities that involve social participation might include sitting quietly during Sunday church services, baby-sitting younger siblings, eating and conversing together during mealtimes, watching television with siblings, going through a bedtime routine with a parent, and doing household chores together with siblings. A child’s ability to establish and maintain healthy relationships with family members supports his or her opportunities to participate in family activities, and helps the child fulfill his or her role as a family member. As noted earlier, family relationships provide stability, nurturance, and emotional support not only throughout childhood but for a lifetime. As families raise their children through the stages of early childhood, middle childhood, and adolescence, family members must adapt to developmental changes that affect the nature of their relationships with one another, and the type of family routines, rituals, tasks, and activities experienced by family members.

Although peers, the media, and teachers all play a significant role in a child’s socialization, parents probably have the greatest influence on the development of a child’s personality, values, and future behaviors. In infancy, parents focus on

caregiving activities, nurturance, and helping the child feel safe and secure, and on developing healthy attachment behaviors. During the preschool years, parents focus more on teaching basic self-care skills, such as dressing and toileting, and begin to make more deliberate efforts to promote their child's socialization. Parents of preschoolers have the challenging task of helping their children regulate their emotions, exhibit self-control, and learn cultural and social norms, morals, and values. During early and middle childhood, the focus of parents shifts to helping their children succeed at school. Parents also continue to help their children develop self-control and are teachers of relevant sociocultural norms and values, which ultimately influence their child's capacity for social interaction within and outside the family. During this time, parents may encourage certain extracurricular activities such as sports, regularly invite their children's friends over to play, and so on. Finally, in adolescence, parents encourage their children to develop independence and responsibility, and provide opportunities for their children to exercise independence and value-based decision making.<sup>5</sup>

There is an abundance of literature studying the relationships between mothers and their children, between fathers and their children, and among siblings, as well as the ways in which such relationships influence child development.<sup>5,35</sup> During your evaluations of children, it is important to consider the nature of the relationships among family members, and how such relationships may be contributing to a child's vulnerabilities or resiliency, and overall development.

Second to the importance of family for providing a context for social participation, is social participation with peers and the development of friendships. Older school-aged children and adolescents often report that they have the most fun when they are with their peers, regardless of the activities that they do together. Besides simply experiencing pleasure, friendships provide a context for the development of social skills, emotional regulation, self-esteem, and a child's identity. Children learn to console others, take turns, cooperate, and compromise. Good peer relations have also been associated with academic success and have been, shown to decrease the risk for deviant or problem behaviors later in

life.<sup>36</sup> The nature and importance of peer relationships and of friendships change throughout the various stages of development. Infants and young toddlers are interested in peers as they observe and explore one another and imitate simple behaviors. However, actual interactions are brief and rarely involve mutual exchanges of behavior. During the preschool years, children engage in all types of play with peers, with a tendency to prefer play with children of the same gender. During this period, peer interactions provide a rich context for development in many domains, such as social-emotional, language, motor, and cognition. Peers provide both models and reinforcement for learning about social norms, and for the development of social competence. Social participation with peers occurs with “play-dates,” in preschool and child care settings, birthday parties, and other celebrations, as well as in community programs and facilities, such as playgrounds.

In the elementary years, children begin to select playmates with whom they share similar behavioral styles and skills. Peers are especially important in the development of feelings of self-worth and to validate and share interests. School-aged children often play in large groups and may single out one or two more special playmates with whom they spend greater amounts of time. During adolescence, peer relationships become more intense with intimate friendships developing. It is common for middle school children and young teenagers to form cliques or to be identified with a specific crowd. Friendships during this time provide a source of support and leisure and recreational opportunities. Peer pressure, positive and negative, can be influential in the behavior of children, particularly from the seventh to the twelfth grade.<sup>37</sup> In addition to establishing membership in a peer group, adolescents usually have one or two close friends. Several studies have examined the personal qualities that contribute to one’s popularity. Qualities that have emerged consistently in the literature include having a pleasing personality, attractiveness, being athletic, being helpful and friendly, conforming to peer norms, being flexible and tolerant, acting naturally and confidently without being conceited, and being the “life of the party.”<sup>3</sup> As adolescents near adulthood and become

more confident with their self-identity, they begin to worry less about being accepted into groups and are more interested in developing meaningful relationships with individuals of both the same and opposite gender. Nonetheless, establishing friendships, feeling accepted by peers, and having opportunities to share, learn, and have fun with peers is important for every child throughout their development. It is therefore important to explore the extent and nature of the relationships, and social participation that a child has with his/her peers.

The family system, and one's social participation with peers, may be viewed as subsets of a larger **ecosystem**. Ecological models consider broader contextual factors such as economic and political climates and community resources, all of which influence family functioning, social, and community participation. It is important for children and their families to feel like they are part of a community. Communities provide recreational and social opportunities, and they support the general health and well-being of family systems. Social participation within one's community as an occupation for children may include activities such as going to the mall with family or friends, attending church services, playing with children in the neighborhood, doing volunteer work, using recreational facilities, and participating in arts, music, and recreational programs. Self-maintenance activities, such as accessing medical services, shopping for groceries, and going out for meals are also considered an aspect of community participation. Community participation involves family activities, activities a child might do on their own, such as attend piano lessons, and activities enjoyed with peers. It is important to realize that every community is unique in the quality and quantity of resources it provides and in the ease with which families can access available resources and programs. All children and their families need to feel like they belong, and "sense of belonging" is enhanced through time spent engaged in activities within one's community. Therefore, in the context of OT evaluations of children, it is important to explore the ways in which children and families are engaged within their communities, and the extent to which their communities are able to meet their needs.

## THE DEVELOPMENT OF PERFORMANCE SKILLS

### Motor and Praxis Skills, and Related Body Functions

Development of motor and praxis skills influences the capacities of children for learning and for performing developmentally appropriate tasks and activities. For infants and toddlers, and other children who may be nonverbal, motor, and praxis skills also support or enable communication. According to the Practice Framework,<sup>1</sup> motor skills allow a child to move physically so that he or she can interact with tasks, objects, contexts, and environments. Motor skills include skills such as sitting, standing, walking, reaching, bending, grasping, manipulating, carrying, and jumping. Related body functions supporting the performance of motor skills, or that lay the foundation for the development of motor skills, include some sensory functions, neuromusculo-skeletal, and other movement-related functions, such as reflexes, joint mobility, muscle strength, automatic reactions, and postural control, as well as cardiorespiratory functions. Therefore, some of these body functions are discussed prior to presenting information on the normal development motor skills, which are further categorized in this chapter as fine motor, gross motor, and oral-motor skills.

#### Reflexes

Sensorimotor development in early infancy is largely characterized by reflexes that dominate infant movement and behavior. Reflex behavior is an important survival function for the infant and is primarily controlled by the more primitive central nervous system areas, including the spinal cord and brainstem.<sup>38</sup> For example, infant crying behavior signals a need for care, and the rooting reflex helps the infant locate food. As infants develop, these primitive reflexes gradually disappear, most by the first year of life. Many of the reflexes are incorporated into more complex, voluntary actions. For example, the grasp reflex (with pressure into the palm of the hand, the infant curls the fingers inward and grabs onto the finger or

object) predominates until the infant is about 3 or 4 months of age. By 4 or 5 months of age, the infant can voluntarily reach out, and he or she learns to grab desired objects.

It is important to examine reflex behavior in infants and children with suspected neurologic impairments because these reflex behaviors serve as a little window into the child's central nervous system. Because data are available that describe these reflexes and identify when they tend to emerge and disappear, they serve as soft signs of neurodevelopmental maturation.<sup>38,39</sup> The examination of reflex behavior is also important because persistence of these reflexes sometimes negatively influence a child's ability to perform functional motor skills. For example, if the grasp reflex persists, the child will experience difficulty in developing hand use. Asymmetries in the performance of reflexes may also indicate neuropathology. Therefore, understanding the influence of primitive reflex patterns on behavior helps explain "why" an infant or child may be experiencing difficulty and is an indicator of neurodevelopmental maturation. The most common reflexes, and when they emerge and disappear, are presented in Table 3-6.

### **Automatic Reactions and Postural Control**

Automatic or postural reactions, including righting, protective, and equilibrium reactions, develop as the child begins to gain postural control for functional movement. Although these reactions typically are automatically performed in response to a stimulus, we can exert some level of control over them. Most of these automatic reactions are controlled at the midbrain level of the central nervous system.<sup>38</sup> The development of these reactions has been reported to occur first in prone, then in supine, then in sitting, then in a quadruped (crawling/hands and knees) position, and, finally, in standing.<sup>40</sup> They primarily serve as mechanisms for maintaining our balance as we move or are moved. As with the primitive reflexes, automatic reactions provide information about the quality of a child's movement, may be influential in a child's ability to acquire increasingly complex motor skills, and provide information about neurodevelopmental maturation. The developmental progression of automatic reactions is detailed in Table 3-7.

**TABLE 3-6** PRIMITIVE REFLEX PATTERNS

<b>Reflex</b>	<b>Stimulus</b>	<b>Response</b>	<b>Age Emerges</b>	<b>Age Fades</b>
Rooting	Stroke side of mouth	Head turns toward stimulus	28 weeks gestation	3–7 months; longer in nursed babies
Sucking	Place finger on lips	Infant sucks	28 weeks gestation	3–7 months
Palmar grasp	Pressure with finger into palm of the hand	Fingers flex in tight grip	30 weeks gestation	2 months
Placing (arms)	Touch back of hand on tabletop	Places hand on table with flexion then extension	36 weeks gestation	2 months
Placing (legs)	Touch dorsum of foot on tabletop	Leg flexes then extends to place foot on table	36 weeks gestation	2 months
Stepping	Upright, slightly tip forward, placing some weight on bottom of feet	Rhythmic, alternating steps	35 weeks gestation	3 months
Plantar grasp	Pressure with finger on bottom of each foot	Toes flex	25 weeks gestation	12 months
Asymmetrical tonic neck	In supine, turn head to one side	Extension of arm and leg on face side; flexion of limbs on skull side	1 month	4 months

(continued)

TABLE 3-6 PRIMITIVE REFLEX PATTERNS (Continued)

Reflex	Stimulus	Response	Age Emerges	Age Fades
Symmetrical tonic neck	Prone, with infant on your lap, flex neck, observe; then extend neck	Upon flexion, arms flex, legs extend; upon extension, arms extend, legs flex	4 months	10 months
Tonic labyrinthine	Observe posture in prone, and observe in supine	Primarily a flexed posture in prone, extended posture in supine	40 weeks gestation	3 months
Landau	Hold child in prone suspension	Neck, back, arms, and legs extend	5 months	7–12 months
Moro	Support infant in semi-reclined position, release support momentarily	Arms abduct and extend and externally rotate, followed by flexion and adduction	28 weeks gestation	4 months

Contributions from: Mathiowetz V, Haugen JB. Evaluation of motor behavior: traditional and contemporary views. In: Trombly CA, ed. *Occupational Therapy for Physical Dysfunction*. 4th ed. Baltimore, MD: Williams & Wilkins; 1995: 157–185; O'Brien J, Williams H. Occupational therapy intervention: performance areas: application of motor control/motor learning to practice. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 245–274.

TABLE 3-7

THE DEVELOPMENT OF AUTOMATIC REACTIONS

Reaction	Stimulus	Response	Age Emerges
Protective responses	In sitting, gently push the child off balance, to the front, to each side, and backwards	Arm extends and places on the supporting surface to prevent falling	Front, 6-7 months; side, 7-10 months; back, 9-12 months
Head righting	In sitting or in vertical suspension, tilt the child gently from side to side and front to back	Child moves head position in opposite direction to maintain the head in alignment with the body	3-4 months
Neck on body righting	In supine, rotate the child's head to one side	Body rotates and child rolls over to prone either as a unit (log roll) or segmentally, with some dissociation of the upper and lower body	Segmental rolling emerges 4-5 months
Body on body righting	In supine, rotate the child's hips to one side	The child rotates upper body and rolls over to align the body	Segmental rolling emerges at 4-5 months
Equilibrium reactions	Can be tested with the child facing you, in prone, supine, quadruped, and standing; tilt the child's supporting surface to one side, then the other side	When tilted to child's left, lateral flexion of the right side of the trunk, head righting, abduction and extension of the right arm and leg, and trunk rotation to the right; when tilted to the right, lateral flexion of the left side of trunk, abduction and extension of the left arm and leg, trunk rotation to the left, and head righting	Prone, 5-6 months; supine, 7-8 months; sitting, 7-10 months; quadruped, 9-12 months; standing, 12-20 months

Contributions from: O'Brien J, Williams H. Occupational therapy intervention: performance areas: application of motor control/motor learning to practice. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 245-274.

The development of postural control for movement requires the ability to move against gravity, and proximal joint stability primarily at the pelvic and shoulder girdles.<sup>40,41</sup> Typical positions assumed by infants and children as they gain motor control and stability in supine, prone, sitting, quadruped (crawling position), and standing and major gross motor milestones in the first year of life are presented in Table 3-8. Figures 3-12 to 3-14 provide examples of postural control and stability observations that can be made of infants in prone, supine, and sitting positions. More formal clinical observations related to postural control and movement are described in Chapter 5.

<b>TABLE 3-8</b>		
<b>DEVELOPMENT OF GROSS MOTOR SKILLS DURING THE FIRST YEAR</b>		
<b>Age</b>	<b>Lying, Sitting, Quadreped</b>	<b>Standing and Locomotion</b>
2–4 months	In prone, lifts head 90° and weight bears mainly through the lower chest and forearms; in supine, keeps head in mid-line; when pulled into sitting by the hands from supine, may begin to flex the neck to keep the head aligned with the shoulders around 4 months; In sitting requires support, rounded back in sitting, with occasional back extensor activity; stepping reflex elicited when held in standing	
4–6 months	In prone, props on hands with back and neck extension, weight shifts from upper to lower trunk and from side to side; in supine, brings feet to mouth, shifts weight laterally, and moves into side lying. May begin to sit independently for short periods, with hand support forward and side; may begin to move in and out of sitting around 6 months	Rolls prone to supine and supine to prone; pivots in prone; partial weight bearing in supported standing

<b>TABLE 3-8</b> DEVELOPMENT OF GROSS MOTOR SKILLS DURING THE FIRST YEAR (Continued)		
<b>Age</b>	<b>Lying, Sitting, Quadreped</b>	<b>Standing and Locomotion</b>
6–8 months	No longer likes to play for extended periods in prone or supine; sits well independently with back fully extended; can use both hands in play when sitting	May begin to crawl or scoot forward; moves in and out of sitting easily; fully weight bearing in supported standing; may take some steps with both hands held 6–8 months
8–10 months	Plays well in supported sitting and moves in and out of sitting easily; crawls	Pulls self up to stand using furniture; walks with one or both hands held
10–13 months	Child may bear walk (walking on hands and feet)	May take first steps; walks well with one hand held or behind a push toy; cruises around furniture

Contributions from: O'Brien J, Williams H. Occupational therapy intervention: performance areas: application of motor control/motor learning to practice. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 245–274. Gilfoyle E, Grady A, Moore J. *Children Adapt*. 2nd ed. New York, NY: Slack, Inc; 1990.

The evaluation of some reflexes, automatic reactions, and postural control is included in standardized assessment tools such as the Motor Assessment of Infants,<sup>42</sup> Clinical Observations of Motor Performance: 2nd edition,<sup>43</sup> and the Toddler and Infant Motor Evaluation.<sup>44</sup> Quality of movement, reflexes, automatic reactions, and postural control characteristics may also be examined through formal and informal clinical observations of the infant or child as he or she moves through and maintains various positions if you have a good understanding of what to look for. For example, it is necessary to know the stimulus or position necessary to elicit a certain reflex or response and what motor or



**Figure 3-12** This 4-month-old infant can lift up her head in prone, and she seems comfortable in this position. She cannot pivot or scoot forward, and she weight bears through her mid to upper chest and forearms. Her hands tend to be in a fist position, and she kicks her legs spontaneously.



**Figure 3-13** This 8-month-old sits well independently with his back straight and can free his hands for play.



**Figure 3-14** In supine, this 4-month-old lifts her feet up, but she cannot lift her buttocks off of the floor. She moves her hands freely, brings them to midline, and can keep her head in midline.

behavioral responses are expected for infants and children of various ages.

The ability to execute normal automatic reactions, the integration of primitive reflexes, and the development of postural control provide a foundation for the development of fine and gross motor skills. If a child's fine or gross motor skills are delayed or if a child experiences difficulty learning or executing certain motor skills, then an evaluation of these foundational motor components may be helpful in uncovering some of the reasons why the difficulties exist. A child may also be experiencing musculoskeletal or orthopedic problems, such as a joint pain or deformities, muscle weakness, bone fractures, or muscle sprains that are contributing to mobility limitations and hindering the development or performance of motor skills. When such motor body function and structure problems exist, they need to be examined in more detail as part of your assessment.

### Gross Motor Skills

The development and performance of gross motor skills largely depends upon the following body functions: muscle strength, postural control and balance, muscle tone, range of

motion and agility, motor coordination, and motor planning. Sensory awareness and processing, particularly of the vestibular, proprioceptive, and visual sensory systems, also contribute to motor skill performance. Cognitive components, such as attention and problem-solving abilities, and psychological components, such as motivational factors, interests, and values, may also be contributing factors. Contextual factors, such as a lack of experience, or frequent opportunities with certain motor activities, also affect a child's level of competency in performing motor tasks. Typical progression of gross motor skills is presented in Tables 3-8 and 3-9.

The ability to learn and perform fine motor skills such as pinching, reaching, grasping, and holding depends upon many of the same underlying body functions and structures needed for gross motor movement. These include muscle strength, postural control, muscle tone, range of motion and agility, motor coordination, and motor planning, in addition to visual motor control and bilateral hand use. Sensory awareness and processing, particularly of the tactile, proprioceptive, and visual sensory systems, contributes to fine motor skill performance, as does the same cognitive and contextual factors discussed above related to gross motor development. The normal developmental progression of fine motor skills is presented in Tables 3-10 and 3-11. Generally, upper-extremity function progresses from gross motor movements to fine motor, proximal control to distal, and mass movements to

TABLE 3-9

DEVELOPMENT OF GROSS MOTOR SKILLS  
FROM 1 TO 18 YEARS OF AGE

Age	Functional Mobility	Gross Motor Skills
1–1.5 years	Walks well for very short distances; may use a wide base of support, and falls frequently, especially over uneven ground; uses high chair for meals, crib for sleeping, and stroller for long walks	Crawls up and down stairs with supervision; rides a push riding toy; throws toys with little accuracy, climbs up a ladder with supervision

TABLE 3-9

DEVELOPMENT OF GROSS MOTOR SKILLS FROM 1 TO 18 YEARS OF AGE (*Continued*)

Age	Functional Mobility	Gross Motor Skills
1.5–2 years	Begins to run, although poorly coordinated; jumps down from a raised surface of a few inches with one foot leading; walks short distances; typically uses stroller for longer walks; continues to use high chair for meals and crib for sleeping	Jumps clearing both feet from the ground; walks up and down stairs by placing both feet on each step and using the railing for support; kicks and tosses a ball but with little accuracy; uses a playground slide with minimal assistance and enjoys playing on playground equipment designed for toddlers; likes to walk with pull toys; and operates push riding toys easily
2–3 years	Begins to negotiate playground equipment but needs close supervision; needs assistance to use standard-sized toilets; continues to require a stroller for longer walks; running is better coordinated, and can stop and change direction without falling; climbs in and out of car seat and out of crib	Rides a tricycle; enjoys playground equipment, running, jumping, and climbing; jumps down from a raised surface with both feet together; catches a medium-sized playground ball against chest; stands on one foot for a few seconds; may hop on one foot
3–5 years	Manages sitting and mobility skills safely to use standard toilet and to get in and out of child's bed; may use a booster seat for meals; often does not use stroller after 4 years of age except for longer walks; manages stairs going up and down with alternate feet by 4–5 years	Begins to learn specific skills such as swimming and skating; may participate in organized recreational programs such as soccer, dance, or swimming lessons; can pump a playground swing and play safely on playground equipment by 4–5 years; gallops and skips; rides a two-wheeled bike with training wheels; turns a somersault and hops on one foot; can toss, kick, and catch a medium-sized ball with some degree of accuracy

*(continued)*

TABLE 3-9 DEVELOPMENT OF GROSS MOTOR SKILLS FROM 1 TO 18 YEARS OF AGE (Continued)		
Age	Functional Mobility	Gross Motor Skills
5–7 years	Rides a two-wheeled bike without training wheels; learns specific skills, such as skating and swimming; begins to participate in organized team and individual sports activities; can complete complex, multistep motor sequences, such as those required for dance or martial arts; participates in regular physical education programs at school	
7–12 years	May be able to jog 1–2 miles; throws a small ball toward a target, and able to catch a small ball; may participate in more advanced competitive sports activities; develops specific interests and skills related to gross motor recreational activities; begins to concern self with physical fitness, and participates in regular physical education programs at school	
12–18 years	Continues to concern self with physical fitness and to participate in regular physical education programs at school; participation in team sports may decline during this period; some adolescents will advance their skills in specific sports activities, and participation in sports and physical recreational activities is influenced by sociocultural factors, family and peer influences, and individual preferences	

Contributions from: Gilfoyle E, Grady A, Moore J. *Children Adapt*. 2nd ed. New York, NY: Slack, Inc; 1990. O'Brien J, Williams H. Occupational therapy intervention: performance areas: application of motor control/motor learning to practice. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 245–274.

more specific, and refined movements. Hand function develops first on the ulnar side, then radial, and overall movement develops from asymmetrical patterns to more symmetrical patterns.<sup>45</sup>

Oral-motor skills are necessary for both feeding and expressive language. Because the oral-motor movements (particularly tongue movements) involved in producing language are very intricate, oral-motor performance may be viewed as a type of fine motor skill. Speech pathologists are specifically trained in the analysis of oral-motor movements for speech production and swallowing, and their roles overlap with

**TABLE 3-10**

**DEVELOPMENT OF REACH, GRASP, AND RELEASE OF OBJECTS**

Age	Description of Typical Patterns Used
0-2 months	Palmar grasp reflex is strong; hands are usually fistled; has visual regard for hands; puts hands in mouth; unable to reach
2-4 months	Palmar grasp reflex is strong; hands often fistled and clasped together; begins to reach for objects; with poor motor control; holds onto objects placed in hands momentarily with gross fistled grasp; often puts hands in mouth; frequent visual regard for hands; demonstrates full active range of movement of fingers, wrists, and hands during spontaneous play, but unable to grasp objects
4-8 months	Palmar grasp reflex weakens; reaches for objects easily; picks up and holds objects like a 1" block using primarily an ulnar, palmar, fistled grasp; shakes rattles; picks up tiny objects with a raking motion and by trapping the object between the thumb and the side of the index finger (scissor grasp); holds larger objects (e.g., a tennis ball) using both hands together, with poor control; transfers objects from one hand to the other; proficient at bringing hands to mouth; puts objects in mouth
8-12 months	Palmar grasp reflex fades; uses gross fistled grasp on objects using the radial side of the hand more than the ulnar; uses a mature pincer grasp to pick up tiny objects; transfers objects from one hand to the other; uses both hands together to pick up and hold larger objects (e.g., a tennis ball or a baby bottle); has voluntary release of objects, although poorly controlled, and likes to throw, bang, and dump objects; does not yet demonstrate a hand preference; does not have in-hand manipulative abilities
1-2 years	Uses a mature pincer grasp to hold tiny objects (object held between the tip or pad of the index finger and the thumb, with the thumb opposed and the wrist extended); uses a radial palmar grasp to pick up a 1" cube and a pronated finger grasp on cylindrical objects; has controlled release of objects; stacks about five 1" blocks; scribbles when given a crayon

Contributions from: Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56-83. Exner CE. Evaluation and interventions to develop hand skills. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St. Louis, MO: Mosby-Year Book, Inc; 2010: 275-324.

TABLE 3-11 DEVELOPMENT OF FINE MOTOR DEXTERITY, IN-HAND MANIPULATION, AND BILATERAL HAND USE	
Age	Characteristics
2–4 months	Holds onto objects placed in hands momentarily with gross fistled grasp; hands often clasped together
4–8 months	Shakes rattles; picks up tiny objects with a raking motion and by trapping the object between the thumb and the side of the index finger (scissor grasp); uses both hands together to hold larger objects (e.g., a tennis ball or a baby bottle), but with poor control; begins to transfer objects from one hand to the other; proficient at bringing hands to mouth; puts objects in mouth
8–12 months	Transfers objects from one hand to the other easily; uses both hands together to pick up and hold objects such as a tennis ball and a baby bottle; has voluntary release of objects, although poorly controlled, and likes to throw, bang, and dump objects; does not demonstrate a hand preference; able to pick up tiny objects with a pincer grasp; finger feeds self; does not have in-hand manipulative abilities
1–2 years	Beginning in-hand manipulation (able to move objects from fingers into palm or to perform finger to palm translocation); has controlled release of objects and can play with shape sorter toys and large insert puzzles; stacks about three to five 1" blocks; uses both hands together to carry objects and claps hands; will stabilize with one hand while manipulating with the other; can scribble; uses a spoon and drinks from a sippy cup; tosses a small ball, with little accuracy; activates more complex cause-effect push-button toys and pop-up toys; turns pages of a book and likes to point isolating index finger; enjoys banging and throwing objects
2–3 years	In-hand manipulation develops and can move objects from the palm into the fingers without help from the other hand (palm to finger translocation); develops controlled release with shoulder, elbow, and wrist stability; stacks about four to seven 1" blocks; uses both hands together to open simple containers with lids; winds wind-up toys, strings large beads; copies a simple line and a circle; colors large forms; snips with scissors

3–4 years	Can do simple fasteners such as large buttons and uses hands well to dress and undress; uses mature tripod grasp on a pencil, colors in the lines, and copies simple shapes; strings beads; cuts out large shapes with scissors; builds with construction toys such as Tinker Toys and Duplo blocks; dresses dolls
4–6 years	Tie shoes; prints name; copies all letters, numbers, and short sentences; can do fasteners such as buttons, snaps, and zippers; uses fork and knife for cutting; completes puzzles up to 20 pieces; enjoys building with construction toys such as Lego blocks; opens most packaging; manages a computer mouse
7–10 years	Learns cursive writing; develops good dexterity for constructing models and other craft projects with small pieces; puts together intricate Lego and other types of models; can create craft projects using tools such as hole punches, staplers, glue, scissors, and needle and thread; can tie knots, cut small shapes with scissors, and make intricate life drawings; proficient and graceful with eating utensils; can manage more complex hygiene activities, such as using nail clippers and styling hair; uses computer keyboard and mouse, texting, although may not use most efficient keyboarding techniques; may develop a specialized skill, such as playing the piano or needlework
10–18 years	Keyboarding speed, and hand use for computer use becomes more proficient; drawing and handwriting abilities improve; may develop specific fine motor skills depending on interests, such as pursuing various forms of art, needlework, and music; able to use tools for completing school science projects and activities such as stapler, hole punch, compass

Contributions from: Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56–83; Gilfoyle E, Grady A, Moore J. *Children Adapt*. 2nd ed. New York, NY: Slack, Inc; 1990; Exner CE. Evaluation and interventions to develop hand skills. In: Case-Smith J, O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St. Louis, MO: Mosby-Year Book, Inc; 2010: 275–324; DeHart G, Stroufe LA, Cooper R. *Child Development: Its Nature and Course*. 5th ed. New York, NY: McGraw-Hill; 2004.

occupational therapists in the evaluation of oral-motor function. The development of oral-motor and feeding skills was presented earlier in Table 3-4.

### **Cognitive Skills**

Cognitive development refers to development of the mental processes of thinking and understanding, and the ability to use the senses to gather information and make sense of the world. According to the OT Practice Framework, cognitive skills are actions one uses to plan and manage the performance of activity such as being able to initiate, organize, and complete a task. Other cognitive skills include problem solving, using sound judgment, and being able to prioritize and sequence activities. The development of cognitive skills is a complex process that begins as soon as infants are born, or even earlier, and has largely been studied by developmental psychologists. Several theorists have proposed explanations for how cognitive development takes place. Jean Piaget is probably the best-known theorist, and he developed a series of stages describing cognitive development from infancy to young adulthood.<sup>12</sup> Specific cognitive skills expected of children at various ages are presented in Table 3-12. Formal assessment of cognition, intelligence, and learning abilities is often carried out by educational or neuro-psychologists.

### **Communication and Social Development**

Communication and social skills are defined in the OT Practice Framework<sup>1</sup> as behaviors a child uses to communicate and interact with others. These include skills such as the ability to use language and communicative gestures, taking turns, being able to hold a conversation, maintaining appropriate eye contact and physical space when interacting with others, forming relationships with others, and relating to others in ways that are socially and culturally appropriate given the context. Communication and social skills are essential for successful and meaningful social participation with family members, peers and the larger community.

Infants communicate primarily through crying behavior, and parents report that they can determine their child's basic

**TABLE 3-12** DEVELOPMENT OF COGNITIVE SKILLS

Age	Cognitive Skill
0–6 months	Infants learn to repeat behaviors that produce desired results (sucking thumb, shaking rattle; understands simple cause and effect); very interested the environment, especially faces; amount of time awake, alert, and attentive increases; mouths objects; recognizes familiar caregivers; coos, smiles, and babbles
6–12 months	Able to coordinate schemes applied to external objects to accomplish a goal, e.g., uses a stick to retrieve a toy; imitates simple motor movements and sounds; recognizes his or her name; begins to use tools such as spoons, for intended purpose; begins to understand that objects exist even if they cannot be seen (beginning object permanence) by searching for hidden objects; simple problem solving through trial and error; figures out simple shape sorters, pop-up toys, etc.; likes peek-a-boo; responds to simple requests
1–2 years	Develops a mature concept of object permanence (searches for hidden objects even when he/she does not see the object be moved); experiments and plays with objects in novel ways; evidence of memory functions (knows where favorite toys are kept; uses words; stranger anxiety with unfamiliar adults); proficient in activating cause-effect toys; groups and stacks toys; develops the capacity for representation or the ability to use ideas or images to represent objects or events, allowing language to emerge
2–4 years	Develops basic preschool skills, such as identifying name, body parts, age, colors, shapes, and some letters and numbers; counts objects up to 10 and may rote count further; discovers causal mechanisms, such as winding up a toy; performs meaningful actions in a sequence, such as carrying out a pretend tea party; speaks in small sentences
4–6 years	Develops an understanding of conservation of liquid volume; understands that the same amounts can appear different depending on the size and shape of the container; develops number concepts to allow for simple addition and subtraction problems; may begin to read simple words; concepts of time develop, including telling time and knowing days of the week

*(continued)*

**TABLE 3-12** DEVELOPMENT OF COGNITIVE SKILLS (*Continued*)

Age	Cognitive Skill
6–12 years	Academic performance in reading, writing, and mathematics becomes important; reading should be proficient by the end of third grade; begins abstract thinking, with logical reasoning; understands consequences of actions
12+ years	Ability for advanced abstract reasoning develops, and more advanced academics, and more responsibility for self-directed learning; has knowledge of major current events; understands consequences, and logical reasoning is more advanced and can project into the future

Contributions from: Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56–83; Parks S. *Inside Hawaii Early Learning Profile (HELP)-Administration Manual*. Palo Alto, CA: Vort Corporation; 2006; Gormly A, Brodzinsky D. *Lifespan Human Development*. 5th ed. Fort Worth, TX: Harcourt Brace Jovanovich; 1993; Piaget J. *Psychology and Epistemology: Towards a Theory of Knowledge*. New York, NY: The Viking Press; 1971; DeHart G, Sroufe LA, Cooper R. *Child Development: Its Nature and Course*. 5th ed. New York, NY: McGraw-Hill; 2004.

needs (tired/need for sleep and hunger) through their child's cries within the first 3 months of life.<sup>4</sup> Research evidence also supports the idea that infants are preprogrammed or genetically predisposed to attend to language.<sup>4</sup> Reciprocity refers to mutual social exchanges between the infant and caregiver, and this behavior becomes more evident as the infant's awake time increases; as motor behavior, including reaching and head control, improves; and as the infant becomes more able to attend. By the end of the third month of life, most infants begin to show some preferential responsiveness to their parents or caregivers and begin to smile. Social exchange/reciprocity also increases as the infant becomes more responsive and able to display feelings of frustration, surprise, sadness, and happiness through facial expressions and vocalizations. By 3 to 4 months of age, the infant learns to smile and use facial expressions to communicate surprise, distress, or happiness. At this time, they also engage in prelanguage cooing and babbling and may enjoy simple interactive games such as peek-a-boo. Between 6 and 12 months of age, infants develop the use

of gestures, such as pointing toward desired objects, waving bye-bye, and lifting up their arms to communicate that they want to be picked up.<sup>47</sup> Socially, in the first year of life, infants become very attached to their caregivers, and learn to distinguish their caregivers from others. They are also interested in other people, and while they may have limited capacities for interaction, they tend to enjoy observing others and being in the company of other children and adults.

Infants learn and use their first words, such as “mama,” “juice,” “ball,” or “dada,” around 12 months of age. It is important to note that the development and use of language is largely a cognitive skill; however, expressive language or talking also requires motor planning, sequencing, and coordination of intricate oral-motor movements. Between 2 and 3 years of age, the use of language increases dramatically, with the average 3-year-old using 3,000 to 4,000 words,<sup>48</sup> and constructing three- to five-word phrases or short sentences. Language is typically well developed by 4 to 5 years of age.<sup>4</sup> As children develop language, they become more and more interested in interacting with others and develop the capacity for engaging in social forms of play with peers. Pragmatic skills or one’s ability to read social cues from others, and use language in a social context also develops.

## Emotional Regulation Skills

According to the OT Practice Framework,<sup>1</sup> emotional regulation skills are behaviors that children might use to express and manage their feelings while engaging in activities, and/or with others. Emotional regulation skills help children maintain appropriate levels of activity or states of arousal in a given context. Emotional regulation skills such as being able to persist when challenged, being empathetic towards others, and being able to control one’s anger influence a child’s motivation, social interactions, frustration tolerance, self-esteem, and levels of stress.

During the first 3 months of life, infant behavior is largely reflexive and to some extent preprogrammed with built-in protective mechanisms.<sup>4</sup> These predispositions assist infants in developing self-regulation and in meeting their

physiological and psychological needs. They also provide a foundation for healthy social-emotional growth. Infant cries may be distinguished to signal hunger, need for sleep, or desire for attention. Infants are believed to be preprogrammed to be attracted to human faces because of the type of contrasting visual stimuli provided by faces and to respond to human speech. Brazelton and Cramer<sup>49</sup> reported that infants are adaptable in that they can accommodate, to some extent, to the style of caregiving provided by their parents or caregivers. It is important that infants experience some consistency and routine in their care; that they feel loved, safe, and secure; and that they are well-nourished.

In understanding typical infants, it is important to consider temperament. Temperament refers to various behavioral dimensions, including general mood, activity level, adaptability, persistence, and emotional responsiveness.<sup>50</sup> Research indicates that individual differences with respect to these behavioral characteristics (e.g., a fussy versus an easy-going baby or a shy versus an outgoing infant) are relatively stable or consistent over time and may reflect the child's individual personality traits.<sup>51</sup> It is important for parents to understand their infant's temperament because it is often helpful for them to adjust their parenting style to better match the temperament of their child.

Attachment is defined as an enduring emotional bond between infant and caregiver.<sup>52</sup> Attachment relationships are crucial because they become part of the infant's coping skills (they look for comfort specifically from their caregiver when stressed), and they provide the infant with feelings of security necessary for the child to later explore the environment freely.<sup>52,53</sup> Various behaviors have been identified to evaluate attachment behavior in infants. For example, typically by 10 to 12 months of age, infants display separation anxiety or feelings of distress when separated from their parent or primary caregiver. At this age, infants show emotion when reunited with their caregiver after they were left temporarily, such as squealing and bouncing up and down with arms outstretched. Different patterns of attachment have been described and an abundance of literature has examined the relationships between caregiving and parenting qualities, and attachment behavior.<sup>53,54</sup>

Toddlers, from about 1 to 3 years of age, learn to cope with rules while becoming more self-reliant, and further develop their social skills and relationships with family members and peers. Toddlers decrease the amount of physical closeness or contact with their caregivers and begin to show less distress when a caregiver temporarily leaves. Toddlers are interested in objects in their environment and like to ask about and share their experiences with others, and they are routinely observed imitating others. With an increase in use of language, toddlers and preschoolers begin to engage in social, interactive play with peers, learn to take turns, share, and perform different roles in games such as hide and seek. During the toddler period, knowledge of one's own existence as a separate individual emerges to begin the development of one's self-concept.

The daunting task of parents during this period is to encourage their toddler's growth and independence while setting limits and clear expectations for appropriate behavior. It is believed that the child's ability to adapt during this period is largely the result of the quality of early attachment relationships as well as the consistency and clarity of parental guidance.<sup>55</sup> Some specific behaviors reflective of healthy infant and toddler psychosocial and emotional development are presented in Table 3-13.

TABLE 3-13

## PSYCHOSOCIAL, COMMUNICATION, AND EMOTIONAL REGULATION OF INFANTS AND TODDLERS

Age	Typical Behavior and Skills
0–3 months	Communicates through cries, facial expressions, and body postures; turns in the direction of voices and establishes eye contact; enjoys physical contact; is calmed by sucking, being held; begins to smile
3–6 months	Expresses emotions such as happiness, sadness, anger, fear, or distress; interested in faces; is calmed when picked up; smiles, coos, babbles, and laughs; explores body parts visually and through touch and mouthing; looks in response to name; develops strategies to calm self; establishes a routine for eating and sleeping; may begin to distinguish caregiver from others

(continued)

TABLE 3-13

PSYCHOSOCIAL, COMMUNICATION,  
AND EMOTIONAL REGULATION OF  
INFANTS AND TODDLERS (Continued)

Age	Typical Behavior and Skills
6–12 months	Imitates sounds and may speak first words; plays strange by being distressed when caregiver leaves; anticipates being picked up by reaching; loves to explore environment; displays likes and dislikes; enjoys watching others and is interested in other children; enjoys social games with adults, e.g., patty-cake; waves bye-bye, and responds appropriately to facial expressions; may begin to show distress when caregiver leaves around 9–10 months
1–2 years	Displays clingy behavior with the parent and is often distressed when the parent leaves but moves freely away from the parent when the parent is nearby; likes to do things for self and may resist adult control; enjoys being the center of attention, recognizes familiar people versus strangers; identifies self in mirror; shows toy preferences; expresses a variety of emotions; expresses affection, including giving hugs and kisses; may display anger and frustration with temper outbursts; language use increases; identifies familiar objects, including body parts and animals; has a vocabulary of at least 15–20 words and follows simple directions, such as “bring me your shoes”; interacts briefly with other children but engages mostly in solitary and parallel play
2–3 years	Has good receptive language; vocabulary is >500 words; engages in simple dialog with sentences of 3–5 words; defends possessions but begins to learn to share and take turns, although difficult for the child; begins to socially interact in play and likes to be with peers; is shy with strangers; can follow simple rules; may display anger and frustration with temper outbursts; takes pride in achievements; insists on performing self-care tasks independently

Contributions from: Bates E, Bretherton I, Snyder L. *From First Words to Grammar*. Cambridge, UK: Cambridge University Press; 1988; Bloom L. Language acquisition in its developmental context. In: Damon W, series ed. Kuhn D, vol ed. *Handbook of Child Psychology: Vol 2. Cognition, Perception, and Language*. 5th ed. New York, NY: Wiley; 1998: 309–370; Bukatko D, Daehler M. *Child Development: A Thematic Approach*. 6th ed. Boston, MA: Houghton Mifflin Co; 2011; Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56–83; DeHart G, Sroufe LA, Cooper R. *Child Development: Its Nature and Course*. 5th ed. New York, NY: McGraw-Hill; 2004.

During the early and middle childhood years, children become increasingly more self-reliant. By age 5 years, many play in their neighborhoods or at a friend's house, and most attend kindergarten. Peer relationships and the development of early relationships become increasingly important. Social competency is difficult to measure, but some indicators include number of friends, ability to get along with others, being liked by peers, and teacher ratings of social competency.<sup>4</sup> Social competency is important because not only is being with friends fun but peer groups provide a rich learning environment for children. Peer groups provide opportunities for children to learn about social and cultural norms and values and the concepts of fairness and right from wrong.

As children reach school age, they learn to take more responsibility for self-control, monitoring, and directing their own behavior. Children learn to wait, to develop some tolerance for frustration, and to control their anger. They also develop empathy and learn to value helping others. Their sense of self continues to develop through their experiences and as their unique strengths, challenges, and interests become more apparent. They also become more aware of gender and gender differences. Generally, most school-aged children have positive self-esteem and self-evaluate their behaviors and skills favorably. They begin to compare their abilities with those of their peers at around 7 years of age. The increasing importance of peers, however, does not lessen the developmental importance of the family on the child's social-emotional growth during this period. Family relationships change as the child matures and is given more responsibility. Parenting styles, from permissive to strict, have an impact on children's behavior. However, regardless of parenting style, support from caregivers, their interest and involvement in their children's activities, and their guidance and approval are all important to every child's growing sense of self and ability to adhere to social norms and responsibilities. Adolescence is a time of transition, as teenagers struggle to claim their independence, their identities, and social acceptance. During this time, vulnerability toward antisocial or mental health problems such as substance abuse, gang-related violence, and depression increases.<sup>58-60</sup> Peer relations continue to be very important, as

TABLE 3-14

## PSYCHOSOCIAL AND EMOTIONAL DEVELOPMENT OF SCHOOL-AGED CHILDREN AND ADOLESCENTS

Age	Typical Psychosocial and Emotional Behavior and Skills
4–6 years	Plays well with others, shares, and takes turns; has and enjoys being with friends; can visit at a friend's house and may sleep over at a friend's house for the first time; follows simple rules and directions; apologizes for errors that hurt others; likes to help others and shows empathy; displays and can identify various emotions in self; has some self-control over anger or disappointment when denied own way; views self positively and views self with respect to physical traits; takes pride in own work and construction play; timid/shy with strangers; has definite likes and dislikes
6–12 years	Peer relationships are important, and more time is spent with peers than with family members; loyal friendships develop; school-aged children view themselves in terms of psychological traits by comparing themselves with others and through peer group membership; gender roles become more pronounced; develop self-discipline and self-control and respect for persons in authority
12+ years	Adolescence may be a time of emotional turmoil, as teens struggle with their desire for independence and need for support, guidance, and limit setting; adolescents may engage in risk-taking behavior, and they continue to be greatly influenced by their peer group; early adolescence is often characterized by a struggle with self-identity, moodiness, and a tendency to return to immature behavior when stressed. By the final high school years, adolescents demonstrate more emotional stability, self-reliance, and concern for the future; a decrease in conflict with parents; and an increased capacity for delayed gratification and compromise. Some signs of psychosocial and behavioral problems include a marked decline in school performance, anxiety, hyperactivity, and sleep and eating disturbances; persistent noncompliance and aggressive behavior, excessive complaints of physical ailments, opposition to authority figures, withdrawn behavior, negative self-statements and depressed mood, difficulties with social relationships, and substance abuse

Contributions from: Davidson D. Psychosocial issues affecting social participation. In: Case-Smith, J O'Brien JC, ed. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 404–433; DeHart G, Sroufe LA, Cooper R. *Child Development: Its Nature and Course*. 5th ed. New York, NY: McGraw-Hill; 2004; Case-Smith J. Development of childhood occupations. In: Case-Smith J, O'Brien JC, eds. *Occupational Therapy for Children*. 6th ed. St Louis, MO: Mosby; 2010: 56–83; Cronin A. Emotional and behavioral disorders. In: Lane S, Bundy A, eds. *Kids can be Kids: A Childhood Occupations Approach*. Philadelphia, PA: F.A Davis Co; 2012: 507–524.

is the teen's development of sense of self, self-confidence, and perceived competencies. Some specific behaviors reflective of typical psychosocial and emotional development, and competencies expected during the early and middle childhood year through adolescence are described in Table 3-14.

## Summary

This chapter provides a brief overview of some of the more common theories of development and basic developmental principles. Important theoretical concepts related to OT were also presented, along with information about the common occupations of childhood. Finally, the normal progression of skill acquisition in a variety of developmental domains was provided. This content can be used as background information to assist you during the evaluation planning process. The age-specific activities, occupations, and skill areas discussed will give you some idea of what to expect of children at various ages. This information will help you focus your evaluation on the most important child competencies and contextual factors when evaluating children of various ages and will help you interpret your evaluation data.

## Chapter Review Questions

1. In examining your own personality, talents, and preferences what factors (“nature” and “nurture”) do you feel have contributed most to the type of person you are today?
2. In what ways does the play of a typical 18-month-old child differ from the play of a 3-year-old child?
3. Can you recall what household chores you were asked to perform and were capable of doing at 10 years of age? What roles do cultural and family values play in developing a child's competencies with respect to the performance of instrumental activities of daily living?
4. How do primitive reflex patterns and automatic reactions impact a child's performance of gross and fine and motor skills especially during the first year of life? Under what circumstances might you evaluate primitive reflex patterns and automatic reactions?
5. At what age, and under what circumstances do you feel a parent should be comfortable with leaving a child in the home alone?
6. How might a child's school experiences impact a child's development of self-concept and self-esteem? How do you feel about home schooling?
7. How does the nature and importance of social relationships change throughout childhood, and through adolescence among peers, and between parents and children?

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# 4

## STANDARDIZED ASSESSMENT TOOLS

### Introduction

This chapter provides information about the use of standardized assessment tools. The content is applicable to other occupational therapy practice areas, as most occupational therapy evaluations include the administration of standardized tests. **Norm- and criterion-referenced** standardized tools are described. Methods for evaluating **psychometric properties** of tests are presented, and information to help you select appropriate measures and understand, interpret, and report **standardized test scores** is covered in detail. The chapter concludes with a sample review of two a standardized assessment tool often used by occupational therapists with children and tables listing some of the more commonly used standardized assessment tools organized by content areas.

## DESCRIPTION OF STANDARDIZED ASSESSMENT TOOLS

**Standardized assessment tools** are those that have specific procedures for administration and scoring. Test materials and forms typically are provided in a test kit, along with a test manual. **Test manuals** describe the purpose(s) of the test and the population for which it was designed. The test construction process should also be described, along with the results of research studies examining the reliability and validity of the tool. Administration and scoring procedures are described in detail so that all individuals trained in its administration and scoring procedures administer the assessment to their clients precisely in the same manner.

Standardized assessment tools are important for providing objective data about client performance. These data may be used for (1) diagnostic purposes, (2) determining the nature and extent or severity of difficulties, (3) evaluating and documenting change in performance over time, (4) determining eligibility for an individual to attend a particular program or service, (5) predicting performance in a related task or future function, (6) program planning purposes, and (7) research purposes. Standardized assessment tools are important for advancing the scientific body of knowledge of professions, and for enhancing communication across disciplines. Objective measurement in occupational therapy clinical practice and for use in applied research also assists in improving the status of our profession and promotes evidence-based practice. There are standardized assessment tools available to examine all domain areas of interest to occupational therapists, including areas of occupation, body functions and performance skills, contexts, and performance patterns and roles. Some assessment tools measure very specific skills such as feeding, visual perception, or characteristics of a classroom, while others are very broad, such as tests that examine most areas of occupational performance. There are two types of standardized assessment tools or tests: norm-referenced and criterion-referenced.

## Norm-Referenced Assessments

Norm-referenced assessment tools provide scores that are compared with the scores of children from a specific sample, or normative group. Because a child's score on a norm-referenced test is converted to a standard score that is derived from the normative data, the score depends on the average performance of children in the normative group. Test manuals include detailed information about the normative data and the sample used to obtain it. It is important that characteristics of the normative group are relevant for your client. For example, norms of children from Denver, Colorado, may not be relevant for children living in rural Alaska; a test of gross motor skills normed on typical children may not be relevant to detect changes in gross motor performance of children with Down's syndrome; or norms of children 9 years of age may not be relevant for children 10 or 11 years of age. Norm-referenced tests typically evaluate a broad array of skills and are particularly good for diagnostic and research purposes, to evaluate change in performance, and to examine the extent or severity of identified delays or dysfunction. Depending on the particular test, norm-referenced tests may or may not be useful for the development of intervention programs.

## Criterion-Referenced Assessments

Criterion-referenced, standardized, assessment tools typically use a rating system or level of mastery to score a child's performance of particular activities or skills. This type of test helps describe specifically the skills a child can or cannot do, and it compares a child's performance with a set of criteria based on research, instead of with the performance of others. Criterion-referenced tests may also provide information regarding the amount of help or the methods children use to complete a particular activity. The administration procedures tend to be somewhat less rigid than those of normative tests. Some assessment tools, such as the Peabody Developmental Motor Scales–2 by Folio and Fewell<sup>1</sup> and the Pediatric

Evaluation of Disability Inventory by Haley and colleagues,<sup>2</sup> are both criterion-referenced and norm-referenced.

## **MAKING THE DECISION TO USE A STANDARDIZED ASSESSMENT TOOL**

Your decision to use a particular standardized assessment tool should be made after consideration of several factors, including: (1) the specific purpose or areas measured by the test; (2) whether the tool was designed for your client's age and abilities; (3) its psychometric properties, including characteristics of the normative data, reliability, and validity (discussed further in this chapter); and (4) pragmatic factors such as length of time needed, your competency in its administration, space requirements, and cost. Sound **clinical reasoning** will assist you in determining whether the child's performance on the test you are considering will provide the type of information you are looking for. You also want to select an assessment tool that is efficient and one that the child has the skill set that will permit you to administer the test in the standardized way in which it was intended to be administered. Questions you may want to ask yourself to help you decide whether or not to administer a specific assessment tool are listed in Box 4-1. Standardized assessment tools used in pediatrics by occupational therapists often focus on specific performance skills, and body functions. There are also some tools designed to measure occupational performance areas. Tables 4-1 through 4-6 provide a sample of the tools commonly used by occupational therapists, organized by the following categories: (1) developmental evaluation and screening tools; (2) occupational performance measures, including those measuring performance in activities of daily living, school-related functions, handwriting, and play; (3) assessments of sensory motor skills, including gross and fine motor skills, postural control, sensory processing, and sensory integration functions; (4) assessments measuring visual-motor and visual-perceptual skills; (5) assessments measuring psychosocial and emotional functioning; and (6) contextual assessments, including ecologic inventories.

Box 4-1QUESTIONS TO AID YOU IN DECIDING  
WHETHER TO ADMINISTER A SPECIFIC  
STANDARDIZED TEST

- What assessment information do you need?
  - Will the test yield the kind of information you and your clients are looking for?
  - Are there more efficient means of gathering the same information?
  - Is the purpose of the test consistent with your guiding frames of reference and the philosophy of your practice and setting?
  - Will the child be able to tolerate and follow the administration procedures?
  - What is your competency level in administering the test?
  - Is the necessary space and equipment available?
  - How reliable and valid is the test for the situation in which you would like to use it?
  - What tests have been administered in the past, and what were the results?
- 

## EXAMINER RESPONSIBILITIES AND ETHICAL CONSIDERATIONS

Your responsibilities as an examiner or standardized test administrator cannot be underestimated because, as noted earlier, critical decisions such as eligibility for certain programs or providing a diagnosis are sometimes made based on your test results. Responsibilities include issues surrounding **competency** and **ethics**. Competency in the administration of standardized tests to be used with children requires not only the ability to administer and score the particular test, but also an understanding of child development (see Chapter 3), knowledge of the principles of measurement, and the ability to effectively interact and establish rapport with children of various ages and personalities.

Learning to administer a standardized test is a labor-intensive process. Developing competency involves first reading and thoroughly understanding the content in the test

TABLE 4-1 STANDARDIZED DEVELOPMENTAL SCREENINGS AND EVALUATIONS

Test Name (Author[s])	Age Range	Purpose/Domains/Description and General Comments
Denver-II (Frankenburg and Dodds) <sup>3</sup>	0-6 years	A screening tool designed for children at risk for developmental problems. Domains include personal-social, fine motor adaptive, language, and gross motor. Takes 20-30 min to administer; easy to learn; psychometrics are adequate, although the number of test items is relatively small
Infant-Toddler Developmental Assessment (Provence et al.) <sup>4</sup>	0-36 months	A comprehensive, multi-disciplinary, standardized assessment system using naturalistic observation and parent report regarding eight domains: gross and fine motor, cognition, language/communication, self-help, psychosocial, and emotional. Reliability and validity are adequate; assists with early intervention programming
Hawaii Early Learning Profile (Furuno et al.) <sup>5</sup>	0-36 months	A criterion-referenced assessment tool measuring personal/social, cognition, communication, self-help, gross motor, fine motor, and visual-motor domains; a relatively quick and easy screening tool often used by interdisciplinary early intervention teams
Battelle Developmental Inventory (Newborg) <sup>6</sup>	0-8 years	Norm-referenced test including five domains: personal/social, adaptive including self-help skills; motor, expressive and receptive communication, and cognition; information is gathered through structured observations, administration of test items, and interviews and can take 1-2 hours; normative data are strong, and reliability and validity is adequate

The First Step (Miller) <sup>7</sup>	Preschool children	A norm-referenced screening tool designed to identify preschool children at risk for developmental problems. Domains include cognition, communication, motor, social-emotional, and adaptive behavior. Has strong psychometrics; quick to administer; training is recommended
Adaptive Behavior Assessment System (Harrison and Oakland) <sup>8</sup>	Birth–21 years	Parent survey (also has teacher forms) measuring adaptive behavior using a rating scale in 10 domains including communication, motor, school skills, self-care, safety, social skills, community use, home living, work and leisure; 30 minutes to administer; psychometrics are strong
Bayley Scales of Infant Development (Bayley) <sup>9</sup>	1–42 months	Norm-referenced test, including a mental scale (cognitive, language, personal/social), a psychomotor scale (fine and gross motor skills, sensory integration, quality of movement), and a behavior scale (social, interests, activity level). Takes 45–60 minutes to administer; strong psychometrics and well researched; training is recommended
Mullen Scales of Early Learning (Mullen) <sup>10</sup>	0–6 years	Norm-referenced; measures gross motor, fine motor, expressive and receptive language and visual reception; provides an Early Learning Composite Score; strong psychometrics

TABLE 4-2

## STANDARDIZED ASSESSMENTS MEASURING OCCUPATIONAL PERFORMANCE AREAS (ADL, IADL, PLAY/LEISURE, AND SCHOOL PERFORMANCE)

Test Name and Authors	Age Range	Main Purpose
Pediatric Evaluation of Disability Inventory (Haley) Haley et al. <sup>2</sup>	6 months–7.5 years	Assesses self-care, functional mobility, and social functioning through structured interview, observation, or both. Considers level of caregiver assistance and use of adapted devices; psychometric properties are strong. Suggest using updated computer version listed below.
The Pediatric Evaluation of Disability—Computer Adaptive Test (PEDI-CAT; Haley et al.) <sup>11</sup>	Birth through age 20	The PEDI-CAT is a revised edition of the Pediatric Evaluation of Disability Inventory <sup>2</sup> (listed above). It measures abilities in the three functional domains of daily activities, mobility, and social/cognitive. It also has a responsibility domain measuring the extent to which the caregiver or child takes responsibility for managing complex, multi-step life tasks. It is completed by caregivers or others who are familiar with the child. Psychometrics are strong, and research on this tool is ongoing ( <a href="http://www.bu.edu/bostonnrc/instruments/pedcat/">www.bu.edu/bostonnrc/instruments/pedcat/</a> )
Evaluation Tool of Children's Handwriting (Amundson) <sup>12</sup>	Grades 1–6	Criterion-referenced tool measuring cursive and manuscript handwriting, including alphabet and number writing, copying, dictation, and sentence generation. It assesses legibility, pencil grasp and pressure, hand preference, manipulative skills with the writing tool, and classroom performance; easy to learn; psychometrics are adequate.
Minnesota Handwriting Assessment (Reisman) <sup>13</sup>	Grades 1–3	Criterion-referenced test measuring cursive and manuscript handwriting, including speed, legibility, form, alignment with baseline, size, and letter and word space. Research is limited, although research to date supports reliability and validity; easy to administer.
School Function Assessment (Coster, Deeney, Haltiwanger, et al.) <sup>93</sup>	Children in kindergarten through 6th grade	Criterion-referenced tool for evaluating child performance, level of participation, and need for assistance in school-related activities, including physical and cognitive tasks, and behavior; psychometric properties are strong

School Assessment of Motor and Process Skills (Fisher et al.) <sup>14</sup>	School-aged children	Child is observed during 3–5 school-related tasks in context. Process (cognitive) and motor skills are measured as they relate to school performance. Training is required; psychometrics are strong.
Assessment of Motor and Process Skills (Fisher et al.) <sup>15</sup>	Children 3 years–adults	The child performs five to six tasks from a list of calibrated ADL tasks. Process (cognitive) and motor skills are measured as they relate to task performance in a given context; used to predict performance in ADL areas. Training is required; psychometrics are strong.
Vineland Adaptive Behavior Scales-II (Sparrow et al.) <sup>16</sup>	Birth through 18 years	Measures communication, daily living skills, socialization, and motor skills; uses a behavior rating scale that is completed through a structured parent interview; easy to administer; psychometrics are adequate.
Canadian Occupational Performance Measure (Law et al.) <sup>17</sup>	Children of all ages; parents may complete on child's behalf	Measures the child's performance and satisfaction in areas of self-care, leisure, and productivity through a structured interview. Helpful in prioritizing intervention goals and measuring functional outcomes; well researched, and psychometrics are adequate.
Child Occupational Self-Assessment (Keller et al.) <sup>18</sup>	Children and adolescents	Self-report measure completed during a structured interview, based on the Model of Human Occupation; includes a card sort version and a checklist form version, examining the child's perceived competencies in self-care, school-related activities and community participation.
Functional Independence Measure (Wee-FIM; Hamilton and Granger) <sup>19</sup>	Child version—6 months–6 years	Universal tool designed to measure rehabilitation outcomes related to functional skills, including self-care, mobility, sphincter control, communication, and social cognition; well researched.

(continued)

**TABLE 4-2** STANDARDIZED ASSESSMENTS MEASURING OCCUPATIONAL PERFORMANCE AREAS (ADL, IADL, PLAY/LEISURE, AND SCHOOL PERFORMANCE) (Continued)

<b>Test Name and Authors</b>	<b>Age Range</b>	<b>Main Purpose</b>
Test of Playfulness (Skard and Bundy) <sup>20</sup>	Children of all ages	60-item observational tool examining playfulness, including intrinsic motivation, suspension of reality, and internal locus of control, in the context of free play; training is required; research is ongoing, and preliminary studies support it as a valid and reliable tool.
Knox Preschool Scales—Revised, (Knox) <sup>21</sup>	Birth–3 years	A rating scale for evaluating play behaviors including space management, gross motor play behaviors, materials management, pretense-symbolic play, and social participation. Research is limited for this revised edition.
Symbolic Play Checklist (Westby) <sup>22</sup>	9 months–5 years	A norm-referenced test designed to assess a child's cognitive and language behaviors through a play observation. A description of 10 stages of play is provided. Research is limited.
Adaptive Behavior Assessment System (Harrison and Oakland) <sup>8</sup>	0–18 years	Parent survey (also has teacher forms) measuring adaptive behavior using a rating scale in 10 domains including communication, motor, school skills, self-care, safety, social skills, community use, home living, work and leisure; 30 minutes to administer; psychometrics are strong.
Children's Assessment of Participation and Enjoyment and Preferences for Activities of Children (King et al.) <sup>23</sup>	6–21 years	Questionnaire examining level of participation in recreation/leisure activities, and children's activity preferences in recreational, active-physical, social, skill-based and self-improvement domains.

ADL, Activities of daily living.

TABLE 4-3

STANDARDIZED TESTS OF SENSORY MOTOR FUNCTIONS, INCLUDING GROSS AND FINE MOTOR SKILLS, POSTURAL CONTROL, SENSORY PROCESSING, AND SENSORY INTEGRATION

Test Name (Author[s])	Age Range	Purpose/Domains/Description and General Comments
Alberta Infant Motor Scale (Piper and Dairrah) <sup>24</sup>	0–18 months	Norm-referenced; measures gross motor movements and quality of movement. Consists of 58 items with the child observed in prone, supine, sitting, and standing; takes about 30 min to administer; psychometrics are strong; well researched.
Milani-Comparetti Motor Development Screening Test (Trembath et al.) <sup>25</sup>	Birth–2 years	Criterion-referenced test measuring reflex integration, movement, postural control, and the development of antigravity positions and movement. Quick and easy to administer and score; psychometrics are fair; research is limited.
Infant Neurological International Battery (Ellison) <sup>26</sup>	1–15 months	Norm-referenced, 20-item test measuring neuromotor behavior and competency including primitive reflexes, hand and head positions, and movement. Quick and easy to administer; normed on 305 infants; reliability and validity measures are fair; research is limited.
Movement Assessment of Infants (Chandler et al.) <sup>27</sup>	2–18 months	Criterion-referenced screening tool, measuring reflexes, muscle tone, automatic reactions, and volitional movement; easy to learn; administration time is approximately 45 minutes; psychometrics are fair with few studies of validity and reliability.
Miller Assessment for Preschoolers (Miller) <sup>28</sup>	2 years, 9 months–5 years, 8 months	Norm-referenced test measuring foundational sensory and motor abilities, tactile processing, kinesthesia, balance, coordination, and motor planning functions; includes some cognitive and language items; has strong psychometric properties.

(continued)

TABLE 4-3

STANDARDIZED TESTS OF SENSORY MOTOR FUNCTIONS, INCLUDING GROSS AND FINE MOTOR SKILLS, POSTURAL CONTROL, SENSORY PROCESSING, AND SENSORY INTEGRATION (Continued)

Test Name (Author[s])	Age Range	Purpose/Domains/Description and General Comments
Toddler and Infant Motor Evaluation (Miller and Roid) <sup>29</sup>	4 months–3.5 years	Norm-referenced test with eight subtests measuring mobility, stability, motor organization, functional performance, social/emotional abilities, movement component analysis, movement quality, and atypical positions. Complex to administer, but thorough test of quality of movement and postural control; psychometrics are strong.
DeGangi-Berk Test of Sensory Integration (Berk and DeGangi) <sup>30</sup>	3–5 years	Norm-referenced test consisting of 36 items measuring postural control, bilateral motor coordination, and reflex integration. Easy to learn; takes about 30 minutes to administer; psychometrics are adequate; research is limited.
Sensory Integration and Praxis Tests (Ayres) <sup>31</sup>	4 years–8 years, 11 months	Norm-referenced test consisting of 17 tests measuring nonmotor visual perception, praxis, somatosensory, vestibular processing, and sensory motor skills. Psychometrics are strong except for test-retest reliability of four tests; extensive training is required; well researched; computer scored.
Sensory Profile (Dunn) <sup>32</sup> ; Infant-Toddler Sensory Profile (Dunn and Daniels) <sup>33</sup> ; Adolescent/Adult Sensory Profile (Dunn and Brown) <sup>34</sup>	Child version 3–10 years; Infant/toddler version, birth–3 years; Adolescent/adult version for 11 years and older	Questionnaire requiring caregivers to rate child behaviors believed to measure aspects of sensory processing, modulation, and emotional/behavioral responses to sensory input. Psychometrics are strong; easy to administer and score. Adolescent/adult version is a self-report measure.

Test of Sensory Function in Infants (DeGangi and Greenspan) <sup>35</sup>	4–18 months	Provides an overall measure of sensory processing and reactivity; includes 24 items measuring reactivity to tactile deep pressure and vestibular input, adaptive motor functions, visual-tactile integration, and ocular-motor control. Reliability and validity are adequate.
Sensory Processing Measure (Home, Main Classroom, and School Environments Form); <sup>36</sup> Preschool Edition, Home and School Forms <sup>37</sup>	5–12 years; (Pre-school version, 2–5 years)	Provides a measure of sensory processing with norm-referenced scores for 8 areas: social participation, praxis, visual and auditory processing, touch/tactile processing, body awareness/proprioception, vestibular processing, and total sensory systems. Psychometrics are strong.
Touch Inventory for Elementary School-Aged Children (Basic-Royeen and Fortune) <sup>38</sup>	Elementary school–aged children	Questionnaire completed by caregivers who are required to rate their child's behaviors on various behaviors believed to measure sensory processing in the following areas: visual, gustatory/olfactory, proprioception, tactile, and vestibular processing. Quick and easy to administer; preliminary research on psychometrics are positive; research is limited.
Quick Neurological Screening Test-3rd edition (Mutti et al.) <sup>39</sup>	5 years through adulthood	Screening tool consisting of 15 test items measuring neurologic functions, including fine and gross motor control, motor planning, spatial organization, visual and auditory perception, and balance. Quick and easy to learn and administer; studies reported in the manual demonstrate adequate reliability and validity.
Peabody Developmental Motor Scales–2 (Folio and Fewell) <sup>1</sup>	1 month through 6 years	Norm-referenced and criterion-referenced test measuring fine and gross motor skills. Takes about 60 minutes to administer and is easy to learn; psychometrics are adequate with strong normative data; new version not well researched to date (see review at end of this chapter).

(continued)

TABLE 4-3

STANDARDIZED TESTS OF SENSORY MOTOR FUNCTIONS, INCLUDING GROSS AND FINE MOTOR SKILLS, POSTURAL CONTROL, SENSORY PROCESSING, AND SENSORY INTEGRATION (Continued)

Test Name (Author[s])	Age Range	Purpose/Domains/Description and General Comments
Bruininks-Oseretsky Test of Motor Proficiency-2 (Bruininks and Bruininks) <sup>40</sup>	4.5–14.5 years	Norm-referenced test including nine subtests measuring fine and gross motor skills. Validity is strong; reliability measures for composite scores are strong; well researched; takes about 45 minutes to administer; fairly easy to learn.
Gross Motor Function Measure-Revised (Russell et al.) <sup>41</sup>	5 months–16 years	Criterion-referenced observational tool designed to measure gross motor functions in children with cerebral palsy and Down's syndrome. Consists of 88 items; administration time is 30–45 minutes; easy to learn; psychometrics are strong.
Test of Gross Motor Development-2 (Ulrich) <sup>42</sup>	3–11 years	Norm-referenced assessment measuring basic gross motor skills; includes two subtests: locomotor and object control. Quick (about 20 minutes) and easy to administer; psychometrics are adequate; not well researched.
Quality of Upper Extremity Skills (Dematteo et al.) <sup>43</sup>	18 months–8 years	Criterion-referenced tool evaluating quality of upper extremity movement and hand function in children with cerebral palsy, including dissociated movements, grasp, protective extension, and weight bearing. Easy to administer; psychometrics are strong.
Miller Function and Participation Scales (Miller) <sup>44</sup>	2 years 6-months–7 years, 11 months	Norm-referenced; measures fine motor, gross motor and visual-motor skills in the context of functional, play and school-related tasks; psychometrics are strong.

**TABLE 4-4** STANDARDIZED ASSESSMENTS OF VISUAL-MOTOR AND VISUAL-PERCEPTUAL SKILLS

<b>Test Name (Author[s])</b>	<b>Population</b>	<b>Description/Domains/General Comments</b>
Developmental Test of Visual Perception, 2nd edition (Hammill et al.) <sup>45</sup>	4–10 years	Norm-referenced tool measuring: Eye-hand Coordination, copying, spatial relations, position in space, figure-ground, visual closure, visual-motor, speed, and form constancy; Administration time is 30–40 minutes; strong normative data, reliability, and validity.
Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery et al.) <sup>46</sup>	3–18 years	Norm-referenced design copy test. Quick and easy to administer; includes a nonmotor visual-perceptual screening and a motor coordination screening test; psychometric properties are strong.
Test of Visual-Motor Skills-3 (Martin) <sup>47</sup>	3–14 years	Norm-referenced design copy test. Quick and easy to administer. Unique in that type of errors are classified and scored to give qualitative information; psychometric properties are adequate; quick and easy to administer.
Test of Visual-Perceptual Skills (nonmotor), Third Edition (TVPS-3) (Martin) <sup>48</sup>	4–18 years	Norm-referenced test of visual perception measuring figure-ground, spatial relations, visual memory and discrimination, visual sequential memory, visual form constancy, and visual closure; Quick and easy to administer; psychometrics are adequate.
Motor-Free Visual Perception Test, Third Edition (Colarusi and Hammill) <sup>49</sup>	4–12 years	Norm-referenced test of visual perception measuring figure-ground, spatial relations, visual memory and visual closure, and visual discrimination. Quick and easy to administer; psychometrics are adequate.
Wide Range Assessment of Visual Motor Ability (Adams and Sheslow) <sup>50</sup>	3–18 years	Norm-referenced; assesses visual-spatial, fine motor and integrated visual-motor skills through design copy, visual-spatial matching and peg-board tasks; psychometrics are strong.

**TABLE 4-5** ASSESSMENT TOOLS FOR EVALUATING PSYCHOLOGICAL, SOCIAL, BEHAVIORAL, AND EMOTIONAL AREAS

<b>Test Name (Author[s])</b>	<b>Age Range</b>	<b>Description and Purpose</b>
Gardner Social Development Scale (Gardner and Gardner) <sup>51</sup>	Children of all ages	Parent questionnaire; norm-referenced assessment of social skills
Early Coping Inventory (Zeitlin et al.) <sup>52</sup>	Infants and toddlers	Observational instrument that evaluates sensorimotor organization, reactive behaviors, and self-initiated behaviors, all believed to be important for effective coping
Neonatal Behavioral Assessment Scale (Brazelton) <sup>53</sup>	Infants	Rating scale that assesses reflex behavior and motor maturity, responses to sensory stimuli, temperament, and adapting and coping strategies
Functional Emotional Assessment Scale (Greenspan et al.) <sup>54</sup>	3–48 months	Evaluates emotional and social capacities throughout different stages of sensory motor and cognitive development; a rating scale to assist in organizing and interpreting unstructured observations of the child and the child with his or her caregiver(s)
Temperament and Atypical Behavior Scales (Bagnato et al.) <sup>55</sup>	Birth–3 years	Rating scale measuring sensory regulation and attachment behaviors
KidCOTE (cited by Kunz and Brayman) <sup>56</sup>	Children and adolescents	Performance-based instrument evaluating behaviors in four areas: general behaviors, sensory motor performance, cognitive behaviors, and psychosocial behaviors
Adolescent Role Assessment (Black) <sup>57</sup>	Adolescents	Structured interview and rating scale that evaluates childhood play, socialization within the family, school functioning, socialization with peers, occupational choice, and anticipated adult work

Social Adjustment Inventory for Children and Adolescents (John) <sup>58</sup>	Children and adolescents	Semi-structured parent interview examining patterns of social function in school, community, and home environments
Social Skills Rating System (Gresham and Elliot) <sup>59</sup>	Preschool; grades K-7; grades 7-12	Standardized norm-referenced scales including parent, teacher, and child forms; examines social behavior and relationships
Evaluation of Social Interaction (Fisher and Griswold) <sup>60</sup>	4 years through adulthood	A performance measure of social interaction skills that is to be completed in a natural context among typical social partners
Adolescent Behavior Checklist (ABC) (Demb et al.) <sup>61</sup>	12-21 years	Identifies behaviors indicating risk of psychiatric disturbance
Autism Diagnostic Observation Schedule II (Lord et al.) <sup>62</sup>	12 months through adulthood	A standardized, observation-based assessment of communication, social interaction, play, and restricted and repetitive behaviors used to assist in the diagnostic process
Beck Depression inventory II (BDI-II) (Beck et al.) <sup>63</sup>	13 years through adulthood	An assessment of the intensity of depression; self report measure
Behavior Assessment Rating Scale, 2nd ed. (BASC-2) (Reynolds and Kamphaus) <sup>64</sup>	2-21 years	A structured development history and student observation to be completed by teacher, parent, and self-rating

(continued)

**TABLE 4-5** ASSESSMENT TOOLS FOR EVALUATING PSYCHOLOGICAL, SOCIAL, BEHAVIORAL, AND EMOTIONAL AREAS (Continued)

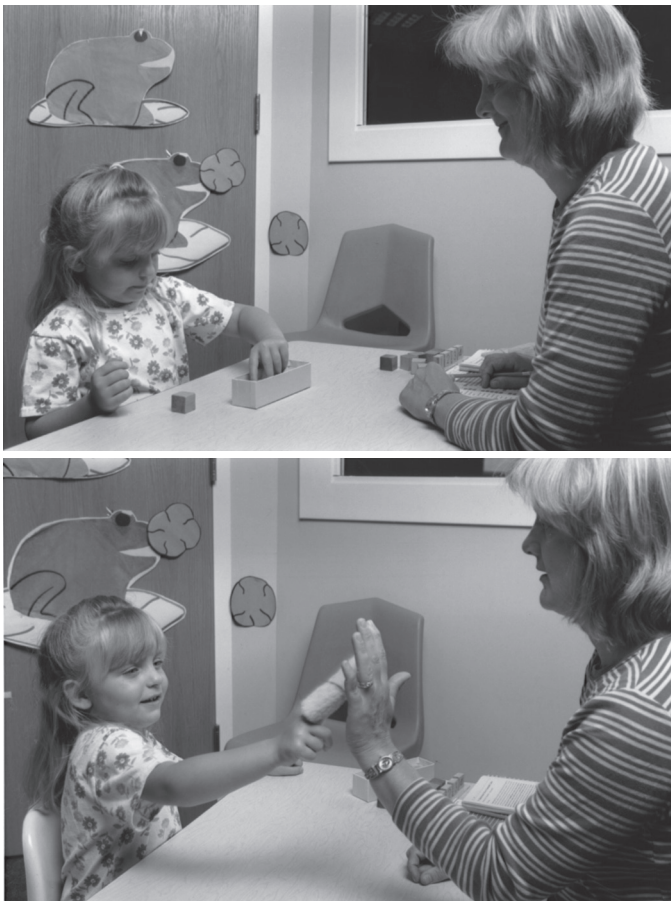
<b>Test Name (Author[s])</b>	<b>Age Range</b>	<b>Description and Purpose</b>
Child Behavior Checklist for Ages 6–18 (Achenbach) <sup>65</sup>	6–18 years	A form to be completed by the child's parent or caregiver based on the child's competencies or behavioral problems
Coping Inventory (Zeitlin) <sup>66</sup>	3–16 years	Assessment of coping habits, skills, and behaviors
Pediatric Volitional Questionnaire (PVQ), version 2 (Basu et al.) <sup>67</sup>	2–7 years	An evaluation of a child's motivation through play-based observation
Piers-Harris Children's Self Concept Scale, 2nd Edition (Piers et al.) <sup>68</sup>	7–18 years	A measure of a child's perceptions via a self-report of psychological health in children and adolescents

TABLE 4-6

## ASSESSMENT TOOLS FOR EVALUATING ENVIRONMENT/CONTEXT

Title (Author[s])	Description and Purpose
Assessment of Home Environments (Yarrow et al.) <sup>69</sup>	Designed to be used for early intervention; structured observations; examines qualities of the home environment of infants for promoting development.
Child Care Centre Accessibility Checklist (Metro Toronto Community Services) <sup>70</sup>	Examines and measures the level of barrier-free accessibility of child care environments.
Classroom Environment Index (Stern and Walker) <sup>71</sup>	A self-administered questionnaire examining the student's perception of the classroom environment and the student-environment fit.
Classroom Observation Guide (Griswold) <sup>72</sup>	An observational guide that examines qualities of activities, people, and communication patterns in a classroom environment.
Environment Assessment Index (Poresky) <sup>73</sup>	Questionnaire format completed by structured observations and interview; examines characteristics of home environments for children aged 3–11 years living in rural areas for promoting education and development.
Home Observation for the Measurement of the Environment—Revised (Caldwell and Bradley) <sup>74</sup>	Structured observations and interview format; examines physical, social, and cultural contexts of the home environment of children from birth to 6 years of age.
Infant/Toddler Environment Rating Scale (Harms et al.) <sup>75</sup>	Examines the quality of child care environments for children up to 30 months; based on structured observations.
Person-Environment Fit Scale (Coulton) <sup>76</sup>	Self-report questionnaire measuring person-environmental fit through the examination of physical, social, and cultural contexts.
Classroom assessment scoring system (CLASS) (La Paro et al.; Bridget et al.) <sup>77,78</sup>	An observational tool that can be used to measure aspects of classroom environments.
School Setting Interview (SSI) Version 3 (Hemmingsson et al.) <sup>79</sup>	A child or adolescent with disability completes a self-report evaluating the environmental impact on function and performance in school setting.

manual. It is important to understand the test development processes, the test's purposes, the strengths and characteristics of the normative data, the reliability and validity data, and the technical aspects of test administration and scoring. Examples of therapists administering standardized tests to children are depicted in Figures 4-1 to 4-3. Some standardized tests require a certification process or require therapists to go through a formal training program. However, many can be self-taught provided that you have the background



**Figure 4-1** Therapist administering a standardized test to a child.



**Figure 4-2** Therapist administering a standardized test to a child.

knowledge in child development and measurement and are willing to put the time in to read the manual carefully, learn the administration and scoring procedures, and then practice. Observing experienced therapists administer tests is another learning strategy that is often helpful.

**Competency guidelines** or **standards of practice** related to the use of standardized assessments are provided by professional organizations such as the American Occupational Therapy Association (AOTA) and by legislation such as



**Figure 4-3** Therapist administering a standardized test to a child.

the Individuals with Disabilities Education Improvement Act, 2004 (see Table 4-7). Organizations that sell testing materials, such as Western Psychological Services (see [www.wpspublish.com](http://www.wpspublish.com)) and PsychCorp/Pearson (see <http://psychcorp.pearsonassessments.com>) have competency standards and qualification forms that potential users must complete prior to purchasing certain materials. These standards are consistent with the Standards for Educational and Psychological Testing published by the American Psychological Association and prepared by the American Psychological Association in collaboration with the American Educational Research Association and the National Council on Measurement in Education.

As an occupational therapist, you also must abide by **AOTA's Code of Ethics** throughout all aspects of your service delivery, and some ethical principles apply to the use of standardized testing. It is important for you to understand the purposes and limitations of the tests that you use. For test scores to be valid, tests must be administered in the standardized manner detailed in the manual. If you must deviate from the standardized procedures to accommodate for child needs or limitations, you must disclose this in your evaluation report and interpret scores cautiously. You may decide

TABLE 4-7

EXAMPLES OF PROFESSIONAL STANDARDS FOR ADMINISTERING STANDARDIZED ASSESSMENTS

Source	Standards
AOTA Code of Ethics, 2010 <sup>80</sup>	Principle 1-D: Avoid inappropriate use of outdated or obsolete tests/assessments or data obtained from such tests in making intervention decisions or recommendations; Principle 3-B Obtain consent before administering any occupational therapy service, including evaluation
ACOTE Standards of Practice, 2011 <sup>81</sup>	An B.4.3. Use appropriate procedures and protocols including standardized formats when administering assessments
Individuals With Disabilities Education Act, 2004 <sup>82</sup>	Sec.300.304 Evaluation Procedures: (b).-3 . . . use technically sound instruments that may assess the relative contribution of cognitive and behavioral factors, in addition to physical or developmental factors . . . (c) . . . are used for the purposes for which the assessments or measures are valid and reliable; are administered by trained knowledgeable personnel; are administered in accordance with any instructions provided by the producer of the assessments

to use descriptive interpretations only instead of reporting the scores. Assessment information obtained through administration of the test can still be valuable as clinical observation data and can be used in the interpretation process. It is also important (as always) to respect client rights, including matters related to confidentiality and the client's right of refusal to participate in or agree to procedures.

## INTERPRETATION OF STANDARD SCORES FROM NORM-REFERENCED ASSESSMENTS

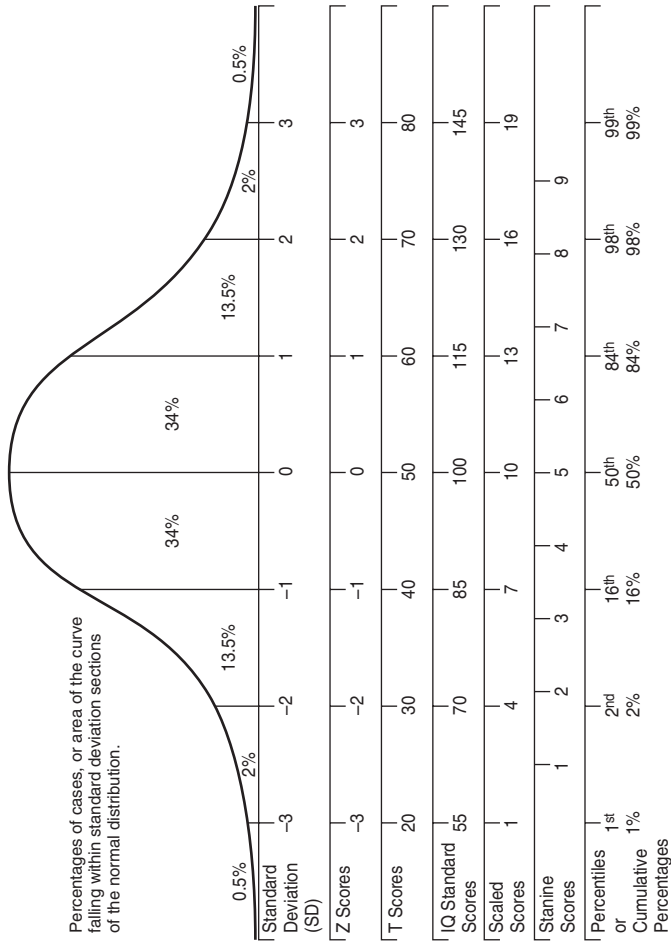
The first step in scoring a child's performance on a test is to obtain a **raw score**. The raw score is then converted to a **standard score** so that meaningful interpretations can be made. A standard score takes into consideration how your client did in relation to the scores of children in the normative sample with whom he or she is compared. The scores

of children in the **normative sample** typically follow a normal distribution, with the bulk of scores clustered around the mean and relatively few scores falling at the extreme ends of the range. The test manual will include tables (often they are in the back of the test manual) to convert your raw scores to standard scores.

The **standard deviation (SD)** of a sample of a given population is a measure of variability or the spread of scores (the extent to which scores deviate from the mean and from one another), and SD is used to divide up the normal distribution (see Fig. 4-4). In a normal distribution, approximately 68% of the scores are within 1 SD of the mean, 28% between 1 and 2 SD of the mean, and 4% outside 2 SD of the mean. This is important because it is believed that “typical” or “normal” performance is behavior (or test scores) that fall within 1 to 1.5 SDs from the mean. In other words, if you consider a score 1 SD below the mean to be significantly below average, you believe that when a child performs at or below the performance of 16% of the children in the comparative normative group then the child’s performance is considered to be lower than the range of scores considered to be typical or average.

Common standard scores used to report a child’s results on pediatric assessment tools are **z scores** (mean = 0, SD = 1), **T-scores** (mean = 50, SD = 10), and scores like developmental quotients and IQ scores that have a mean of 100, and SD of 15. **Stanine scores** range from 1 to 9 with a mean of 5, and scores of 3 to 7 are interpreted as being within the “normal” range. As long as you know the mean and SD of the sample that is used to compare your score, you can convert from one type of standard score to another (see the examples in Box 4-2) because they are all based on a normal distribution.

**Percentile scores** are defined as the percentage of people in the standardization sample who scored at or below a given score. For example, a child’s raw score of 15 that falls at the 38th percentile means that 38% of the children with whom he or she is compared scored at or below this score. Percentile scores are also derived based on the normal distribution. The mean, therefore, is at the fiftieth percentile, and percentile scores within 1 SD of the mean are those that range from



**Figure 4-4** The normal distribution and associated standard scores. (Adapted from: Richardson P. Use of standardized tests in pediatric practice. 2010. In: Case-Smith J, O'Brien J, eds. *Occupational Therapy for Children*. 6th ed. Mary Heights, MO: Mosby Elsevier).

## Box 4-2

CONVERTING STANDARD SCORES  
TO Z SCORES**EXAMPLE 1**

Standard Score = 7, from a test with a mean of 15, and SD = 5

$$\begin{aligned}z \text{ score} &= (\text{observed standard score} - \text{mean}) / \text{SD} \\ &= (7 - 15) / 5\end{aligned}$$

z score = -1.6, significantly below average performance

**EXAMPLE 2**

Given a T score of 65 (mean = 50, SD = 10)

$$\begin{aligned}z \text{ score} &= (\text{observed standard score} - \text{mean}) / \text{SD} \\ &= (65 - 50) / 10\end{aligned}$$

z score = 1.5, significantly above average performance

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the sixteenth percentile to the eighty-fourth percentile (see Fig. 4-4).

Another type of score sometimes reported is an **age-equivalent score**. An age-equivalent score relates the child's score to that of a typical or average child of a particular age group. For example, if a child's raw score of 25 is converted to an age-equivalent score of 6 years, 4 months, this means that the child received the mean score for children aged 6 years, 4 months (from the normative sample) or is performing like typical children aged 6 years, 4 months. Methods of reporting the results of standardized assessments, including test scores, are provided in the sample evaluation reports included in Appendix A.

**STANDARD ERROR OF MEASUREMENT**

All test scores inherently have some error associated with them. A child's score which is sometimes referred to as an **observed score** really represents a **true score** (a hypothetical

construct representing the child's true ability), plus or minus **measurement error**. Measurement error is inevitable with standardized testing and can result from characteristics of the test itself, examiner error, and child errors (see Table 4-8). **Standard error of measurement (SEM)** indicates how much variability can be attributed to error, as described by Murphy and Davidshofer<sup>83</sup> and it depends on (1) the test-retest reliability coefficient, "*r*" (discussed later in this chapter), and (2) the SD of the sample used to determine the reliability coefficient. It is calculated using the following formula:  $SEM = SD\sqrt{1-r}$ .

The SEM is important in relation to test scores because it affects the confidence you have in the reliability and validity of the test score, and sometimes test scores are reported using the SEM to account for the test's measurement error. A test's SEM usually is given in the test manual, and it can be used to create a confidence interval around a child's observed score.

**TABLE 4-8** TYPES OF MEASUREMENT ERROR

Error Type	Description
Child error	Lack of understanding of directions; noncompliance; inability to give "typical" or "true" performance owing to fatigue, disinterest, illness, or inattention; lack of motivation; may also "overachieve" owing to ability to perform better in a one-on-one situation, eager to please administrator; practice effect if test is given more than once. Test-retest reliability coefficients are one measure of the degree of possible child errors.
Examiner error	Inability to put the child at ease or to establish rapport with the child; poor optimization of the testing environment; lack of competency, resulting in inaccurate test administration procedures, including presentation of verbal directions and test items, use of materials and testing protocols; scoring errors; Inter-rater reliability coefficients are one measure of the degree of possible examiner errors.
Test characteristic error	Damaged testing materials, poorly calibrated testing materials, or use of substitute, non-standardized materials; lack of objectivity or clarity of scoring criteria; high complexity of test administration procedures.

A confidence interval is a range in which it can be stated with a known degree of confidence that a specific score would fall. Based on the normal distribution, it is known that 68% of scores fall within 1 SD of the mean and that 95% of scores fall between  $-2.5$  and  $+2.5$  SD of the mean. Therefore, we can use these numbers to construct 68% and 95% confidence intervals.

For example, suppose a child 6 years of age had an observed standard score on a test of 70 (mean = 100, SD = 15), and the manual reported that the SEM for this test is 6 for a child of that age. Instead of reporting the child's score as 70, it is more accurate to express the score in terms of a confidence interval by stating that you are 68% confident that the child's true score falls between 64 and 76. To establish the 95% confidence interval, you add and subtract 2 SEMs instead of 1 and would report the child's true score as falling within the range of 58 to 82.

## EVALUATING PSYCHOMETRIC PROPERTIES OF ASSESSMENT TOOLS

Evaluating the **psychometric properties** of standardized assessment tools involves examining the results from research studies that were conducted during the development of the test, and they are typically described in the test's manual. There also may be research published in refereed journals after the time the test was published that contribute useful information about the quality of the test's normative data and aspects of reliability and validity. Being able to evaluate a test's normative data, reliability, and validity requires a solid understanding of a type of statistic—the correlation coefficient—which is briefly discussed below.

A **correlation coefficient** is a measure of the strength of the relationship between two variables. It is a number that ranges from  $-1$  (a perfect negative relationship) to  $+1$  (a perfect positive correlation), and a correlation of zero means that there is no relationship. A negative correlation means that as one variable increases, the other decreases (or vice versa). A positive correlation means that as one variable increases, the other increases, or as one decreases, the other decreases.

**TABLE 4-9** EXAMPLES OF CORRELATION COEFFICIENTS

Variables	Correlation Coefficient	Interpretation
Interscale correlation between the Body Awareness Scale and Touch Scale of the Sensory Processing Measure-Home Form	$r = 0.69^{36}$	Moderate, positive relationship suggesting that high scores on the Body Awareness Scale are positively related to high scores on the Touch Scale and vice versa.
Test-retest reliability coefficient of the Constructional Praxis of the SIPT (children were tested twice within 1–2 weeks, and their scores were correlated)	$r = 0.70^{31}$	Moderate to strong positive correlation, indicating that children score similarly when tested twice; as a measure of test-retest reliability, this correlation is fair.

SIPT, Sensory integration and Praxis test

In other words, if both variables move in the same direction, it is a positive correlation, and if they move in opposite directions, the correlation or relation is negative. Examples of correlations with interpretations are given in Table 4-9. In general, weak correlation coefficients range from 0.26 to 0.49 (or  $-0.26$  to  $-0.49$ ), moderate correlation coefficients from 0.50 to 0.69 (or  $-0.50$  to  $-0.69$ ), and strong correlations from 0.7 to 1 (or  $-0.7$  to  $-1$ )<sup>84</sup>. Determining acceptable correlation values when evaluating research studies that examine the reliability and validity of standardized tests is somewhat subjective and is dependent upon the type and purpose of the study. A format for completing reviews of standardized tests is provided in Box 4-3. As an example, a review of the Peabody Developmental Motor Scales–2,<sup>1</sup> is provided at the end of this chapter. Guidelines for evaluating normative data, reliability, and validity are described below.

## Evaluation of the Normative Data

**Norms** provided in a test manual are not the “true norms,” but estimates of the true norms based on the performance of the sample of the population used to develop the norms.

## Box 4-3

STANDARDIZED ASSESSMENT  
REVIEW FORM

Test name:

Author(s):

Publisher and Date of Publication:

Cost:

Test Description and Purpose: (age range, domains measured, type of test and format, administration time)

Review of Psychometric Properties:

Normative Data:

Reliability Data:

Validity Data:

Practical Considerations: Technical skill and training required; administration time, space and materials required; child prerequisite skills

Overall Strengths and Weaknesses:

Reference List and other data sources (publications following test publication)

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Therefore, the usefulness of normative data is directly related to how much the sample used to generate the norms reflects the population from which it was drawn. This is also true for criterion-referenced tests. Typically, criteria are developed based on the performance of a sample from the population of interest. Therefore, the sample used must be considered, particularly in relation to age, gender, disability, and sociocultural factors, when determining how relevant the test items and criteria are for your clients.

When evaluating how good normative data are, the first question you need to ask is, "How representative is the sample used to generate the normative data of the population that the test was designed for?" For example, if a test was designed to target U.S. children, then the sample should be selected using a stratified, randomized procedure to ensure that age, race, gender, socioeconomic status, and urban and rural populations are all represented, and in approximately

the same proportions as in the U.S. population. It is also important that the sample you are using to compare your client's performance is relevant for your purposes. A relevant sample is one that has characteristics similar to the clients with whom you intend to use the test. Norms should also be relatively recent. It is important that you take the time to review the methods used to obtain the sample, which should be covered in detail in the test manual. Generally, the more recent the norms the better (ideally within 10–15 years), and the larger the normative sample the better; samples obtained through a randomized process are more representative of populations being targeted than convenient samples.

## Reliability

A reliable assessment tool is one that is consistent, i.e., designed in such a way that all those who administer the test to the same individual under the same set of circumstances would obtain the same results. In addition, if the test is reliable, then children who are asked to do the test items should perform in a relatively consistent manner if given the test more than once within a reasonably short period (days or a couple of weeks). The SEM discussed earlier is one measure of **reliability**. There are three other types of reliability that you should look for when evaluating the overall reliability of an assessment tool: inter-rater, test-retest, and internal consistency. To evaluate how reliable an assessment tool is, review research studies reported in the test manual designed to evaluate all three of these types of reliability. Similar studies may also have been published in refereed journals after the test was published and are also important sources of information about a test's reliability.

### Inter-Rater Reliability

**Inter-rater reliability**, also referred to as inter-rater agreement, examines the extent to which test results vary because of factors introduced into the testing situation by the test administrators. Typically, inter-rater reliability studies determine the correlation between the scores of two independent raters scoring the same child simultaneously. Inter-rater reliability

is especially important when scoring involves some degree of subjectivity. If a test has strong inter-rater reliability, then two different raters (with adequate training in the test administration and scoring procedures) scoring the same child should get exactly the same results. There is no universal agreement as to how high the minimum acceptable inter-rater reliability coefficient should be, and factors such as the type of behaviors being measured and the range of possible scores should be taken into consideration. A standard was suggested by Anastasi<sup>84</sup> of 0.80; however, specifically for the types of tests we use in pediatric occupational therapy, minimum values of acceptability for inter-rater reliability should be closer to 0.90.

### **Test-Retest Reliability**

**Test-retest reliability** refers to how consistently a group of children will perform on the same test when it is given on more than one occasion (usually just twice) in a relatively short period of time. Scores from the two testing situations are correlated with one another and represent a measure of stability of the test results over the time interval. Essentially, a test with good test-retest reliability assures that if you gave a test to a child and then gave it to the child again (within a couple of days or weeks) he or she would perform similarly, generating similar scores. When evaluating an assessment tool's research related to test-retest reliability, look for the number of subjects used in the study (should be >20, and the more the better) and the length of time between testing (should be 1–2 weeks). Test-retest correlation coefficients tend to be stronger when there is a shorter interval between testing. Again, there are no hard and fast, definitive rules about what the minimal acceptable correlation coefficients should be. It is important to note that the stability of the behaviors being measured greatly impacts the test-retest reliability. For example, fine motor skills would not be expected to vary naturally near as much as social behavior, mood, or ability to attend. It is important that studies examining test-retest reliability for pediatric assessments use a time interval is not too long because developmental changes could naturally occur, or too short, which would allow the children to remember the items, potentially causing a practice effect.

A practice effect occurs when children tend to score slightly higher the second time because of their previous experience. In general, acceptable coefficients for test-retest reliability are those *r*-values equal to or greater than 0.8.<sup>85</sup>

### Internal Consistency

A test is believed to have **internal consistency** when the individual test items positively correlate with one another. For example, if a test is designed to measure fine motor ability, then, in theory, all of the test items should be related to or be able to measure some aspect of fine motor performance. Therefore, a child (whether he or she has strong or weak fine motor skills) should perform somewhat similarly on all of the test items that measure this area. Studies of internal consistency often will correlate a group of scores from one half of the test with those from the other half (first half with second half; odd- versus even-numbered items), also referred to as split-half reliability.

Various more sophisticated statistical techniques are commonly used to calculate reliability coefficients for measuring internal consistency (e.g., Kuder-Richardson and Cronbach's alpha)<sup>86</sup> that specifically account for the ways of grouping the test items and for allowing the total length of the test to be considered in the analysis (i.e., the split-half method reduces the test length in half, which would result in a slightly lower coefficient than if the whole test was accounted for in the calculation). High correlations indicate that the test is measuring a homogeneous construct. If the test has good internal consistency, then correlation coefficients should be between 0.6 and 0.8 according to Anastasia.<sup>84</sup>

### Validity

**Validity** may simply be referred to as the extent to which a test actually measures what it was intended to measure.<sup>87</sup> However, it is really a much more complex idea than it seems. For example, on what type of evidence may we interpret test scores to be a good indication of a specific function like social competency or sensory processing? How well does a test designed to predict kindergarten readiness actually predict

success or failure in early elementary school? Can we justifiably allow or disallow a child to enroll in a specific program based on his or her test scores? What evidence do we have to support the kinds of test score interpretations we make, and how we use test scores?

Messick<sup>88</sup> defined validity as an integrated, evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of our inferences and actions based on test scores or other modes of assessment. He further emphasized the importance of the meaning, relevance, clinical utility, and value implications of scores as a basis for action, and of concerning ourselves with the social consequences of their use. Test validation, then, is scientific inquiry into score meaning. Although Messick<sup>88</sup> emphasized that validity is a unitary idea, different types of validity (content, criterion-related, and construct) have been described in the literature, and these different types are often addressed separately in the test manuals of pediatric standardized assessments. Therefore, each of these facets of validity is discussed separately in the following subsections; however, be mindful that various forms of validity overlap greatly, and that they all address the issue of score meaning and examine the extent to which the test is measuring what it says it measures.

### **Content Validity**

**Content validity** is the extent to which the test items of a particular test adequately and accurately sample the skill areas or behaviors it is designed to measure while not being contaminated by items measuring other types of behaviors or skills. For example, if a test is designed to measure fine motor performance, there should be enough items to adequately measure all aspects of fine motor skill (such as eye-hand coordination, speed and dexterity, grasp patterns, visual-motor control, and functional fine motor tasks). There should be evidence in the manual that items addressing all facets of fine motor skill were systematically analyzed and then the best items were selected. It is never feasible to include all possible test items, which would make tests too long. Often, evidence for selecting adequate test content is derived from a panel

of experts who determine how each test item relates to each domain being tested. The experts then comment on the thoroughness of the items for measuring each of the domains/constructs the test is designed to measure. Then, statistical techniques are used to analyze the items and to help select the “best” or most meaningful items. A table of specifications may be included in the test manual to summarize how test items relate to each of the domains, and there should be a description in the manual regarding the selection process, with a clear rationale for the test items that were ultimately selected.

### **Construct Validity**

**Construct validity** addresses the extent to which the test measures the construct or domain it purports to measure. Common constructs measured in pediatric occupational therapy include fine motor performance, gross motor function, sensory integration, play, self-help skills, occupational performance, self-esteem, social skills, and visual perception. Many constructs are largely abstract entities that cannot be measured directly. For example, a test of sensory integration really measures directly behaviors that are theoretically believed to represent sensory integration, since we cannot measure this brain function directly. When a test is developed, hypotheses are generated about the relationship among variables believed to be measured by the test. Several sources of evidence are necessary to evaluate construct validity including an examination of the theory supporting the domains/constructs being measured.

One source of evidence comes from studies correlating the scores of a sample of children on the test of interest, with their scores on a similar test. For example, the Test of Visual Motor Skills–3<sup>47</sup> and the Beery-Buktenica Developmental Test of Visual-Motor Integration<sup>46</sup> both state that they measure visual-motor skills. Therefore, children should perform similarly (their scores should correlate positively) on these tests.

Another source of evidence of construct validity comes from studies that compare scores from different groups of children. For example, on tests measuring areas of development, it would be expected that the scores of older children

would reflect a higher level of performance than the scores of younger children. Similarly, the scores from a group of typical children would be expected to reflect a higher level of performance than scores from age-matched peers with known developmental delays.

Research applying multivariate statistical techniques, particularly grouping techniques such as factor and cluster analyses, also provide evidence for construct validity. Examples of standardized tests that have been studied extensively using these techniques include the Sensory Integration and Praxis Tests<sup>31,89,90</sup> and the Sensory Profile.<sup>32</sup> The purpose of factor analyses is to group test items that are alike or that all relate to some underlying construct. Factor analysis assists in identifying sub-scores or subscales such as different patterns of sensory processing or different areas of gross motor functioning. Another grouping technique is cluster analysis. This technique aims to cluster like individuals together meaningfully, so that patterns of dysfunction, specific problem areas, or diagnostic groupings can be identified.

### **Criterion-Related Validity**

**Criterion-related validity** is the ability of a test to predict performance on other measures or activities. A test may have predictive validity (ability to predict future performance on some criterion) or concurrent validity (the ability to predict performance on some criterion concurrently). To evaluate concurrent validity, the scores of a sample of children are correlated with their performance on the criterion measure. For example, if a test of visual-motor skills is believed to predict handwriting performance, then scores on the visual-motor test would be expected to be positively correlated with scores on a test that measures handwriting ability.

Predictive validity studies examine the relationship between a test score and performance on some criterion measured in the future. For example, it is of interest to occupational therapists and other child development experts to identify infants and preschool children who are at risk for developmental problems or for school problems once they reach school age. Using a test of development that can predict

reasonably well whether a child is at risk for developing problems later in life may detect concerns early on, so that appropriate early intervention services can be-initiated.

## **USING STANDARDIZED ASSESSMENT TOOLS FOR OUTCOMES-BASED RESEARCH**

Today it is important for all health and human service professionals to conduct services using evidence-based practices. This includes selecting assessment tools that have strong validity and reliability data, and choosing intervention approaches that have research evidence demonstrating effectiveness for achieving desired therapy outcomes. Occupational therapists must be knowledgeable and confident that the therapy they provide will yield the outcomes expected, based on previous research. As with many other professions, the body of evidence upon which occupational therapists can draw for clinical decision making is developing. Therefore, as a profession, we need to direct resources toward the generation of more efficacy research, and OT practitioners need to be good consumers of research to effectively apply the existing research for clinical decision making. Standardized, occupation-based assessment tools like those listed in Table 4-2 are ideal for use in research studies aiming to evaluate the effectiveness of occupational therapy interventions. In addition, as noted earlier, these assessments are also clinically useful for determining client priorities for intervention planning, identifying important, relevant therapy outcomes, and for measuring and documenting progress.

In order to conduct rigorous clinical research, sound measures are essential in occupational areas such as play, school activities, self-care skills, and social and community participation. Assessment tools that measure levels of participation in meaningful activities associated with these occupational areas, and levels of satisfaction with performance and participation, are also useful outcome measures. In clinical practice and research, the collection of objective data for demonstrating and documenting progress can also be achieved

through a technique called goal attainment scaling (GAS). GAS is particularly useful when desired outcomes are so individualized that they cannot be measured adequately using a standardized assessment tool. GAS requires therapists to craft individual therapy goals using a special method. Each goal is written using a 5 point scale ( $-2$  to  $+2$ ) where the mid-point (0) represents the expected or probable level of performance of the desired outcome skill or behavior (see Mailloux and colleagues).<sup>91</sup> Measurable behaviors are then identified at each level of the scale. To illustrate, an example of a goal related to the achievement of wheelchair mobility skills for a child is provided in Box 4-4. An advantage of GAS is that the evaluation tool measures only those areas that are relevant



## Box 4-4

## SAMPLE GOAL USING GOAL ATTAINMENT SCALING

Goal: To demonstrate independent and safe wheelchair mobility

-2 (much less than expected)	Requires verbal cues to safely transfer in and out of wheelchair; able to propel the wheelchair frontwards and backwards 10 feet
-1 (less than expected)	Safely transfers in and out of wheelchair; maneuvers the wheelchair forward and backwards and around obstacles; pace of propulsion is slower than typical walking pace
0 (expected level of performance)	Uses wheelchair safely for school-related and leisure activities; propels around obstacles, and keeps up with peers while walking for short distances
1	Uses wheelchair safely; easily propels around obstacles, and keeps up with walking peers while for long distances (30 minutes)
2	Maneuvers safely around obstacles; moves at a pace that exceeds with peers when walking; does wheelies safely to move over 2" thresholds

for the child with whom you are working. In addition, in a research context, it allows for group studies examining the effectiveness of occupational therapy services to be conducted using a sample of children who have very different therapy goals. More information on applying GAS in OT practice and research is provided by Mailloux and colleagues<sup>91</sup> and Ottenbacher and Cusiak.<sup>92</sup>

In selecting evaluation measures for the purposes of conducting efficacy research for building the body of evidence upon which therapists can draw for clinical decision making, it is also important to consider a test's psychometric properties discussed in this chapter, the specific purposes for which the test was designed, and the sensitivity of the measure for detecting change in performance. Most importantly, be reminded of the occupational lens through which occupational therapists view the success of their interventions, and ultimately you will see that the occupation-based measures listed in Table 4-2 yield the most important information about your client's desired outcomes and the potential effectiveness of occupational therapy.

## **IMPORTANT CONSIDERATIONS AND CHALLENGES RELATED TO THE USE OF STANDARDIZED TESTS**

The development and use of standardized tests in pediatric occupational therapy is quite extensive and has allowed for a more scientific, objective approach to evaluation. Although the use of standardized tests enhances the credibility of our profession, and provides us with an objective means to identify problem areas and to detect change or progress, these tests are not without drawbacks. First, many tests are expensive, and it may be labor intensive to become competent in their use. Second, young children are often difficult to test due to behavioral problems such as inattention or inability to comprehend directions. Third, many tests were normed on typical children instead of on the clinical populations often seen by occupational therapists. While normative data are useful, without

clinical populations represented in the test development process, the ability of the test for evaluating client progress is often limited. Fourth, some standardized tests are limited in their usefulness for developing intervention programs, and, for some populations, such as children with severe and profound disabilities, relatively few tests are available. Fifth, when reporting scores, it is important to be able to explain standardized test scores in language that can be easily understood by all interested parties, such as parents and teachers.

## Summary

This chapter provided information about the use of standardized assessment tools, including factors to consider when selecting specific tests and how to evaluate the psychometric properties of a test. The interpretation of standardized test scores was covered in detail. Ethical and professional considerations were discussed, and lists of available pediatric standardized assessment tools organized by skill/domain area were provided. Although standardized assessment tools provide useful, objective assessment information, test scores should never be a substitute for sound clinical judgment, and test scores should be considered as only one of many sources of data that you will use in your evaluation process.

## Chapter Review Questions

1. What are the main characteristics and advantages of using criterion-referenced and norm-referenced standardized tests?
2. Why might all types of validity evidence be considered as contributing to the test's construct validity?
3. What are some of the most psychometrically sound measures of occupational performance available to us in our work with children? What types of standardized tests are we lacking, representing areas for research and development?
4. In what ways do standardized tests contribute to research examining the effectiveness of OT interventions and the promotion of evidence-based practices?
5. What would be effective means for helping you to learn to administer a standardized assessment tool?
6. Why is it important for occupational therapists to understand the characteristics of the normative sample of a norm-referenced test they would like to use?

**SAMPLE REVIEW****PEABODY DEVELOPMENTAL MOTOR SCALES-2 (PDMS-2)****Author(s)**

Folio R, Fewell R.<sup>1</sup> (Copyright 2000, Pro-Ed, Austin, TX. 1-800-897-3202)

**Test Description**

The PDMS-2 is both a norm-referenced and a criterion-referenced standardized assessment tool. It consists of six subtests that measure fine and gross motor performance in children from birth through 6 years of age. Subtests include reflexes (for infants to 12 months of age), stationary gross motor skills, locomotion, object manipulation, grasping, and visual-motor integration. Subtest standard scores and composite standard scores for fine motor, gross motor, and total motor skill are available, as are age-equivalent scores. The test comes with a test kit that includes some (but not all) of the necessary test equipment and supplies, scoring sheets, an examiner's manual, an item administration manual, a motor development chart, and a programming manual and activity cards.

**Psychometric Properties***Normative Data*

Normative data from 2,003 U.S. children were collected in 1997–1998. Four major U.S. geographic regions were identified as norming sites, and children from 46 states and one Canadian province were included. The normative data were compared with 1997 U.S. Census data and found to be representative of demographic characteristics to describe children younger than 5 years, including geographic area, gender, race, type of residence (rural versus urban), ethnicity, and socioeconomic status. Overall, the normative data are very impressive, including recent data and a large representative sample of typical children. Normative data for children with specific disabilities are not included.

Internal consistency measures using Cronbach's coefficient alphas ranged from 0.84 to 0.98, indicating that test

items measuring the same construct (fine and gross motor skills) were strongly associated with one another. Standard errors of measurement for each of the subtests and composite scores by age group are acceptable. Test-retest reliability was evaluated with two groups of children aged 2 through 11 months ( $n = 20$ ) and 12 to 17 months ( $n = 30$ ) with acceptable results, with correlation coefficients ranging from 0.73 to 0.96. Inter-rater reliability for scoring completed protocols has been evaluated, with strong coefficients ranging from 0.96 to 0.98. However, it is believed that discrepancies related to examiner error would more likely occur in the rating of the child's performance on test items rather than during scoring procedures, which has yet to be tested.

### *Validity*

Rationale for the development of test items is described in detail in the manual, with strong theoretical support, and was also addressed and well researched with the earlier version of the test. Various item analysis techniques were used, including the application of Item Response Theory and logistic regression to analyze differential item functioning, which supported the PDMS-2 content. Age-related trends were established, as the mean PDMS-2 scores increased with age, as would be expected. Confirmatory factor analysis was also used and supported the inclusion of the various subtests within each of the fine and gross motor composites. Concurrent validity was established by correlating PDMS-2 scores of children from the normative sample with their scores on the earlier version of the PDMS-2. Resultant correlations for the fine motor and gross motor composites were strong, 0.84, and 0.91, respectively. PDMS-2 scores also had moderate to strong correlations with scores from the gross and fine motor scales of the Mullen Scales of Early Learning: AGS Edition. PDMS-2 scores could also discriminate children with physical and mental disabilities from those without disabilities.

### **Practical Considerations**

The PDMS-2 is easy to learn, although time and practice are required to become familiar with the administration of the

test items. It takes about 60 minutes to administer the entire battery, although the administration process may be broken up if necessary. Space for running, ball throwing, and kicking is necessary. It is relatively expensive, with the test kit costing approximately \$530.00, available from [www.pearsonassessments.com](http://www.pearsonassessments.com).

## Overall Strengths and Weaknesses

The PDMS-2 is an excellent tool for measuring overall fine and gross motor skills, although administration time is relatively long. It is easy to learn. It is a well-known test, and although research on the second edition is limited, there is an abundance of research on the earlier version.

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# 5

## CONDUCTING INTERVIEWS AND OBSERVATIONS

### Introduction

This chapter discusses nonstandardized evaluation procedures, including **interview** techniques and various types of formal and **informal observations**. Standardized tests are limited in that they often measure performance in very specific areas. In addition, administration procedures are most often conducted under prescribed rather than naturalistic conditions, making it difficult for us to predict exactly what doing well or poorly on a standardized test really means for an individual's occupational performance in the natural context. Therefore, conducting nonstandardized procedures as a part of your evaluation is essential. Advantages of using **non-standardized procedures** are that they tend to be fairly easy to do, and they do not require extensive training. Although conducting interviews and observations are sometimes

time-consuming, the process is inexpensive, noninvasive for the client, and often contextually relevant. Informal evaluation procedures also provide flexibility to tailor your evaluation activities to each individual child and family, which allows the focus to be placed upon only the important areas that are most relevant for individual children and families.

Chapter 5 begins by presenting information about conducting interviews, including strategies and sample interview formats to help enhance your interview skills. Conducting naturalistic observations in classrooms, during play, and during the performance of occupations and associated activities and tasks such as self-help skills are discussed next. Third, structured observations, including those that can be made during the administration of standardized tests are discussed, followed by a description of some of the more common formal clinical observation procedures often included as part of occupational therapy evaluations with children.

## **CONDUCTING INTERVIEWS**

In all areas of occupational therapy practice, evaluations include client interviews. In pediatrics, it is important to interview the child's caregiver or parent(s), the child (depending on the age and maturity of the child), and other important persons in the child's life, such as the child's teacher or child care provider. Interviews provide a unique opportunity to establish rapport with your client and his or her family, and to learn about the occupations, roles, and activities they value. Through interviewing, you will also gather vital information about your client's expectations related to your involvement, and about his or her priorities, and you will begin to understand how your client sees his or her situation. Interview data are essential for developing the child's occupational profile, as discussed in Chapter 2.

Types of interviews range from very informal (lets chat and get to know one another) to very formal and procedural, such as the administration of a standardized tool that takes the form of a structured interview or questionnaire, with a specific set and order of questions. However, there are some

general interview skills and techniques that will enhance your effectiveness as an interviewer that can be applied regardless of the situation, type of interview, and the age of the interviewee. These skills and techniques are discussed in the following section.

## Prepare for Your Interview

To be an effective interviewer, you need to take the time to prepare for your interview. It is helpful to set clear goals about what information you want to gather and what you want to accomplish. Examples of goals that can be achieved through client interviews are provided in Box 5-1. In preparing for the interview, draft some questions that you would like to ask and anticipate what questions the interviewee may have for you so you can prepare to respond to their needs. Depending on your situation, there may be sensitive areas you wish to discuss. Anticipate questions that may evoke an emotional response or that may be uncomfortable for you or the interviewee, and think about effective ways you can deal with them.

### BOX 5-1 COMMON INTERVIEW GOALS

1. To gather relevant medical information, detailed information about the referral concerns, and information about medical and education services the child is receiving or has received in the past.
2. To build a therapeutic alliance and begin to establish rapport and trust.
3. To get to know the child and family better, including their interests and daily life activities.
4. To identify child and family goals, expectations, and priorities.
5. To provide an opportunity to conduct informal observations of client skills, functions, and environments.
6. To share information about your skills, roles, and services.

## Create a Comfortable, Relaxed Atmosphere

You will gain the most useful information if you and your interviewees relax and are comfortable during the interview. Therefore, schedule interviews during times that are convenient for the interviewee and when major distractions are unlikely to occur. The physical environment should be comfortable, including consideration of lighting, temperature, and seating arrangements. When working with children (and families with children), you will need to be flexible by conducting caregiver interviews around schedules and routines, and you may need to problem solve ways of conducting an interview when children must be present (see Fig. 5-1). As you begin, always make sure that the interviewee knows why he or she is being interviewed, and let the interviewee know that he or she can ask questions of you at any time. Explain your reasons for conducting the interview in language that your interviewee understands. It is important to be aware of and sensitive to the physical and emotional needs of the interviewee. Be aware of your nonverbal language, and constantly be reading and responding appropriately to the nonverbal messages you receive from the interviewee.



**Figure 5-1** Example of a caregiver interview. This parent interview is being conducted with the child present on the parent's lap. It is important to be flexible and for both the interviewer and the interviewee to feel comfortable.

## Use Strategies to Promote Interaction

The ways in which questions are formulated and asked will affect the amount and quality of information received. Most importantly, you must listen, listen, listen, and then listen some more. Building your questions from what your client has just told you is a technique that provides the interviewee with a clear message that you care about, and are listening carefully to what they are saying. Frequently ask for clarification, or paraphrase what your client has told you, to ensure that you understood what they were trying to tell you. Use open-ended instead of yes/no questions as much as possible because they promote interaction (e.g., “Tell me more about. . .” and “What would you like me to know about your son?”). Allow for some silence now and again without being too quick to jump in with a comment or another question. Although this is sometimes difficult, and may feel slightly awkward at times, such pauses provide time for reflection, time for you and the interviewee to process what has been said, and for you as the interviewer to organize your thoughts for the next exchange. Indications that an interview has been effective are that you needed to ask very few questions, your client did most of the talking, the atmosphere was pleasant and comfortable, and the information gained fulfilled your goals.

## Structure Your Interview with a Beginning, Middle, and End

The interview process should flow smoothly, with a natural beginning, middle, and end. The beginning typically includes introductions, going over the reasons for the interview, and perhaps some “small talk” to ease into the interview. The middle of the interview is the period when most of the information is gathered. About 5 to 10 minutes before ending the interview, it is important to prepare for closure. This is accomplished by first letting the interviewee know that time allotted for the interview is almost over, so he or she has an opportunity to ask any final questions of you or to share any information that was left out earlier. It is important to have

time to thank the interviewee, to share how the information will be used, and to describe the next step in the evaluation process.

Although interviews are conducted with caregivers for various reasons, the most important reason is to give the parent an opportunity to tell his or her story so that you can begin to understand who he or she is and who the child is. You will always customize your interview style with caregivers to fit their individual personality, in consideration of cultural factors, and of their needs so that you can achieve the goals that you set for the interview. Sample questions used in an initial caregiver interview are provided in Box 5-2 to help guide your interviews and gather relevant information useful for intervention planning.

**BOX 5-2****SAMPLE QUESTIONS WHEN CONDUCTING  
AN INITIAL PARENT INTERVIEW****DEMOGRAPHIC INFORMATION AND RELEVANT  
MEDICAL HISTORY**

(Child and parents' names, address, telephone number, child's date of birth, and health insurance information when relevant should be gathered ahead of time). Tell me about your family and who lives in your home? What are the ages of the other children? What is the easiest way for me to contact you? Who is J's primary physician? Tell me little more about J's early history. Did you have any complications with your pregnancy or delivery with J? How long did you spend in the hospital? At what age did J learn to sit up? Smile? Crawl? Walk? Has J had any major illnesses or hospitalizations? (If yes, can you tell me a little bit about what happened). What have been the results of eyesight and hearing tests? Does J take any medications or have allergies? Tell me what led you to seek out occupational therapy services for J? What have you learned about J's development from other professionals who have worked with or evaluated J? Is there anything else about his medical history or current condition you think I should know?

### **GATHER INFORMATION ABOUT THE CHILD AND HIS/HER FAMILY**

Tell me about J, and how he typically spends his time. What does J like to do at home? At school? Does J have any particular fears or dislikes? Tell me about any extracurricular activities J participates in. What kinds of things do you do as a family? What responsibilities do J and his siblings have around the house? Do you have neighbors, friends, or relatives with whom you can depend to help you if needed? What is important for me to know about your family? What do you and your husband do for work? Tell me about J's child care situation? What is J really good at?

### **GATHER INFORMATION ABOUT THE CHILD'S SCHOOL PROGRAM AND OTHER SERVICES**

Tell me about J's school program. What is his teacher like? How is his day structured at school, and what kinds of skills is he currently working on? What is important to you regarding his school program? How is he doing at school? Tell me about the other services he is currently receiving.

### **IDENTIFY CHILD AND FAMILY PRIORITIES AND GOALS**

What are the skills or areas that you would like us to address most in occupational therapy? In terms of J's development and skills, what are your priorities? In developing a program for you and J, is there anything else that you think I should know about J or your family that would help me tailor your program to meet your goals and expectations?

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## **Considerations for Interviewing Children**

A few important considerations must be kept in mind when you are interviewing children. First, you must acknowledge the developmental level of the child you are interviewing. The ability of a child to express his or her thoughts and feelings depends on various language and other cognitive prerequisite skills. For example, typically, children younger than 8 years of age will describe themselves only in terms of observable traits and not by internal characteristics.<sup>1</sup> The accuracy of information reported by children of this age is also questionable. Therefore, interviews with children younger than

8 years of age are primarily conducted to establish rapport, share information about you and your role, and to develop an understanding of the child's personality and their likes and dislikes. Several clinical observations can also be made during an interview with a child, such as his or her ability to communicate, interact, and follow directions, his or her affect, behavioral regulation, and activity level.

As the capacity for abstract thinking becomes more sophisticated, young adolescents are more able to reliably answer questions. Many young teens and older children will have the capacity for self-reflection and can begin to describe their feelings, behaviors, and skills in relation to those of their peers, and they can comment on how others view their behavior.<sup>1</sup> Therefore, the amount of information that can be obtained through interviews with older children and adolescents is far greater than what can be obtained through interviews with young children.

### **Using Standardized Assessment Tools for Conducting Structured Interviews**

Most standardized interview-assessment tools used in occupational therapy have been designed for adults, although there are some for pediatric practice. The Canadian Occupational Performance Measure<sup>2</sup> is administered as a structured interview, and it can be used with both adult and child populations. Children older than about 8 years of age can be interviewed using this tool, while the parents of younger children can complete the interview on the child's behalf. The Pediatric Evaluation of Disability Inventory<sup>3</sup> and its latest version, the Pediatric Evaluation of Disability Inventory Computer Adaptive Test<sup>4</sup> and the Sensory Profile,<sup>5</sup> are examples of assessments that can be administered through structured interview, or they can be completed by the caregiver independently (caregiver completes assessment forms or using a computer, without the therapist present). Using an interview format provides an opportunity for the interviewee to elaborate on the areas included on the assessment which provides for more detailed and richer information than can be gained from the checked responses on the testing items

alone. In addition, the interviewee can ask for clarification of questions on the assessment, thereby enhancing their understanding of the meaning of the items they are rating. Finally, the Model of Human Occupation, which is an occupational therapy practice model developed by Gary Kielhofner,<sup>6</sup> has associated assessment tools, which are administered as structured interviews, and can be used with children and adolescents. Examples of these tools include The Short Child Occupational Profile Version 2.2, 2008<sup>7</sup>; The Occupational Performance History Interview-II, version 2.1, 2004<sup>8</sup>; and The School Setting Interview, Version 3.0, 2005.<sup>9</sup> More information about these tools and purchasing information can be found on their website, [www.moho.uic.edu](http://www.moho.uic.edu).

## CONDUCTING OBSERVATIONS

Your structured and unstructured observations often will be the most valuable sources of information gathered throughout the evaluation process. Your observations are simply defined as what you see. Although this sounds straightforward, it is important and sometimes challenging to distinguish mere observations from your interpretations of the behaviors observed. For example, suppose that during a 30-minute evaluation session, a 6-year-old child was observed to cry briefly on separation from her mother and to have very flat affect (little facial expression) for the rest of the session. She refused to engage in 8 of 10 activities presented to her, and when she did participate her movements were slow. She answered questions with one-word answers, and she initiated no conversation. Overall, she seemed very sad, lethargic, withdrawn, and somewhat noncompliant.

The behaviors that were observed included crying, flat affect, little use of language, refusing to engage in most activities presented to her, and having a low energy and slow movements. These observations are clear and quite undisputable. However, these observed behaviors may be interpreted in various different ways. For example, one may conclude that she is demonstrating symptoms of depression or has feelings of sadness. Another interpretation may be that she is shy and

has trouble relating to strangers. And yet another is that she simply did not want to be evaluated and was therefore acting defiant. This example demonstrates that there are many ways that observed behavior can be interpreted and why it is so important during the evaluation process, particularly in your report writing, that you explicitly differentiate between what it is you observed (exactly what you saw) and how you interpreted your observations.

Observations can be recorded in various ways, and, whenever possible, it is important to document observations in an objective rather than a subjective manner. There are three main ways that observations can be recorded. First, you may use **narrative description**, which provides a detailed account of and qualitative information about the behaviors observed. Second, when you are looking for specific behaviors, you could record the rate of the behavior by using either a **frequency count** (the number of times the behavior occurred in a given period) or duration recording (the length of time the behavior occurred). To perform a frequency count or duration recording, it is important that the behavior of interest that is being observed is operationally defined so that it is clear what the behavior is, when it begins, and when it no longer meets the criteria for being present. A third way to record observations is to record the behavior on a self-designed data recording form that may be in the form of a checklist or rating scale. Often such forms also include space for writing narrative descriptions.

For the purposes of this book, observations have been classified into three main categories: **naturalistic observations**; **structured observations**, including those that can be made during the administration of standardized tests; and **formal clinical observation procedures**. Each of these categories is discussed in more detail in the following sections of this chapter.

## Naturalistic Observations

Naturalistic observations are those that take place in the context of the child's regular activities and environments. True naturalistic observations also require that you as the observer be as unobtrusive as possible so that your presence does not affect

the way the child or anyone else in the environment would usually perform. Naturalistic observations conducted by pediatric occupational therapists commonly include classroom observations for those working in school settings; observations of play in the home, school, and child care environments; and observations of children performing activities of daily living such as feeding, dressing, and for older children, household, community living, and vocational/work-related tasks.

### **Classroom Observations**

Naturalistic observations of a child's school environments may include the child's classroom as well as other spaces at school like the lunch room, playground, and music room. Observations in these contexts occur as a part of most school-based occupational therapy evaluations. Occupational therapy evaluations in school-based settings, as described in Chapter 1, are provided under the Individuals with Disabilities Act, Part B, 2004<sup>10</sup> and follow the regulations set forth in this legislation. Seeing first-hand how the child's classroom is run, what the child's curriculum entails, and how the child functions in the classroom provides valuable information for program planning, and assists in determining the educational relevance or impact a child's deficits have on his or her ability to be successful in the classroom.

In preparing for a classroom observation, it is important to speak with the child's parent(s) and teacher to discuss any concerns or questions they have regarding the child's school performance and to find out what they think is important for you to observe. Once the behaviors in question have been identified, you and the teacher can decide together when the most appropriate time and place to conduct the observation would be. For example, if the child has fine motor and attention difficulties, it might be most useful to observe the child during a sit-down art activity or a writing task. Self-designed checklists and rating scales may be developed and used to help structure and document classroom observations. An example of a self-designed classroom observation form is provided in Figure 5-2. Although the school-related skills and areas that you will be interested in observing will vary greatly depending on the age or grade of the child and on

## School Observation Form

Student Name: \_\_\_\_\_ DOB: \_\_\_\_\_ Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

Special Education Services: \_\_\_\_\_

Teacher and Parent Concerns: \_\_\_\_\_

Date of Observation: \_\_\_\_\_

Activities Observed: \_\_\_\_\_

Classroom Environment: (desk arrangements, traffic patterns, work areas, auditory and visual stimuli, etc.)

### Sensory Motor Observations

Skill	Problem	Not a Problem	Comments
Sitting			
Functional mobility			
Fine motor, handwriting			
Gross motor coordination			
Strength and endurance			
Visual processing			

### Performance of Classroom Activities and Behavior

Skill	Problem	Not a Problem	Comments
Attention/activity level			
Task completion			
Works independently			
Follows directions			
Communication skills			
Self-care skills: snack and lunch, toileting, dressing, managing belongings			
Use of classroom materials			
Accesses playground, lunchroom, hallways, lockers			
Transitions smoothly between activities			
Interacts well with peers			
Respects teacher			

Curriculum Modifications:  
Summary:

**Figure 5-2** Sample classroom observation form.

the child's needs, examples of typical skills and areas that occupational therapists are asked to assess are included in this observation form.

### **Observations of Play**

Although a few standardized assessment tools are available for evaluating play skills and playfulness (see Chapter 4), you may choose to observe a child's play informally in the context of regular play situations at home, at school, or in the child care setting. Play is complex, and, as the primary occupation of children, it is of great interest to occupational therapists. Play is the means by which infants and young children learn, have fun, and interact. Evaluations of play should include gathering information about a child's ability to engage in meaningful play, their playfulness, play preferences, and social play behaviors and skills. Also, by conducting observations of children's play, information can often be gathered on various underlying skill areas and client factors. For example, you can learn a great deal about a child's fine and gross motor skills, balance and postural control, social communication, and cognitive skills (e.g., knowledge of shapes, colors, and size concepts) by watching them play. It is also important to observe psychosocial skills and behaviors, such as activity level, affect, ability to express emotions, and emotional stability during play. Social interaction patterns between the child and the caregiver and among peers can also be evaluated through play observations.

Reviewing the typical play behaviors and skills expected of children of various ages and developmental levels will help you identify the specific behaviors to look for when evaluating individual children (see Chapter 3). A guide to help you structure and gather important information about children's play preferences, use of materials, social play behaviors, adaptability, and other psychoemotional factors is provided in Boxes 5-3 and 5-4. Examples of play observations are provided in Figures 5-3 and 5-4.

When conducting evaluations of the play or leisure skills and interests of older school-aged children and adolescents, it may be most useful to observe them with their peers during a group recreational or leisure activity. In addition, much can

## BOX 5-3

CONDUCTING CONTEXTUAL  
OBSERVATIONS OF PLAY AND  
USE OF MATERIALS**DOCUMENT THE CHILD'S PLAY PREFERENCES**

What does the child seem to like? Dislike? What does the child spend the most time doing during play? What characterizes the types of toys or activities the child prefers? Does the child spend more time in sedentary or active play? What are the specific sensory features of the toys the child chooses? Does the child prefer unstructured and creative play, or play that is structured and has rules? Does the child tend to play alone or to seek out others during free play? What roles does the child assume during play (observer, leader, or follower)?

**DOCUMENT THE WAYS IN WHICH THE CHILD USES MATERIALS AND PLAY EQUIPMENT**

Does the child use toys in the ways in which they were intended to be used? Does the child use the same play materials in different ways? Are materials used in a perseverative, repetitive fashion? Describe the ability of the child to manipulate materials and toys (note dexterity, grasp patterns, fine motor coordination). Does the child have the ability to move around and the strength and coordination to engage in age-appropriate gross motor play? Describe what the child does well. Does the child initiate play? For how long does the child engage in the same play activity and seem curious and excited about exploring novel objects and play situations? Does the child engage in pretend play?

be learned about their use of leisure time, their interests, and social skills by interviewing them and their caregivers.

**Making Observations of Activities of Daily Living and Work-Related Activities in Context**

Information about a child's ability to perform basic self-help skills such as feeding and toileting and to participate in household tasks and vocational activities is often gathered through parent report. Standardized assessment tools that use an interview, self-report, or observation format, such as the PEDI-CAT<sup>4</sup> are limited in that they are completed based on the overall

BOX 5-4CONTEXTUAL OBSERVATIONS OF SOCIAL  
PLAY AND EMOTIONAL REGULATION  
DURING PLAY**SOCIAL PLAY BEHAVIORS**

Does the child tend to play alone, next to, or with others? Does the child interact verbally and nonverbally with peers? Describe the child's use of language and other means of communicating; How well does the child communicate his wants and needs during play? Does the child share materials and take turns? Does the child engage others actively in play situations? Is the child willing and able to adapt play situations to accommodate others? Can the caregiver easily elicit a social smile from the child or make him/her laugh?

**PSYCHOSOCIAL AND EMOTIONAL FACTORS DURING PLAY**

Does the child transition easily to and from different play activities? How long does the child typically stay with or attend to a specific activity? Does the child appear happy and playful? Does the child engage in approach-avoidance behavior (goes to an activity briefly but then leaves the activity without much productive play)? Describe the child's affect and ability to express emotion or empathy for others. What emotions are expressed by facial expressions and behaviors? Does the child seem interested in the environment and play opportunities? Engaged? Bored? Aggressive? Passive? Cooperative? For how long will the child persist when challenged? Does the child become easily frustrated and give up quickly when challenged?

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perceptions of the person filling them out. In contrast, making direct observations, describing and/or rating of a child's performance of their occupations and associated tasks and activities while he or she is actually performing the activities of concern or interest in context, or in real time, provides the most objective and detailed information of the child's ability and quality of performance. Conducting naturalistic observations of children performing basic or personal daily activities allows you to formulate a comprehensive understanding of the child's strengths and challenges, level of independence, and of the techniques and strategies used to accomplish the tasks. The influences of the environment and the demands of each task can



**Figure 5-3** Observations during play. These two children, 25 and 21 months of age, are observed playing in a tunnel filled with small plastic balls. During play, these children look frequently at one another and are comfortable next to each other but do not engage in social play. They seem to enjoy playing in the tunnel of balls, tolerating the tactile, visual, and auditory stimuli it provides without difficulty. They explore the balls, move well in the tunnel by crawling, and are both stable in sitting to free their hands to explore and toss the balls. They demonstrate the ability to grasp and release the balls, although they show little throwing accuracy. The older child identifies some of the colors, and the younger child frequently says the word “ball.”



**Figure 5-4** This 4-year-old is playing with friends in a backyard pool. He demonstrates the ability to motor plan a novel task by successfully climbing onto the raft and positioning himself for a ride. He is able to stabilize himself in a 4-point position, and he demonstrates effective body and head righting reactions to maintain his balance and avoid tipping. His hands grip the handles tightly, and he demonstrates adequate co-contraction at the shoulders and mobilization to accommodate the movement of the raft. He enjoys this unpredictable movement experience. He engages in parallel play by being comfortable being in close proximity with other children in the pool and doing his own thing.

also be determined, as they relate to the child's performance. This information is particularly helpful for intervention planning. Consideration of the child's occupational profile, which is established early in the evaluation process, will assist you in selecting the activities of daily living that are most important for you to observe in individual clients. Table 5-1 lists some of the common daily activities that occupational therapists might consider observing in children of different ages in context, as part of comprehensive occupational therapy evaluations. Table 5-2 lists some instrumental activities of daily living, school-related, and work activities that occupational therapists might consider observing children of different ages do in context. When evaluating the level of competency or independence that a child exhibits when performing activities of daily living, or work-related tasks such as daily chores, it is important to observe and take note of the following:

1. Characteristics of the context in which the activity takes place, including environmental factors and task demands
2. The child's level of independence, including the amount and type of assistance required for the child to complete the activity (common terminology used by occupational therapists to describe levels of assistance was provided in Chapter 2).
3. Special techniques, compensatory strategies, and adaptive equipment used by the child to complete the task.
4. Qualitative characteristics regarding how the child completes the activity, including the sequence of steps performed, approaches taken, and kind of errors made.
5. Any underlying deficits, body functions or performance skills, or client factors (sensory, motor, cognitive, social, and emotional) that seem to be interfering with the child's ability to perform the task efficiently and safely.
6. The amount of time or effort required to complete the activity.
7. How satisfied the child, or caregiver, appears with the child's performance of the task.

### **Structured Observations**

When you do not have the opportunity to observe the child performing their daily occupations and associated activities that have been identified as important, and as areas of concern,

TABLE 5-1

## OBSERVATIONS OF ACTIVITIES OF DAILY LIVING FOR CHILDREN BIRTH THROUGH 5 YEARS OF AGE

Age	Activities of Daily Living
0–12 months	Observe child with caregiver during bathing, dressing, diapering; does the child assist at all, such as by lying still during diaper changes or by pushing arm through arm hole of shirt? note positioning and ease with which the caregiving activities are completed; observe bottle feeding or nursing when parent expresses concerns with feeding; note positioning, suck-swallow coordination, and other oral motor skills during feeding; observe cup drinking, finger feeding, and use of spoon beginning around 12 months; observe positioning during rest/sleep.
1–2 years	Observe child with caregiver during bathing, dressing, diapering; how much does the child assist or resist? Note positioning and ease with which the caregiving activities are completed; does the child indicate a need for a diaper change or show an interest in toilet training? observe cup drinking/nursing when problems are evident, finger feeding, and spoon feeding; note positioning, oral motor skills, level of independence during feeding; observe positioning during rest/sleep; observe functional mobility/ability to move or explore the environment, retrieve objects; ability to reach for, grasp, hold, and manipulate objects; observe caregiver transporting child, e.g., to and from car seat, stroller, carrying when concerns are raised.
3–5 years	Observe level of independence and type of assistance required for feeding, dressing, bathing, grooming, toileting, and whether regular routines for bathing, dressing, eating/meals, sleep are established; observe level of safety and independence with mobility, such as walking, running, climbing stairs, getting in and out of the bathtub, and maneuvering within the child's natural environments; note the functional use of the upper extremities for grasping, holding, carrying, and manipulating objects for play and self-care tasks; when relevant, observe the child's ability to participate in typical preschool activities, such as sitting quietly in a group for 10–15 minutes, following directions, and following a classroom routine.
5+ years	As above; note the amount of time, energy, level and type of assistance required for child to complete self-care tasks; does the child self-initiate appropriate grooming, bathing, and dressing tasks, such as tooth brushing? Does the child a thorough job with bathing/grooming activities? Does the child select appropriate clothing for the weather or context? Does the child eat in ways that satisfy socio-cultural norms or expectations? Note whether the child and caregiver(s) appear satisfied with the child's performance in these areas.

TABLE 5-2

OBSERVATIONS OF INSTRUMENTAL ACTIVITIES OF DAILY LIVING, EDUCATION, AND WORK ACTIVITIES TO CONSIDER WITH CHILDREN 4–18 YEARS OF AGE

Age	Instrumental Activities of Daily Living	Education/Work Activities
4–6 years	Preparation of a simple snack, like a bowl of cereal or spreading butter on toast; putting away own belongings and tidying up bedroom; assisting with setting and clearing the table after a meal; assisting with cleaning up messes; simple caregiving of a pet like feeding or walking the dog; turning on/off electronic devices like computer, television; use of a phone	Select a task requiring the child to follow simple directions like retrieving mail and putting it in a designated spot; observe ability to use an electronic device like computer or cell phone; observe child in classroom setting and note ability to attend quietly in a group situation, follow a classroom routine, and initiate and complete simple tasks
7–11 years	Observe child doing a household chore like setting the table, washing dishes, tidying a room, putting laundry away, emptying trash, or completing caregiving activities of a pet; observe the child prepare a simple meal or snack	Observe during school activities in the classroom and in other environments such as on the playground and in the cafeteria; observe the child organizing school belongings, doing homework activities
12+ years	Observe child doing one of their household chores like setting the table, washing dishes, tidying a room, putting laundry away, emptying trash, or completing caregiving activities of a pet; observe the child prepare a simple meal; in the community, observe ordering a meal, shopping (finding, selecting, and purchasing items)	In addition to observations of school-related tasks, observe during volunteer or paid/unpaid work activities, such as child care activities, lawn care and maintenance, computer tasks, fund-raising activities, teaching/coaching/tutoring activities

it may be necessary to set up an evaluation situation in which the child is asked to perform the occupation (or aspects of it) out of context. In general, observing children in their natural context is a bit risky because child behavior is somewhat unpredictable, and you may not get the opportunity to see exactly what you are looking for. Therefore, setting up or contriving

to some extent evaluation situations and activities in ways that will yield the kinds of occupational engagement whether related to play, self-care, and work-related skills, that you would like observe, is often an effective alternative strategy. You will apply your knowledge of the child's occupational profile, common sense, and a bit of creativity to decide upon and setup evaluation activities that will yield the kinds of behaviors and skills you would like to observe. Specific equipment, materials, or space may be necessary, as you do your best to simulate the contexts and situations where and how the occupation would naturally occur. As an illustration, examples of setting up structured observations for evaluating gross motor skills and play skills and are provided in Boxes 5-5 and 5-6.

**BOX 5-5****STRUCTURED OBSERVATIONS OF GROSS MOTOR SKILLS****SETTING: CLINIC/THERAPY PLAY ROOM OR GYM**

Plan a 10-minute play situation that limits the child's play choices to gross motor activities by removing more sedentary or fine motor play choices and by making available large therapy balls, a suspended swing, a rocker board, a riding toy, balance beam, balls of various sizes, climbers, and a mini-trampoline as play choices. Set up an obstacle course with a climbing apparatus and a tunnel, and mats for the child. For an infant or child with significant neuromotor deficits, place the child in various positions on a mat on the floor with enticing toys to examine sitting posture and balance, postural control, movement, and ability to play in prone and in supine. If you suspect that a child is overly sensitive to or fearful of movement (posturally insecure), gently place him or her on a therapy ball in the sitting position or on a suspended swing and observe the child's reaction to having his or her feet off of the ground. Ask the child to perform some age-appropriate gross motor skills such as sit-ups, climbing stairs, jumping rope, running, push-ups, hopping, skipping, jumping jacks, and playing catch.

Note: Many of the ideas listed above can be implemented in the home or in a backyard. Whenever possible, observe activities that the child typically participates in, such as watching the child ride his own riding toys or play on his backyard swing set. Select activities that are easy and difficult for the child to perform so you can see the range of the child's abilities, i.e., what the child can do well and the skills that are just emerging.

BOX 5-6EXAMPLE OF A STRUCTURED PLAY  
OBSERVATION OF A CHILD SUSPECTED  
OF HAVING AN AUTISM SPECTRUM  
DISORDER (ASD)**GOAL**

Prepare/set up play activities that increase the probability of observing the kinds of behaviors that characterize children with ASD and that may be areas of concern or challenging for the child. This may include setting up situations that require the child to play with novel toys, transition to and from different play situations/materials, to engage in social, pretend play, and process multi-sensory input. Also select a variety of toys and activities so that the child's strengths, interests and preferences can be observed.

**ACTIVITIES/TOYS**

Have available sensory-based toys with enticing visual and auditory stimuli (push buttons that result in noises, lights); use pretend toys like a tea/kitchen set, train set or play farm; observe the child while playing with you or with others during turn-taking games, imitation games, and situations that require social interaction, and the child to follow the directions and play ideas of others, and to transition to and from different activities. Include some unstructured, solitary play time and play with caregivers, peers, and siblings when possible as well as with you. Opportunities should be provided for the child to assume different roles (leader and follower), use language, request desired objects, initiate play with a variety of play materials and objects, explore the sensory features of objects, and socially interact with others.

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In addition to conducting structured observations of child performance, skills, and functions by setting up, and asking the child to engage in a specific set of evaluation activities, structured observations can and should be made during the administration of any standardized, performance-based test. For example, when administering a test of visual-motor integration skill that requires a child to draw with a pencil while seated at a table, you have a wonderful opportunity to

take note of the child's sitting posture, ability to follow directions, and attend. Motor planning and sequencing skills, basic pencil skills including grasp patterns, and the child's hand preference can also be observed. Therefore, in addition to gaining a standardized score of visual-motor skills provided by the test results, you will gain insight into some functional handwriting skills, praxis, postural control, and other fine motor skills.

The options for developing structured observations are limitless. Therefore, it is important that you are very deliberate in your selection of evaluation activities and that you set up situations most likely to yield the kinds of observation data that you are looking for. It is important to conduct your evaluation efficiently and to avoid duplication of data obtained through standardized testing or gathered by other team members. Other examples of structured observations that can be conducted to evaluate specific child factors/performance components are given in many of the tables in Chapter 2. To assist you in writing up your observations related to movement, terminology for describing types of movement, motor behaviors, and positions is given in Table 5-3.

<b>TABLE 5-3</b> SAMPLE TERMINOLOGY FOR DESCRIBING MOTOR, COGNITIVE, AND PSYCHOSOCIAL BEHAVIORAL OBSERVATIONS	
<b>Type of Behavior</b>	<b>Common Terminology and Considerations</b>
Motor functions, skills, and quality of movement	Head and trunk control; postural control; proximal stability at the shoulder and pelvic girdle; weight bearing and base of support; weight shifting, muscle elongation, trunk rotation, body and head righting; random movements, spontaneous movements, purposeful or volitional movement; bilateral movement, symmetry, asymmetry, influence of gravity, antigravity movement; fine and gross motor coordination such as smooth, jerky, or tremulous; muscle tone descriptors including hypotonic, flaccid, hypertonic, and rigid

(continued)

TABLE 5-3

SAMPLE TERMINOLOGY FOR DESCRIBING MOTOR, COGNITIVE, AND PSYCHOSOCIAL BEHAVIORAL OBSERVATIONS (*Continued*)

Type of Behavior	Common Terminology and Considerations
Various positions	Prone, supine, side lying, sitting, supported sitting, W-sit, ring sit, long sitting, kneeling, half kneeling, quadruped/crawling or 4-point position, standing, supported standing; body postures such as anterior or posterior pelvic tilt, lordotic, kyphotic, upright, slouched, leaning, or flexed forward postures; midline orientation
Direction of movement	Flexion, extension, abduction, adduction, rotation, lateral flexion of the trunk, trunk rotation, internal and external rotation, supination, pronation, dorsiflexion, plantar flexion, inversion, eversion, shoulder retraction, shoulder protraction, and elevation
Sensory and perceptual functions and skills	Hyper- or hyposensitivity, awareness, registration, modulation, discrimination, localization, and integration of sensory information; acuity or accuracy; spatial relations, awareness of body and space; pain descriptors such as sharp, dull, radiating, ache, throbbing, intermittent, or constant
Cognitive skills	Awareness, recognition, attention, concentration; orientation to person, place and time; ability to following directions; judgment; adapting, and problem solving; insight; making decisions, and choices; locating, gathering, sorting and categorization of objects; verbal and nonverbal communication; organization, sequencing and planning; use of logic and abstract thinking; general knowledge and understanding of language; visual, kinesthetic, verbal learning styles; abilities in reading, writing, math, and other academics
Social skills	Awareness of others; verbal and nonverbal communication; use of gestures, and language; ability to initiate, sustain interactions; number of back and forth exchanges; taking the perspective of others and listening; eye-contact; reciprocity and sharing; respect and empathy; understanding of social norms and expectations
Emotional regulation	Level of arousal and activity level; display of emotions, calmness, or aggressive outbursts; behavioral regulation and self-control; affect; self-confidence; persistence and frustration tolerance; anxiety; flexibility; responsiveness and coping

## Formal Clinical Observations and Procedures

**Formal clinical observations** are those that have specific directions for administration, although they are not performed as part of any specific standardized assessment tool. Pediatric occupational therapists often use formal procedures to assess underlying sensory and motor functions and **postural control**. Although some standardized assessments include test items for this purpose, such as items to measure automatic reactions, reflex behavior, and muscle tone, these neuromotor components can be, and often are, evaluated separately from a standardized test.

It is important to recognize that many of the clinical observation procedures included in this section have limited research on which to base interpretations, and specific administration procedures used by therapists vary somewhat.<sup>11-16</sup> Therefore, findings from these observations must be interpreted cautiously and used to augment your evaluation data from other sources, such as the results of standardized tests and information gathered from interviews. When conducting sensory and neuromotor clinical observations and procedures, it is important to look for asymmetries or differences in the left versus the right side of the body, so many of these procedures should be performed on both sides of the body. Because primitive reflex patterns and righting and automatic reactions were presented in Chapter 3 as part of normal development, they are not included with the observations presented later herein.

### Muscle Tone

**Muscle tone** is the amount of muscle contraction or tension of a muscle at rest and can be assessed by following the steps described below.

1. Sitting opposite the child, ask him or her to extend arms with forearms supinated and place wrist flexors on stretch; observe for hyperextensibility in the elbows and wrist, which is an indication of low tone.
2. Examine the amount of resistance during passive movement of the limbs. For example, with the child in supine,

move the lower limbs in abduction with knees flexed; move the foot in ankle plantar and dorsiflexion; move the upper extremities in elbow flexion and extension, and shoulder flexion and extension. Little to no resistance is evidence of low tone, and moderate to high resistance is indicative of high tone.

3. Palpate the muscle bellies at rest (e.g., biceps, gastrocnemius); the muscle bellies are soft when muscle tone is low and firm when muscle tone is high.

### **Musculoskeletal Deformities and Postural Alignment**

OT evaluations of children with suspected or possible musculoskeletal deformities or injuries, such as those commonly seen with neuro-motor disease, cerebral palsy, juvenile rheumatoid arthritis, and arthrogryposis, include a physical examination. The child can be placed on a mat or plinth, and areas for assessment include active and passive range of motion of the limbs and spine to note any movement restrictions, and/or pain, muscle strength, and visual inspection and palpation for examining the integrity of the muscles, bones, and joints. Any abnormalities should be identified and described, and results of related radiographic evaluations should be reviewed if available.

### **Co-Contraction of the Muscles and Joint Stability**

**Co-contraction** of the muscles is the ability of opposing muscle groups to contract at the same time to provide stability around a joint. With the child sitting in a chair across from you, with back unsupported, the child is asked to grab onto your thumbs (put your arms forward with thumbs up). Then, ask the child to stay as still as possible and not to let you push or pull him or her. Allow the child some elbow flexion, and give the child a chance to build some muscle tone. Then, push and pull in an arc-type motion, up and toward the child and down and away from the child. Do not let the child's lock elbows; if the child has good co-contraction, he or she should be able stay relatively still. You can also examine co-contraction of the shoulder girdles bilaterally by having the child assume a wheelbarrow position (hands flat on the floor, therapist lifts and hold legs at the knees).

Note stability around the shoulders, the child's ability to assume and hold the posture, and to walk forward on hands with the legs held.

### **Muscle Strength**

To perform **manual muscle testing**, you must know the muscles of the body and their functions, anatomical positions and direction of the muscle fibers, and angle of pull of the joints. Muscle testing cannot be conducted with children who have abnormal muscle tone. Assignment of a muscle grade depends on clinical judgment, knowledge, and examiner experience. The grading system used goes from 0 to 5, with low grades representing weakness, and is based on how well the child moves the limb against gravity and by the amount of resistance the individual can endure. Formal manual muscle testing of specific muscles is rarely done with young children because of difficulties with child compliance and understanding of what is required. Specific procedures can be found in numerous other sources and are not included herein.<sup>17-19</sup> Another method to evaluate abdominal strength is to simply have the child perform as many sit-ups as he or she can in 1 minute and record the number. Upper extremity strength especially of the triceps can be examined by asking the child to do as many push-ups as possible in 1 minute and record the number (children 7 years of age and younger and girls can do push-ups from the knees).

### **Antigravity Postures Indicating Aspects of Postural Control**

Place the child in supine, with arms crossed on the chest and with the neck, hips, and knees flexed (like in a ball; demonstrate as needed); record how long in seconds the child can assume this supine flexion position; determine whether the child can maintain the position with gentle resistance applied to the forehead pushing toward neck extension and to the knees toward hip extension. Place the child in prone with shoulders abducted and elbows flexed, legs extended with knees off of the floor; (like an airplane position; demonstrate if needed). Record how long the child can assume this prone extension position (norms available from Gregory-Flock and



**Figure 5-5** Assessment of prone extension.

Yerxa<sup>12</sup>; Wilson et al.<sup>16</sup>). The child in Figure 5-5 demonstrates this position, although he is experiencing some difficulty assuming the correct posture because he cannot lift his knees completely off of the floor.

### **Visual Pursuits Including Visual Tracking and Quick Localization of a Visual Stimulus**

These observations provide you with information about **ocular-motor control** and **visual-motor coordination**. Facing the child in sitting, the child is asked to keep his or her head still while allowing the eyes to move. Move a pencil or penlight slowly horizontally, vertically, and then diagonally about 8 to 10 inches from the child's eyes, and note the child's ability to follow the stimulus with their eye movement, and their ability to separate eye movements from head movements. Check for quick localization of the eyes by asking the child to look at an object like a penlight while you move it quickly in different planes. Ask the child to look at your nose and then look at the object. Observe for smoothness of eye movement versus jerky or inaccurate movements, midline jerk, and the child's ability to separate eye movements from head movements (see Fig. 5-6).



**Figure 5-6** Assessment of visual pursuits.

### Motor Coordination

1. **Rapid alternating movements:** Child and examiner are sitting facing one another, with arms flexed, resting on laps. You demonstrate rapid supination and pronation (slapping thighs gently), first with one hand, then the other hand, then with both hands together. Instruct the child to do it fast, and count the number of times the palms slap the thighs in 10 seconds (should be around 10 times); observe coordination, smoothness of movements, and right-left differences.
2. **Thumb-finger touching** (see Fig. 5-7): Ask the child, after demonstration, to touch his or her thumb with each finger in sequence from the index to the little finger and then back in sequence to the index finger, repeating several times. First start with one hand, then the other hand, and then both hands simultaneously. Then ask the child to perform the same task with his or her eyes closed, which allows you to gather information about the child's proprioception. Look for associated reactions, asymmetries, speed and smoothness of movement, and degree of visual input the child requires to complete the task. The child in Figure 5-7 can replicate the movement, although her



**Figure 5-7** Assessment of motor coordination: thumb–finger touching.

movements are very slow and deliberate, and some associated movements are noted with the left hand.

3. **Finger-to-nose testing:** In sitting, facing the child within arm's reach, extend an index finger upward and in front of your nose. Using one arm at a time, ask the child to touch the tip of your index finger and then the tip of their nose, moving their arm back and forth for 3 to 5 consecutive times, and then to repeat the movement sequence using the other arm. Note the accuracy and smoothness of the movements.

## Summary

Nonstandardized evaluation procedures, including interviews and observations were covered in this chapter. Information gained from informal and formal observations and through interviews, particularly with caregivers may be the most valuable evaluation data you gather throughout the evaluation process. This is particularly true for children who are difficult to test using standardized instruments, and for those with severe or profound disabilities for whom few standardized assessment tools are available. Observing clients perform the activities that they typically do every day, in their natural contexts, is one of the most exciting, content-rich tools

that you can use. Information gained from such naturalistic observations helps you understand what and how children and families engage in their daily occupations. It is, however, important to consider the limitations of their use, namely, the subjectivity and bias that affect your interpretations and the lack of reliability and validity data supporting the conclusions you draw from nonstandardized procedures. Nonetheless, such informal procedures provide you with the flexibility to individualize your evaluation plan for each child, and help to maximize efficiency, and to ensure that you gather evaluation data that are most helpful to you and your clients.

As you gain clinical experience by applying these and other nonstandardized procedures with numerous children and their families, you will become more and more familiar with what you can expect to see from children of various ages and with certain types of disabilities. Although all children must be viewed as individuals, there are some common behaviors that can be predicted based on the ways in which certain types of children typically respond in similar situations. Over time, differences in behavior among children will become more obvious to you, and you will become more proficient, accurate, and confident in making interpretations based on your observations.

### Chapter Review Questions

1. How do you know when you have carried out an effective interview, and what strategies can be used to create a comfortable atmosphere during an interview?
2. Why is it important to be able to distinguish your interpretations of observed behavior from your actual observations of the behavior?
3. What can be learned about children from watching them play with peers at a playground, or by watching them at a grocery store with their parents?
4. How do you make decisions about what contextual/naturalistic observations would be most helpful to conduct, and where and when to conduct them?
5. What are the pros and cons of doing informal evaluation procedures such as unstructured interviews and observations, as opposed to administering a standardized test?
6. What are ways of improving your ability as a keen observer of relevant and important information throughout the evaluation process?
7. What formal, clinical observations and procedures might you do to evaluate specific motor functions of a child with a motor disorder such as cerebral palsy?

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# 6

## INTERVENTION PLANNING AND DOCUMENTATION

### Introduction

The content covered in this chapter expands on the information presented in Chapter 2 on the final two steps of the evaluation process: intervention planning and communicating evaluation results through verbal and written reports. Making sense of all the evaluation data you collected and then planning intervention are complex processes. Completion of these evaluation activities should ultimately result in a list of client strengths, challenges, and priorities and will provide you with the necessary direction for identifying intervention options and creating client-centered intervention programs. Important factors to consider as you engage in the **clinical reasoning** process for developing intervention plans are discussed in this chapter. In particular, the need for collaboration, making discharge projections, selecting a

theoretical model and frame(s) of reference for guiding intervention, and applying the best available research evidence when creating intervention plans are discussed. Practical skills for writing intervention goals and behavioral objectives as part of an intervention plan are addressed in detail, and examples are included. The chapter concludes with information to assist you with communicating evaluation results through report writing and oral presentations such as those delivered during family and team meetings. Refer to the sample occupational therapy (OT) evaluation reports in Appendix A that illustrate some of the ways in which reports might be written.

## DEVELOPING THE INTERVENTION PLAN

### Collaboration with Others

Intervention planning, first and foremost, should be a **collaborative effort**. It is essential that you review your OT evaluation results with the child's parents and with the child when he or she is old enough. Client involvement in the process helps ensure that child and family priorities are addressed and that practical considerations such as those related to scheduling are taken into consideration as the intervention program is developed. It is also important to share evaluation results and intervention planning ideas and recommendations with other professionals who are directly involved with the child's care and services, such as the child's teacher. In hospital settings, you will most often be a member of a multidisciplinary team of professionals who work together to provide a comprehensive rehabilitation program, so sharing information and determining and clarifying one another's roles in the intervention planning process is an important early step. It is important that **parental consent** is obtained before sharing evaluation information with others and that all regulations related to patient disclosure, such as those detailed in the Health Insurance Portability and Accountability Act (HIPPA) enacted in 1996, are followed. These policies help to protect our consumers and clients against a breach of personal medical information with set standards for maintaining medical privacy. Discussing your recommendations with other team members ensures

that your proposed interventions are not overly redundant or contradictory with the services of others. It is most beneficial if the intervention approaches used and the areas addressed by different disciplines complement or support one another's whenever possible. If you are working in educational settings under the Individuals with Disabilities Education Act, Part B or Part C,<sup>1</sup> then your intervention program will be a part of a larger program. The development of individual education programs and individual family services plans are required by law to be collaborative processes, so that you will not have your own program, but rather, be responsible for addressing portions of a more comprehensive program delivered by a team of individuals. Finally, in medical and other community settings, **reimbursement for services** often needs to be discussed, and preapproval for intervention services may be necessary before finalizing your intervention plan.

## Creating Long-Term Goals and Discharge Projections

Many factors contribute to your clinical reasoning as you develop intervention plans for children. The process includes the identification of **long-term goals** or **functional, occupation-based outcomes** that you, along with the child and family, believe are important and that can be realistically achieved as a result of OT intervention. Long-term goals are sometimes referred to as **discharge projections** in medical settings, and they represent the anticipated results or outcomes of your interventions. Discharge projections or long-term goals are what you hope your client will achieve and what you anticipate the child's functional status to be at the time therapy is discontinued and no longer requires your intervention.

Making predictions of the benefits or gains you anticipate a child will experience as a result of your intervention helps justify the medical or educational necessity for OT intervention services and often serves as essential documentation for insurance reimbursement. Making such predictions is not an easy task. To help with this process, consider the child's developmental history and response to interventions in the past, and diagnostic or condition-specific information.

Also, your judgments should be based on the scientific, research evidence provided in the literature, and on your own clinical experience. The OT Practice Framework<sup>2</sup> describes a number of different types of desired outcomes that you might consider, including improving occupational performance and role competency, enhancing one's capacity for adaptation or change, enhancing health and wellness, prevention of illness or disability, increasing quality of life, increasing participation in desired occupations, self-advocacy, and the promotion of occupational justice. In determining desired outcomes, consider the kinds of positive changes, gains, and outcomes that can be expected if the child receives OT intervention, and what you would anticipate happening if OT services were not provided.

## Writing Goals and Objectives

The purpose of writing goals and objectives is to help guide the intervention process, to communicate to others what it is you are doing, and to provide a measure of intervention effectiveness or child progress. Careful goal writing and documentation in general is also essential as medical records are considered legal documents, and they are also often used for obtaining reimbursement for services. Goals are commonly divided into short term and long term. There is no "official standard" for determining the time frame that defines a long- or short-term goal. The time frame selected depends on various factors, including the child's condition, the anticipated rate of progress, and the setting or service delivery system.

Generally speaking, **long-term goals** reflect what you would like the child to be able to do at the time services are no longer needed, which relates to the anticipated results of your interventions. However, for children with chronic or progressive conditions, this might not always be applicable. In school settings, long-term goals are often established for a child's school year. In rehabilitation or other hospital settings, long-term goals might be written for a 2-month or a 3-week period if that is the time frame you anticipate that the child will be hospitalized or require inpatient OT services.

It is important that long-term goals relate to a specific occupation important to the child, and that you define the

time frame in which you expect the goal to be achieved. For example, a goal related to feeding performance might be: Within 3 months, Jack will be able to eat all three meals independently, with setup assistance only.

**Short-term goals** reflect the steps the child needs to accomplish or go through to meet his or her long-term goals. Short-term goals are often written as behavioral objectives so that they can be used as a means of measuring the child's progress toward the long-term goal. It is important that you select and write behavioral objectives carefully so that they are capable of helping you monitor, measure, and document the progress of the child. **Behavioral objectives** include three main components:

- 1. The Behavior:** The behavior is what you would like the child to be able to do.
- 2. The Condition:** Conditions are factors that support or describe the context in which the behavior will be performed, such as the type and level of assistance provided, use of adapted equipment, or any other environmental or situational factors. Conditions help define the range of the behavior and often define when, where, and in what context you will examine the behavior.
- 3. The Criterion:** Criteria are set to provide a standard or measure for determining whether the child has achieved the desired behavior. Criteria used to measure performance are extremely variable and depend directly on the type of behaviors you wish to work on and measure. A common type of measurement criterion is the percentage of time the child does the desired behavior when requested. Qualitative descriptors may also be used as a type of criterion, and they define how the behavior needs to be demonstrated. For example, the criteria might be the level of assistance the child requires to perform the behavior, the length of time the child needs to perform the behavior, or the percentage of correct responses observed in given situation.

Examples of long-term goals are provided in Boxes 6-1 to 6-3, and examples of behavioral objectives are provided in Boxes 6-4 and 6-5.

**BOX 6-1****SAMPLE LONG-TERM GOALS FOR  
AN INPATIENT REHABILITATION SETTING**

1. Within 2 months, Matthew will improve sitting and standing balance so that he can dress himself independently, 90% of the time.
  2. Within 2 months, Matthew will improve his ability to attend and concentrate so that he can work on homework activities for 20 minutes in a quiet area with no verbal cues.
  3. Within 2 months, when set up, Matthew will be able to feed himself, including the use of utensils independently, 90% of the time, in the common dining area.
- 

**BOX 6-2****SAMPLE LONG-TERM GOALS  
FOR A SCHOOL SETTING**

1. By the end of the school year, Carol will improve fine motor skills so that she can print her name legibly on top of her work papers, 100% of the time.
  2. By the end of the school year, Carol will improve her social skills so that she plays nicely with peers on the playground during recess, 75% of opportunities.
  3. By the end of the school year, Carol will be able to perform her morning routine of getting off of the bus, getting to her classroom, and putting her coat and belongings away independently.
- 

**BOX 6-3****SAMPLE LONG-TERM GOALS  
FOR AN OUTPATIENT CLINIC SETTING**

1. Within 3 months, Johnny will decrease his tactile hypersensitivity so that at preschool he can play comfortably in the sand table and with art materials, including fingerpaint and playdough.
  2. Within 3 months, Johnny will improve motor planning abilities so that he can ride a tricycle independently.
-

**BOX 6-4****SAMPLE BEHAVIORAL OBJECTIVES  
TOWARD ACHIEVING A LONG-TERM GOAL****LONG-TERM GOAL**

Within 2 months, Matthew will improve sitting and standing balance so that he can dress himself independently.

**SHORT-TERM BEHAVIORAL OBJECTIVES**

1. Matthew will stand unassisted while conversing for 1 minute, 80% of the time when requested.
  2. During therapy, Matthew will maintain an upright sitting posture on the large therapy ball while being tilted side to side by the therapist for 20–30 seconds.
  3. In the morning, Matthew will get dressed while sitting on his bed, with minimal physical assistance for support in standing to pull up his pants and verbal cues, 80% of the time.
- 

**BOX 6-5****SAMPLE BEHAVIORAL OBJECTIVES  
TOWARD ACHIEVING A LONG-TERM GOAL****LONG-TERM GOAL**

By the end of the school year, Carol will improve her social skills so that she plays nicely with peers on the playground during recess.

**SHORT-TERM OBJECTIVES**

1. With verbal prompts, Carol initiates play with another classmate during free play time 50% of the time.
  2. Carol will spontaneously initiate play with another classmate during free play time 80% of the time.
  3. With assistance to follow the lead of others and take turns, Carol will participate in play successfully with peers during recess 50% of the time opportunities arise.
-

## Selecting a Model of OT Practice and Frame of Reference

The clinical reasoning process involves the selection of an OT model of practice and a frame (or frames) of reference that will determine your approach to intervention, and that will guide your actions throughout the intervention process. Models of OT practice and frames of reference are based on theory representing a set of ideas or concepts that explain why or how a phenomenon occurs. They carry with them a number of assumptions or beliefs, define concepts, and explain relations among concepts. OT practice models delineate the scope or area of concern for the OT profession, including the overall beliefs and knowledge of the profession, and as such emphasize the importance of occupational engagement for health and well-being. It is important for occupational therapists to understand and articulate *why* they are doing what they are doing and to be able to justify their actions to their clients and other professionals. Models of OT practice and frames of reference not only provide practical guidelines for evaluation and intervention, but provide the rationale for the selection of certain assessment tools, activities, and intervention techniques. Theory and frames of reference provide a way of looking at and understanding certain phenomenon. They assist in our understanding of the challenges or problems of our clients or of a population, and in how we might think about addressing these challenges in intervention. Together with research evidence discussed below, and practical considerations, models of OT practice and frames of reference form the basis of clinical decision making.

At this point in your education, you have most likely been introduced to many theories. Developmental theories, for example, explain the physical and psychological quantitative and qualitative changes experienced by humans as they move from infancy through childhood and into adulthood. Some theories are rather global like learning theory, while others explain changes in very specific areas such as Piaget's theory of cognition. Behaviorist theories for example, assume that certain behaviors are performed or learned because they have been positively reinforced by others. Many of the

theories from which OTs draw insights for clinical decision making in pediatric practice were discussed in Chapter 3.

OT models of practice are designed by occupational therapists specifically for OT practice, and can be used in conjunction with American OT Association (AOTA's) OT Practice Framework.<sup>2</sup> In fact, many of the ideas incorporated in the OT Practice Framework were derived from common models of OT practice, such as the Model of Human Occupation by Gary Keilhofner<sup>3</sup> and the Person-Environment-Occupation Model by Law and colleagues.<sup>4</sup> Like all models of OT practice, these are grounded in occupational science and satisfying occupational engagement is viewed both as a means to achieving wellness, as well as the desired outcome of intervention. Performance of one's desired occupations is the central construct which unites them. All OT models also apply a systems theory perspective, emphasizing the importance of viewing the occupational performance of individuals as complex, and resulting from client/individual factors, environmental/contextual factors, and the interactions between the self and the environment/context. Typically, OTs select a model that best suits their specific area of practice, setting, and client characteristics, as well as personal preference.

OT models of practice are broad in scope, and are therefore combined with more specific frames of reference that have been developed to address specific client problems. Frames of reference are more narrowly defined than models of practice, and occupational therapists select certain frames of reference largely based upon the type of referring problems they encounter. For example, a biomechanical frame of reference may be considered for children with a musculoskeletal or neuromotor problem, and a sensory integration frame of reference might be applied with a child with sensory integration dysfunction. Like models, they assist in guiding evaluation and intervention.

## Applying Research Evidence

After your client's goals have been identified, and you have selected intervention approaches based on a model of practice and frames of reference, you need to decide specifically

on the intervention techniques/activities and service delivery methods you are going to use. How will you go about helping your client accomplish his or her goals? Will your intervention be delivered directly by you or be provided indirectly by a certified OT assistant, rehabilitation aide, or teacher under your supervision? Will treatment be provided in a group or individually? Where will intervention services be conducted? The service delivery options that are available to you in your setting, specific child and family goals and preferences, and your skills and resources all need to be considered as you develop intervention plans for individual clients.

In addition to considering all the factors discussed above in your clinical reasoning for intervention planning, it is important to apply the best available research evidence on the efficacy of the interventions you are considering. Just like using available research to select psychometrically sound measures/assessment tools for evaluation, research evidence is important for guiding your treatment decisions, and will assist you in making discharge projections. Using the best available evidence for guiding clinical decision making has been termed **evidence-based practice**. This practice involves the integration of your clinical expertise and experiences with the application of the current, best research evidence in making decisions about the care of individual clients.<sup>5</sup> Evidence-based practice has been endorsed by our national professional organization, the American OT Association, as well as by most other educational and health care professional organizations. It is the ethical responsibility of occupational therapists to keep current on the research evidence, limitations, and scope of the interventions that are recommended, and to share this information with clients. This information helps you identify appropriate intervention options to consider for certain clients. In addition, sharing information gained from the synthesis of well-designed research studies helps the families you serve make informed decisions about whether to accept proposed intervention plans.

Once your long-term goals, approaches, intervention techniques, and service delivery methods have been determined, you need to determine the **scheduling** of your interventions. Scheduling involves determining the frequency and length of sessions and the location of the services. Family activities

and schedules, type of client and intervention plan and goals, research evidence, reimbursement considerations, and your schedule all will impact scheduling decisions. Questions to aid you as you go through the process of synthesizing evaluation data for intervention planning are summarized in Box 6-6.

**BOX 6-6****QUESTIONS TO AID YOUR CLINICAL REASONING DURING EVALUATION PROCESS STEPS 10 TO 12****STEP 10—INTERPRET, SYNTHESIZE, AND SUMMARIZE YOUR EVALUATION DATA**

What are the most important findings from your evaluation data? What was the purpose of the evaluation, and have you answered the questions posed by the referral source? What objective data do you have to support your interpretations and impressions? What are the child's overall strengths and weaknesses? What are the child's and caregiver's priorities related to functional goals and occupational performance? What child factors, performance skills, environmental/contextual factors, and activity demands are contributing to the child's successes and challenges in performing daily activities? What new information can you contribute to the family and team about this child and his or her programming needs?

**STEP 11—DEVELOP RECOMMENDATIONS AND INTERVENTION PLANNING**

What are the parent and child priorities? What is feasible for them, and you, in consideration of your resources? What are other professionals addressing with the child? What is the research evidence supporting the interventions you are considering? What gains can you expect in response to intervention? What are your short- and long-term goals for this child? What model of OT practice and frame(s) of reference will assist you in determining your intervention approaches and techniques?

**STEP 12—DOCUMENT AND SHARE YOUR EVALUATION RESULTS**

Who is going to read your report? Have you addressed all of the referral questions? Is your report professionally written? Are your impressions clearly supported by objective evaluation data? How will you present the information concisely in a meeting?

## DOCUMENTATION AND SHARING OF INFORMATION

The final step in the evaluation process includes documentation of the evaluation and sharing of the information. Five **sample evaluation reports** documenting pediatric OT evaluations for different practice settings and ages of children are provided in Appendix A. Although there is some room for individual styles and preferences in the way reports are written, it is important that you follow the specific format for writing up evaluation reports required in your setting. The information that should be included in your OT evaluation reports, with a sample format is presented in Box 6-7.

The most important section in an evaluation report is the **evaluation summary and impressions section**. This section is a synthesis of all of your evaluation data and is written in a concise way so that professionals who just want a quick summary of the evaluation can get the information they need in this section alone. The rest of the report should provide the detailed information that supports your summary and impressions.

It is recommended that when writing evaluation reports you choose language carefully so that all interested audiences (parents, teachers, and physicians) can understand what you have written and your report is “professional.” A professional report is clear, concise, and typewritten; contains no grammatical or spelling errors; is well organized; and contains accurate information. Standardized test scores should be reported and interpreted accurately, and your impressions, subjective interpretations, and recommendations should be clearly supported by the objective data that you include in your report (from results of standardized tests and from your observations). You should also take care to use politically correct language, such as person-first language (i.e., a child with autism instead of an autistic child) and to avoid negative language such as “inflicted with” or “suffers from.” A standard length for writing evaluation reports has not been established, but most comprehensive reports can be completed in 3 to 6, single-spaced, typed pages.

Once your report has been written, it is important that you spend time with the child and family to go over the

## BOX 6-7

## SAMPLE TEMPLATE FOR REPORT WRITING

**OCCUPATIONAL THERAPY INITIAL EVALUATION**

Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Chronological Age: \_\_\_\_\_  
Date of evaluation: \_\_\_\_\_  
Parents names/Contact information: \_\_\_\_\_  
School information (grade, school program, teacher): \_\_\_\_\_  
Reason for referral: \_\_\_\_\_  
Referral source: \_\_\_\_\_  
Diagnosis or educational coding: \_\_\_\_\_  
Evaluation methods and assessments administered: \_\_\_\_\_  
Child behavior and response to assessment: \_\_\_\_\_  
Occupational profile/Relevant background information: \_\_\_\_\_  
Evaluation results (test scores; summary of clinical and natural-  
istic observations, and interview data addressing client fac-  
tors, skills, roles, activity demands of relevant occupations,  
contexts): \_\_\_\_\_  
Summary and impressions (the child's strengths, challenges; how  
factors above affect occupational performance; problems  
areas that would benefit from occupational therapy interven-  
tion; other concerns that may require referral to other services  
and professionals): \_\_\_\_\_  
Recommendations: \_\_\_\_\_  
Therapist signature, qualifications \_\_\_\_\_

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report and answer any questions that they may have. Typi-  
cally, evaluation reports are sent to the referral source and to  
the family. They become part of the child's medical chart in a  
hospital setting and part of a child's official education record  
if the child was seen in an educational setting. Other team  
members or professionals working with the child outside of  
the setting you work in may also want a copy of your evalua-  
tion report. With the parents' written consent, you can send  
a copy to them as well.

Often you may be asked to report your evaluation find-  
ings in the context of a team meeting in early-intervention,

educational, or hospital settings. It is important that you are able to summarize your major findings and recommendations in about 3 to 5 minutes. When **reporting your findings**, it is important to summarize what you did during your evaluation. Highlight the major findings, including summarizing test scores; the child strengths, challenges, and needs; and how the child's difficulties impact his or her ability to participate in valued occupations (roles and activities). Finally, briefly describe what your intentions are for further involvement, including any recommendations for OT intervention.

## Summary

This chapter expanded on information on the final three steps of the evaluation process presented in Chapter 2 and emphasized methods of synthesizing evaluation data for intervention planning, writing goals, and communicating evaluation results through report writing. Synthesizing and summarizing evaluation data and the intervention planning that follows are probably the most challenging clinical activities that you will engage in as an occupational therapist. Your proficiency in completing these steps for individual clients will continue to evolve throughout your years as a practitioner. The content of this book does not include information regarding the intervention process or specific intervention techniques. It is, however, important to point out that your knowledge and skills related to intervention play an important role in determining what your intervention programs will ultimately look like. Collaborating with others, especially the child and parents, the importance of making discharge projections or identifying long-term occupation-based goals, and of applying the best available research were highlighted as essential considerations throughout the intervention planning process, regardless of practice setting. Guidelines for writing intervention goals and behavioral objectives and for creating evaluation reports were also included, with examples.

## CHAPTER REVIEW QUESTIONS

1. How do occupational therapists prioritize system factors such as reimbursement with client needs and resources for intervention planning?
2. How might you handle differences in opinion regarding priorities for intervention services among team members?
3. What sources of information are available to assist you in making reasonable discharge projections?
4. What are some ways in which occupational performance goals can be measured, and how often should data be recorded on progress towards goal achievement?
5. How do therapists manage to create evaluation reports that are professionally written, but appropriate and easily understood by multiple audiences?
6. What can be done to assist occupational therapists in engaging in evidence-based practices?

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# 7

## OCCUPATIONAL THERAPY EVALUATION FOR SPECIALIZED AREAS OF PRACTICE

**Autism, Neonatal Intensive Care,  
Assistive Technology, Transition  
Services**

### **Introduction**

This chapter describes evaluation techniques and assessment tools for four very different specialized areas of occupational therapy (OT) practice: work with individuals with autism spectrum disorders (ASDs); OT in neonatal intensive care unit (NICUs); evaluation and consultation in the area of assistive technology (AT); and work related to transition planning for adolescents moving to adulthood. The content in this chapter illustrates how common elements discussed earlier in this book such as creating an occupational profile, using a combination of interviews, observations and assessment tools or tests, and applying critical thinking for decision making apply no matter what the setting and/or population. In addition, the content demonstrates the importance of and

appreciation for the many specialized skills that are required in some areas of practice and the subsequent need for further training or professional development. In many ways, because OT practice with children is very broad and diverse, most areas or types of settings require some level of expertise and unique skill set to be developed with further training, or with clinical experience beyond what is typically provided in an entry-level professional OT education program. It was difficult to decide what specialized areas of OT practice to include in this chapter, and many, many were considered. The four areas of practice that were ultimately selected and that are highlighted in this chapter were chosen because they are popular areas of practice where there is a need for professional expertise, and because the areas are very different from one another. Expert clinicians currently working in these OT practice areas were consulted in the development of some of the content for this chapter. It is important to be reminded that when evaluations are conducted for clinical purposes including intervention planning, an understanding of client occupational performance, and identification of the barriers and facilitators to more satisfying and efficient performance of one's desired occupations is sought regardless of specialty area. With that in mind, different perspectives, and evaluation strategies associated with OT practice with individuals with ASDs, practice in NICUs, for selecting and applying AT solutions for improving occupational performance, and for providing services in the area of transition planning from adolescent programming to adulthood are discussed in this chapter.

## **EVALUATING CHILDREN WITH OR SUSPECTED OF HAVING AN ASD**

In approaching evaluations of clients with a known or suspected disorder such as an **autism spectrum disorder** (ASD), it is important to fully understand and consider the main characteristics of the disorder. This knowledge helps occupational therapists structure clinical observations so that the behaviors often affected by the disorder are more likely to

be revealed. Screening tools and diagnostic tests specifically designed for diagnostic purposes for the disorder of interest may also be available. Such tools ideally examine occupational areas, performance skills, and body functions and structures that are typically affected by the disorder, and that would provide the most relevant and valuable information for differential diagnosis and intervention planning.

The increasing prevalence of ASD, reported to be 1 in 88 by the Centers of Disease Control and Prevention<sup>1</sup> (based on data from 2008), has resulted in research efforts in early detection and advances in screening and evaluation techniques for ASD. Screening processes and assessment tools such as surveys, questionnaires, and checklists are available for use by physicians and other professionals such as child care workers, and therapists who serve the needs of young children and their families. Such tools not only assist in the screening and diagnostic process for young children suspected of having an ASD, but may also be useful for intervention planning. The rationale for universal screening is that early detection facilitates entry into early intervention and other therapeutic services that, when provided as early as possible, lead to more positive developmental outcomes.<sup>2</sup> The main characteristics of children with ASD include challenges with communication including the development of language and social interaction and atypical behavior characterized as repetitive and/or restricted in nature. Therefore, structured observations and interview questions aimed at eliciting information about how the child plays, communicates, and socially relates to others is essential. Children with ASD also often display sensory and motor challenges, and therefore, these areas should also be addressed in an evaluation. Some common early signs of ASD (prior to age 2) that therapists should look for are listed in Box 7-1.

It is important to acknowledge that the evaluation of children with or suspected of having ASD is a complex process since the diagnosis is made based on behavioral characteristics. The DSM-IVr,<sup>5</sup> provides a framework and criteria for diagnosis, although the reliability of applying the criteria has been questioned by some experts<sup>6</sup> who believe the criteria are too broad. The typology for ASD diagnosis was revised for

## Box 7-1

EARLY SIGNS OF AUTISM SPECTRUM  
DISORDER (PRIOR TO 2 YEARS OF AGE)

Not responding consistently when his or her name is called

Not pointing at objects to share interest

Not interested in or able to play “pretend” games

Avoiding eye contact and eye gaze towards people

Engaging in solitary play for long periods of time

Delayed speech

Repeating words or phrases over and over

Getting very upset by changes in routine

Having strong but restricted interests

Atypical motor movements such as flapping hands,  
rocking the body

Unusual reactions to the way things sound, smell, taste,  
look, or feel

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Contributions from: Bryson SE, McDermott C, Rombough V, et al. The Autism Observation Scale for Infants (AOSI): scale development and reliability data. *J Aut Devel Dis.* 2008;38:731–738; Mulligan S, White BP. Sensory and motor behaviors of infant siblings of children with and without autism. *Am J Occup Ther.* 2012;66(5): 556–566.

the DSM-V, which at the time of the writing of this book had just been approved but was not yet out in print. The revised typology, which was endorsed by the American Academy of Pediatrics, collapsed the previous subtypes of autism into one broad category called ASD, with diagnostic criteria organized under two main dimensions: behavior and social communication. Team approaches are recommended for conducting evaluations of children for both determining an ASD diagnosis, and for determining intervention programming needs. Typical teams include specialists in speech/language and communication, sensory and motor development, emotional development and behavior, cognition, and medicine. The administration of specially designed standardized tests such as the Autism Diagnostic Observation Schedule (ADOS), second edition<sup>7</sup> and the Autism Diagnostic Interview-Revised<sup>8</sup> are

highly recommended when one of the purposes of an evaluation is to determine whether or not the child has ASD. Common screening and evaluation tools used by occupational therapists and other professionals with individuals with ASD are listed in Table 7-1.

When planning evaluations for children with ASD, it is important to acknowledge that most children with ASD have communication challenges. Therefore, the use of language, expectations for time to respond, verbal directions, and amount and type of interaction expected often need to be adjusted to maximize the child's ability to participate and level of comfort. Second, many children with ASD have difficulties with changes in routine, coping with novel settings and people, and sensory sensitivities. Therefore having an understanding of the child's fears or anxieties, and ability to self-regulate, calm, and cope prior to placing demands on the child during an evaluation is important to maximize the efficiency of the evaluation process, and to reduce the risk of upsetting the child.

Occupational therapists bring important expertise to team evaluations of children with ASD by viewing the child as an occupational being. We aim to understand fully how the child's environments and desired activities, contexts, behaviors, skills, and challenges impact the child's satisfaction, competency, and capacity for performance and learning. OTs are particularly skilled at examining play behaviors, sensory processing and sensory integration functions, motor development, behavioral regulation, and the performance of self-care and other daily living skills. So whether the OT evaluation is part of a more comprehensive team evaluation, or performed specifically for the purposes of OT programming, these areas should be addressed. Watling<sup>9</sup> listed a number of functional domains that she found were frequently addressed in OT evaluations of individuals with ASD. Overall development, motor coordination, fine motor skills, visual motor and visual perceptual skills, and sensory processing were included, along with behaviors such as active engagement, arousal, attention, affect and emotion, and stereotypic behaviors. She also cited activities of daily living, play, social skills and joint attention, and habits and routines as being frequently addressed by occupational therapists.

TABLE 7-1

COMMON ASSESSMENT TOOLS USED WITH CHILDREN WITH AUTISM SPECTRUM DISORDERS

<b>Test Name</b>	<b>Type; Publisher</b>	<b>Purpose; Domain</b>
Autism Diagnostic Observation Schedule <sup>7</sup>	Performance, play-based; Western Psychological Services	Diagnosis; communication, social, and play behaviors
Autism Diagnostic Interview-Revised <sup>8</sup>	Parent interview; Western Psychological Services	Diagnosis; family and medical background, development, language and communication, social and play behavior
Autism Behavior Checklist <sup>10</sup>	Questionnaire, checklist	Screening; development, communication, sensory, social interaction, play behavior, and object use
Childhood Autism Rating Scale <sup>11</sup>	Behavior rating scale; NHS, Inc.	Communication, social, and play behavior
Communication and Symbolic Scales-Developmental Profile Infant-Toddler Checklist <sup>12</sup>	Parent questionnaire; Paul H. Brookes Publisher	Eye gaze, communication, social interaction, gestures, symbolic behavior, object play
Modified Checklist for Autism in Toddlers <sup>13</sup>	Parent questionnaire, checklist; Public domain	Screening; development, communication, sensory, social interaction, play behavior
Screening Tool for Autism in Toddlers <sup>14</sup> (Stone, Vanderbilt University)	Performance-based; www.kc.vanderbilt.edu/triad/training	Diagnosis; global development, communication, social, play behaviors
Pervasive Developmental Disorder Screening Test-II, Stage 2 Developmental Clinic Screener <sup>15</sup>	Parent questionnaire; PsychCorp	Screening; global development, communication, social, play behaviors
Bayley Scales of Infant Development, 3rd edition <sup>16</sup>	Performance-based and parent questionnaires; PsychCorp	Developmental evaluation; gross and fine motor, cognition and language, behavior, and social-emotional

Mullen Scales of Early Learning <sup>17</sup>	Performance-based; American Guideline Service, Inc.	Developmental evaluation; gross and fine motor, visual reception, receptive and expressive language, early learning composite
Vineland Adaptive Behavior Scales, 2nd edition <sup>18</sup>	Parent questionnaire; American Guidance Service	Developmental evaluation; motor, cognitive, language and communication, self-help and community living, social-emotional, adaptive behavior composite
Sensory Integration and Praxis Tests <sup>19</sup>	Performance-based; Western Psychological Services	Visual space and form perception, tactile, vestibular and proprioceptive processing, sensory motor coordination, praxis
Sensory Processing Measure, Home and School Forms <sup>20,21</sup>	Caregiver, teacher questionnaires; Western Psychological Services	Sensory processing across home and school environments
Sensory Profile; <sup>22</sup> Infant-Toddler Sensory Profile; <sup>23</sup> Adolescent/Adult Sensory Profile <sup>24</sup>	Caregiver questionnaires; Psychological Corp.	Sensory processing
Pediatric Evaluation of Disability Inventory—Computerized Adaptive Test <sup>25</sup>	Caregiver questionnaire, and observation scale; Boston University Health and Disabilities Research Institute	Self-care, functional mobility, and social skills
School Function Assessment <sup>26</sup>	Caregiver, teacher questionnaire, and observation scale; The Psychological Corporation	School function and participation, need for supports, activity and task performance
Evaluation of Social Interaction <sup>27</sup>	Observations and rating of behavior in context; Three Star Press	Social interaction

Interviews should be conducted with caregivers, teachers, or other care providers to gather information about the child's preferred activities, strengths, challenges, likes and dislikes, and behaviors across settings. Questions specifically about the child's social communication skills, daily routines, play behaviors, adaptability, and temperament provide valuable insight into how autistic-like symptoms may be impacting the child's occupational performance. Semi-structured observations that engage the child in play should provide opportunities to evaluate how the child interacts and communicates with others, how they use objects, their creativity, and imagination in play. Behavior regulation, communication, motor planning, and sensory motor skills can also be observed during play and during the child's favorite fine and gross motor activities.

Setting up an evaluation situation that allows for the examination of behaviors of interest such as social communication and play is essential. Ideally information should be gathered through observations made in natural contexts (e.g., home, preschool) and across multiple settings. A combination of performance-based standardized tests and structured interviews should also be implemented. Three case examples are provided below to illustrate a possible list of appropriate evaluation activities for children with ASD at various ages.

## JOHN

John, 30 months of age, was evaluated in an out-patient clinic setting by an interdisciplinary team to determine if ASD was an appropriate diagnosis to explain his behaviors and to assist with intervention planning. He was referred for an evaluation by his pediatrician upon the recommendation of the Early Support and Services Agency where he had been receiving early intervention services for developmental delays. Team members involved in the evaluation process included his parents, occupational therapist, speech/language pathologist (SLP), pediatric neurologist, and developmental psychologist. Prior to the clinic visit, a home visit was done to observe the child interacting and playing in the home environment, and to complete parent interviews including the Autism Diagnostic Interview<sup>8</sup> and Infant/Toddler Sensory Profile.<sup>23</sup> Standardized

tests administered during the clinic visit included the ADOS<sup>7</sup> and Mullen Scales of Early Learning.<sup>17</sup> Semi-structured observations of play behaviors, social interactions with adults, fine and gross motor skills, and communication were conducted, and the physician completed a medical history and physical examination.

## **ASHLEY**

Ashley, 6 years of age, was diagnosed with autism at 24 months of age, and she was evaluated in a school setting for her 6-year old evaluation, according to the Individuals with Disabilities Education Act. A multidisciplinary team evaluation including a special educator, child psychologist, SLP, and occupational therapist (OT) was conducted to determine her levels of function and school-related programming needs. Extensive review of medical and educational records including details related to previous educational programming was done, and her parents were interviewed. Contextual observations of Ashley were made during school-related activities and during recess with special attention towards her social play behaviors, communication, and safety in school environments. Standardized tests that were administered by OT included the Evaluation of School Interaction,<sup>27</sup> Miller Function and Participation Scales,<sup>28</sup> and Sensory Processing Measure-School Form.<sup>21</sup> Standardized tests for communication skills, language, cognition, and academic achievement were completed by other team members.

## **BRAD**

Brad, a 15-year-old boy, who had been diagnosed with Asperger's syndrome at age 10, was evaluated by a school-based interdisciplinary team including a special educator, child psychologist, SLP, and occupational therapist. The purpose of the evaluation was to determine his levels of functioning and school-related programming needs including transition planning. Review of educational records and of previous programming was done, and extensive interviews were conducted with Brad, his parents, and one of his teachers. Contextual observations of Brad were made during classroom activities,

and in the gym with special attention towards social skills, ability to participate and meet class expectations, and motor coordination. Standardized tests that were administered by the occupational therapist included the Canadian Occupational Performance Measure,<sup>29</sup> and The Evaluation of Social Interaction.<sup>27</sup> Tests of language pragmatics and academic achievement were also administered by other team members.

In summary, evaluations of children with ASD are complex, as challenges are inherent in the ways that such children are able to communicate and interact, and therefore participate in some evaluation activities. A number of specially designed, play-based assessment tools and caregiver questionnaires tailored to accommodate the needs of this population are however available. These tools provide therapists with clever ways of obtaining pertinent, objective evaluation data upon which clinical decisions can be based. It is strongly suggested that therapists working with the ASD population be familiar with many of these tools and be prepared to individualize the evaluation process to accommodate for the unique and variable needs presented by each child with ASD.

## **OT EVALUATION IN THE NICU**

This specialized area of practice is based upon a practice setting, the NICU. Whether a setting is a type of classroom, clinic or hospital unit, it is important that occupational therapists are aware of the typical roles and routines of the people who work in the setting, the services provided, typical client conditions or problems encountered in the setting, and how space, equipment, and language/terms are used within the setting. Newborn infants in NICUs are cared for with highly advanced medical technology and are medically fragile. It is therefore recommended that occupational therapists receive specialized training to gain the necessary knowledge and competencies to practice in NICU, which are presented in a document by the American Occupational Therapy Association (AOTA).<sup>30</sup> Because of the nature of the reasons for admission to an NICU, it is probably safe to say that all NICU infants

have developmental risks and would therefore be appropriate for OT services not only to address neurodevelopmental vulnerabilities, but also to support parents in the management of their child's medical and developmental needs during this difficult time. The NICU environment is very different from the natural preterm intrauterine environment. Subsequently, another important role for occupational therapists is to evaluate the mismatch between infant needs, and the sensory demands of the NICU environment, and to assist in minimizing the negative impact that such an overwhelming environment may have on an already stressed infant.

The Synactive Theory of Development provides a framework to conceptualize the organization of the neurobehavioral capabilities in the early development of the fetus and young infants.<sup>31</sup> This framework is based upon the idea that an infant's capacity to regulate their behavior emerges through continued interaction with the environment and is expressed through autonomic/physiological, motor, state, attention/interaction, and self-regulation systems. Premature, or very ill young infants, are often unable to integrate and synchronize these systems and manage environmental inputs, often demonstrating overreactive responses and poor tolerance from even minimal input. Occupational therapists must be skilled at reading infant cues and thresholds for sensitivity and be ready and able to suggest adjustments to care, handling, and the physical environment based on the infant's behavioral communications. Interactions and interventions that aim to support the infant's stabilization and organization of the autonomic, motor, and state systems at each level of maturation, while minimizing stressful events is key to this approach.<sup>31</sup>

Like other acute or critical care hospital units, serving infants in an NICU requires a team of professionals where the medical staff of nurses and physicians are paramount, as care is focused on achieving medical stability and reducing the risk of further injury, illness, or complications. Occupational therapists must appreciate the medical fragility of their clients and most importantly do no harm. Safe practices include being prepared to postpone or eliminate portions of an evaluation based on an infant's medical needs or behavioral cues of stress. Occupational therapists should minimize physical handling of the infant by knowing their assessment tools well

and by being well-prepared. Occupational therapists may also consider assessing the infant while nurses or others are interacting with the infant to avoid any unnecessary duplication of evaluation procedures and to minimize the physical handling of the infant. Finally, the timing of evaluations should be scheduled thoughtfully in consideration of infant feeding schedules, medical care/procedures, and sleep routines.

Comprehensive OT evaluations of infants in a NICU address: (a) the social and physical environment and associated stressors; (b) the infant's autonomic capacities, state regulation, and ability to attend and interact; (c) infant sensory and motor neurodevelopment; (d) oral motor and feeding skills; and (e) parent needs. Evaluation procedures for each of these areas are discussed in more detail next.

**a) NICU Environmental Assessment:** The NICU environment is inherently stressful and whatever can be done to minimize infant agitation, energy expenditure, and disorganization should be implemented. This may include evaluation of lighting, sounds, and the need for techniques to assist with body thermoregulation and supportive body positioning. Evaluation of factors that may assist in the development of strategies to minimize unnecessary physical handling and to maximize nurturing physical contact may also be implemented. Environmental factors should be evaluated to determine where changes could be made to promote safety, comfort, and development, and to reduce unnecessary discomfort or risk of further health complications. Guidelines for NICU design and environments are detailed in a series of 27 Standards based on a report from the 7th Consensus Conference on Newborn ICU design, available at <http://nd.edu/~nicudes/stan%2015.html>. The standards address everything from use of space, unit configuration, wall and flooring materials, lighting, temperature, and acoustics, to furnishings, ventilation, infection control, and support space for families and staff. Therapists working in NICU environments should be familiar with these standards. For example, with respect to lighting, preterm infants need protection from light, as the typical visual system in utero develops in darkness. Early exposure to light may damage the visual system and may even interfere with the normal development of other sensory systems such as the auditory system,

which normally develop without competing stimuli.<sup>32</sup> It is, however, important for medical staff to have enough light to be able to provide necessary care.

### b) Autonomic Capacities, State Regulation, Interactions:

To evaluate and be able to interpret infant autonomic capacities and state regulation, an understanding of normal development, expectations for sleep-awake states, and ability to self-regulate from 22 weeks gestation are essential (see stages of development presented in Table 7-2). Clinical observations

TABLE 7-2

NEURODEVELOPMENTAL AND BEHAVIORAL CHARACTERISTICS OF PRETERM INFANTS

Gestational Age	Autonomic and Physiological Homeostasis	Regulation, States of Arousal, and Interaction
22–28 weeks	Needs assist with respiration, cardiac function, thermoregulation; primarily ANS responses to stimuli prior to 26 weeks	Light sleep predominates; states not well-defined; easily stressed and self-regulation efforts are ineffective; hearing is developed; preference for mothers voice possible
28–32 weeks	Needs assist with thermoregulation; periodic apnea, bradycardia	Light sleep predominates although states more defined; easily stressed and self-regulation efforts are ineffective
32–34 weeks	Needs assist with thermoregulation; periodic apnea, bradycardia; may be able to bottle or breastfeed	Light sleep predominates with some deep sleep; states easily observed; self-regulation efforts at times effective for calming
34–39 weeks	Breast or bottle feeds, prefers human voice, active gaze, and displays visual preferences focuses best at 8–10 inches from face	Successful self-regulation efforts such as thumb sucking, bracing; purposeful interest noted when calm and alert; seeks out a visual or auditory stimulus; strong cry, well-defined sleep states, and transitions smoothly between states

of many these behaviors can be made during regular caregiving activities. The Neonatal Individualized Developmental Care and Assessment Program<sup>33</sup> provides comprehensive guidelines for both NICU evaluation and intervention and is a very family-centered program. Other examples of neonatal assessment tools for evaluating state regulatory behaviors, sensory, and motor development that you may want to consider adopting include the Dubowitz Neonatal Neurological Exam,<sup>34</sup> Neonatal Behavioral Assessment Scale by Brazelton and Nugent,<sup>35</sup> and the Neonatal Neurobehavioral Examination.<sup>36</sup>

Common language for describing states of arousal of preterm infants that occupational therapists may use during evaluation procedures as reported by Hunter<sup>37</sup> include six stages as follows: (1) deep sleep; (2) light sleep; (3) transitional state of dozing or drowsiness; (4) quiet, alert; (5) active, alert; and (6) crying. Ideally, as infants mature, they are able to move fairly smoothly between states, and increase the amount of time in quiet alert and active-alert states. Preterm infants who are excessively irritable when awake, who experience difficulty awakening, or rarely assume quiet or active-alert states, indicate pathology or immaturity. Although temperament also plays a role in state regulation, the ability to regulate one's state in response to both internal and external stimuli is an essential skill and sign of maturation. Physiological states should also be noted in an evaluation including the infant's ability to regulate their body temperature, heart and respiratory functions, digestion and elimination. During interactions, careful monitoring of skin color, respiration, and heart rate is essential, as it is common that compromised infants and all premature infants prior to 34 weeks are easily physiologically overwhelmed by external stimuli. Physical handling should be avoided when the infant is displaying signs of stress which are listed in Box 7-2.

**c) Sensory and Motor Development:** Behaviors associated with the motor and sensory development of neonates at various stages and ages that should be examined are described in Table 7-3. Most can be observed in the context of caregiving routines and procedures. Conducting formal assessments of muscle tone, motor reflexes, range, and quality of

## Box 7-2

INFANT STRESS SIGNALS AND  
PHYSIOLOGICAL MEASURES

**Body Temperature:** ideally 36.5°C; 97.6°–99°F

**Heart Rate:** ideally maintained at 120–180 bpm

**Oxygen Saturation:** maintained at 90%–100%

**Stress Signals:** yawning, hiccupping, spitting up, skin color changes, squirming, trunk arching, disorganized movements, gaze aversion, drowsiness, increase in heart and/or respiratory rates

TABLE 7-3

MOTOR AND SENSORY NEURODEVELOPMENT  
OF PRETERM INFANTS

Gestational Age	Motor Reflexes, Muscle Tone, Movement	Tactile, Auditory, Vestibular Processing	Vision
22–26 weeks	Low tone; poorly controlled, jerky, tremulous spontaneous limb movement; startle reflex	Infant perceives pain and may have a generalized withdrawal response to pain; ear and cortical auditory center fully formed; is often stressed by sounds and when moved	Retinal layers are present; blinks in response to light
26–28 weeks	Low tone; poorly controlled, jerky, tremulous spontaneous limb movement; Moro, plantar grasp reflex	May be comforted by firm, continuous touch, swaddling; prefers human voice; stressed by movement	Eyelids no longer fused; may spontaneously open eyes but unable to visually focus

(continued)

TABLE 7-3

MOTOR AND SENSORY NEURODEVELOPMENT  
OF PRETERM INFANTS (*Continued*)

Gestational Age	Motor Reflexes, Muscle Tone, Movement	Tactile, Auditory, Vestibular Processing	Vision
28–32 weeks	Low tone; poorly controlled, jerky, tremulous spontaneous limb movement; Moro, plantar and palmar grasp, rooting reflexes; some flexed posturing noted, with increased tone in the lower extremities; some head control	Continues to be physiologically stressed by touch, sound and movement; tolerates one type of sensory input at time; may turn head toward sound	Eyes may remain open with visual attention emerging briefly; eye movements jerky closes eyes to bright light
32–34 weeks	More flexed posturing noted; some head control, movements less jerky; Moro, plantar and palmar grasp, rooting reflexes	Continues to be physiologically stressed by touch, sound, and movement; tolerates one type of sensory input at time; may turn head toward sound	Horizontal visual tracking; visual preference for human faces; contrasting black and might may be too stressful
35–39 weeks	More variety of movements; movements are smoother; emerging head righting; Moro, plantar and palmar grasp, rooting, stepping, and placing reflexes	Processes touch, sound, and movement without physiological stress; tolerates one type of sensory input at time; may localize sound	Tracking in all directions; brief visual attending; preference for human faces and contrasting black/white, shapes, sees colors; head/eye movements poorly coordinated

movement are useful as they are important indicators of neurodevelopmental maturation, and they may also identify specific neuromuscular problems. However, complete reflex and motor testing is stressful for the preterm infant, and should therefore only be conducted when information obtained is essential for intervention planning purposes. The body of the preterm infant prior to 30 weeks gestation tends to be quite flaccid, and muscle tone gradually increases in distal to proximal, and caudocephalic (feet to head) directions. Movements prior to 40 weeks gestation are quite jerky and may be tremulous. Many of the neonatal behavioral assessment tools mentioned above also have items for the assessment of sensory and motor behaviors. Muscle tone and quality of movement are greatly affected by an infant's medical status, so understanding an infant's medical status during evaluation activities is essential. Generally, preterm infants need assistance in maintaining a comfortable, symmetrical, flexed, posture, which reflects the typical contained posture of the fetus in the womb. Occupational therapists have an important role in addressing positioning needs and in suggesting methods of physical handling and holding, largely based upon an evaluation of the infants motor and neuro-behavioral capacities. Related to sensory processing, the basic systems of touch, taste/smell, hearing, and movement are largely intact by 24 weeks' gestation. A priority is often protecting the infant from environmental stimuli that he or she would not normally have to deal with in utero and that is often stressful and disorganizing for the infant. Sensory processing can be observed through a number of behaviors as described in Table 7-3.

It is important to note that physical therapists also play a role in NICUs, in support of infant mobility, motor development, and positioning. Therefore, occupational therapists often work closely with physical therapists in this setting, and it is important to develop a shared understanding of one another's roles to avoid duplication of services and maximize expertise, quality, and efficiency of care

**d) Feeding:** Feeding problems in the NICU are often addressed by a team of professionals, including nurses, dietitians, occupational therapists, SLPs, and breast feeding specialists,

or lactation consultants. Breast milk is the preferred nutrition for infants, and therefore often mothers will choose to pump milk for their infants. Oral feeding is extremely important and the ability to oral feed with adequate weight gain is common criteria for discharge from the hospital. Preterm infants may begin to oral feed as early as 32 to 34 weeks, although the risk of aspiration increases the younger the infant.<sup>38</sup>

Evaluation of readiness for oral feeding or oral feeding ability begins by examining infant non-nutritive sucking ability (sucking without liquid, such as with a pacifier or finger) which emerges prior to the ability to suck liquids. Non-nutritive sucking not only prepares the infant for oral feeding, but is an effective self-calming technique. Oral motor skills, the anatomical structures involved in feeding, and oral reflexes are also examined, with consideration of the infant's medical status and neurodevelopmental maturation. Next, nutritive sucking is examined, which requires the careful observation of the coordination of sucking movements with breathing and swallowing, and observations for overt, and silent signs of aspiration. Mature sucking is characterized by the ability to do from 10 to 30 consecutive sucks with continuous breathing or only slight pauses for breathing. Typically developing infants suck, swallow, and breathe in a coordinated and rhythmical pattern. Preterm infants often exhibit more labored or slower sucking motions, hold their breath while sucking, and the suck-swallow-breathe pattern is often disorganized. Finally, an understanding of infant abilities and caregiver routines around feeding provides useful information regarding positioning strategies, for encouraging and supporting parents, and for suggesting adapted or specialized bottles or nipples when appropriate.

**e) Parent Needs and Support:** Providing effective caregiving interventions necessitates establishing supportive relationships with parents during this stressful time. To accomplish that, OT evaluations in NICU aim to identify parent priorities, their coping skills, their needs, learning styles and preferences, cultural influences, and comfort level participating in their infant's care. Through interviews and all other interactions throughout the evaluation process, it is

important to take the time to listen carefully and actively to caregiver concerns, and provide reassurance throughout the process. Caregiver involvement helps to establish a family-friendly environment, and identify the types of caregiving interventions and support that would be most beneficial.

In summary, OT evaluations in the NICU are conducted with one of the most if not the most vulnerable populations with whom occupational therapists work. Therefore, it is recommended that specialized training beyond entry-level preparation be completed. Such training should result in the attainment of knowledge and proficiencies related to common medical conditions of preterm infants, and associated precautions, and specialized NICU equipment. OTs also need to develop expertise and confidence in physical handling of preterm infants, and have a thorough understanding of infant behavior and state regulation, the development of feeding and sensory motor skills, and of supportive developmental care.

## EVALUATIONS FOR ASSISTIVE TECHNOLOGY

Evaluations for determining a child's Assistive Technology needs for enhancing occupational performance at home, school, and community has become an important specialized area of OT practice. There have been significant technological advances related to seating, mobility, electronic aides for daily living previously referred to as environmental control units, computer hardware and software for educational /school and work-related activities, educational applications for cell phones and I-PADS, as well as robotics. Such advances have resulted in increasingly more complex devices, creating a demand for therapists with specialized knowledge, skills, and experience in this area. Specialized clinics for providing AT evaluations also typically provide services related to procurement, adaptation and custom design, fitting, and training in the use of AT. This is a very exciting practice arena as the technology changes so rapidly, and increasingly enables children to participate in their desired occupations, creating new possibilities for enhancing quality of life. Because of the multi-faceted, complex nature of AT evaluations, like other practice

areas, team approaches are often used. Disciplines represented on AT evaluation teams often include occupational therapists, rehabilitation engineers, suppliers of durable medical equipment, educators, nurses, speech-language pathologists, and physical therapists. The Rehabilitation Engineering and Technology Society of North American (RESNA) credentials assistive technology practitioners (ATPs) by administering a certification and evaluation process for professionals with advanced training in AT. Therefore, AT evaluation teams also often have a member who is a certified ATP.

AT evaluations include a number of steps beginning with a clarification of the problem, and ending with follow-up to determine if the device selected has met child and caregiver goals.<sup>39</sup> The steps involved in the evaluation process and questions to be addressed within each step are summarized below:

- 1. Problem Identification:** What does the client hope the AT device will accomplish? What does the child want to be able to do with the help of the device and in what contexts?
- 2. Evaluation of Context and Activity Analysis:** What are the specific characteristics, demands, and supportive qualities of the contexts (environment and task specific) in which the device is to be used?
- 3. Evaluation of Child Factors:** What are the child's physical, cognitive, sensory, psychosocial, and emotional strengths and limitations? What are the child's performance skills and limitations? What is the nature of the child's diagnosis, potential for growth, development, improvement or regression? What are child and family values and preferences?
- 4. Identification and Evaluation of Potential Devices/Solutions:** What options are available, and what are the physical, cognitive, sensory, psychosocial demands required to use proposed devices? How effective and feasible will the options be in terms of affordability, meeting the child's goals, portability, and durability? How easily are the options being considered to learn and operate? How do they compare with respect to comfort, safety, and acceptance factors, and for maintenance, growth, and repairability?
- 5. Selection and Procurement:** Where can the items be purchased? Is there an opportunity to try the items out

without purchasing? What steps must be taken to complete any necessary justification for medical or educational necessity that may be required for funding or reimbursement purposes?

6. **Training in Use:** What fitting or programming of devices is necessary? What are the training needs? Are any adaptations necessary?
7. **Follow-up evaluation:** How effective and usable is the device? Is it meeting the client goals? Are there further needs that may require AT solutions?

There are evaluation tools available that have been designed specifically to evaluate client AT needs and the effectiveness of AT solutions. Most are designed for both adults and children, and provide a series of forms/questionnaires, and checklists as part of a systematic process or guiding framework that aims to ultimately result in the selection of the most efficient and effective AT device for achieving client desired goals or functions. Examples of available tools are listed in Table 7-4.

ASSESSMENT TOOLS AND SYSTEMS FOR CONDUCTING ASSISTIVE TECHNOLOGY EVALUATIONS		
Name	Description	Contact
Functional Evaluation for Assistive Technology (FEAT) <sup>41</sup>	Ecological evaluation including questionnaires with five scales assessing context, client factors, previous experience with technology, device specific evaluation, and potential effectiveness scale	<a href="http://www.nprinc.com/assist_tech/feat.htm">http://www.nprinc.com/assist_tech/feat.htm</a>
Matching Person and Technology (MPT system) <sup>42</sup>	Assessment system consists of six different questionnaire/surveys; forms for client/caregiver, and therapists for determining AT needs for use in home, community, work, and school environments	Glavin & Scherer (1996); <a href="http://matchingpersonandtechnology.com/">http://matchingpersonandtechnology.com/</a>

(continued)

TABLE 7-4

ASSESSMENT TOOLS AND SYSTEMS FOR CONDUCTING ASSISTIVE TECHNOLOGY EVALUATIONS (*Continued*)

Name	Description	Contact
Quebec User Evaluation of Satisfaction with Assistive Technology <sup>43</sup>	Questionnaire to determine satisfaction with a specific assistive technology device	(Demers et al., 1996)
Psychosocial Impact of Assistive Devices Scale (PIADS) <sup>44</sup>	Questionnaire to measure the impact of assistive technologies on quality of life	Day & Jutai, (1996)
Student Environment Task Tool (SETT Framework) <sup>45</sup>	Series of questions and forms designed to evaluate AT needs in educational/ school environments	Zabala & Korstein (2005) <a href="http://www2.edc.org/ncip/workshops/sett/SETT_home.html">http://www2.edc.org/ncip/workshops/sett/SETT_home.html</a>
Wisconsin Assistive Technology Initiative Assessment Package <sup>46</sup>	A systematic process including a number of assessment forms, questionnaires, and checklists for guiding the AT evaluation and intervention process	<a href="http://www.atp.ne.gov/techassist/ATcklistWATI.pdf">www.atp.ne.gov/techassist/ATcklistWATI.pdf</a>

There are many occupational performance needs that can be addressed using AT, with the most common areas of focus for AT evaluations being: (a) seating, positioning, and mobility; (b) computer access for educational and work purposes; (c) communication; and (d) electronic aids for daily living. Although each area involves the selection of different types of AT solutions, the process of evaluation for collecting and analyzing data related to contextual/environmental demands and characteristics, client characteristics, and features of the devices being considered is quite consistent across areas. The presentation of specific evaluation techniques for each of these areas is beyond the scope of this chapter. However, as an illustrative example, AT evaluation for addressing wheelchair mobility is discussed below.

Seating, positioning, and mobility AT solutions compensate for motor impairments, while promoting functional movement, increased mobility, and comfort.<sup>40</sup> They also aim

to prevent secondary problems or disability such as skin breakdown or joint contractures. Therefore, all wheelchair evaluations require gathering comprehensive data regarding the motor area, including the child's muscle strength, range of motion, muscle tone, reflexes and automatic reactions influencing motor control, motor coordination, and physical endurance. Skill-based evaluations of fine and gross motor skills may also be necessary, and medical factors that may contribute to the potential for decline or improvement in functions, risk for skin breakdown and normal growth and development must be all considered. Other client factors such as motivation, child and family preferences and values, and sensory, and cognitive skills must also be considered. AT devices, such as power wheelchairs, require a number of such skills for safe and ease of operation, and are used in such in way that they become an integral part of a child's daily activities and routines.

One of the first decisions that must be made when conducting an evaluation for recommending a wheelchair, is whether the child plans to propel the wheelchair independently or whether the child will be pushed by others when in the chair. This will depend on the child's upper extremity function and physical endurance. Contextual considerations are very important in making wheelchair recommendations, and it must be determined during what activities, when, how, and where the chair will be used. Will the chair be used primarily indoors, outdoors, or both? What type of vehicle does the family plan to use to transport the chair? How much time does the child intend to spend in the chair? Another important question to answer early in the process is whether the child would benefit most from a power or manual wheelchair. In general, power mobility devices are recommended when a child does not have the physical endurance, strength, or upper extremity function to propel a manual wheelchair at a similar pace as the average person walking. The child must also have the visual and cognitive capacity or skills to learn to operate a power chair safely, and have a consistent, reliable movement or way of switch activation to control an input device.

Evaluations for recommending wheelchairs require careful fitting. The goals of any positioning device are to achieve body symmetry, optimal alignment, and stability

while maximizing distal mobility and function. A series of body measurements of the child must be taken with the child seated comfortably, with knees, hips, and ankles flexed at approximately 90°. Measurements are required to determine the appropriate size of the chair in consideration of seat height, width, depth, and back height. In addition, for optimizing biomechanical advantages for propulsion and comfort, the angle between the seat and back must be carefully measured and the placement of wheels considered. When working towards finding optimal positioning, it is suggested that the positioning of the pelvis be addressed first, as the pelvis serves as a key point of control.<sup>39,40</sup>

For manual wheelchairs, information must be gathered to assist in making decisions regarding the type of wheelchair that would best meet the child's needs (manual standard, light weight, or ultra-light weight). Then, the type of seating surface must be selected from a flat planar surface, a contoured seat, or custom seating. If a custom seat is being considered, then a contoured seating simulation evaluation is recommended, which may also include pressure mapping. There are numerous wheelchair features to consider such as lateral and head supports, abductors pads, different types and sizes of leg and arm rests, and chairs with reclining backs or tilt and space options. To determine optimal positioning in a wheelchair or other seating device, including the selection of accessories and features, there are simulators or adjustable chairs available that enable the trial of various features and positions. Adjustable seating systems may also be used and placed on a mobility base as a temporary solution to try out various positions and features.<sup>40</sup>

For power wheelchairs, decisions regarding the type and placement of the control device need to be made. The most common input source is a joystick. However, for children who are unable to use a joystick reliably, alternative input devices such as push button or plate switches, head controls, and pneumatic sip and puff control mechanisms may be used. Concurrent with selecting an input device is determining where and how it will be mounted. Evaluations for powered mobility are best completed in a loaner chair and working with a vendor who will allow the child and therapist to work together to find the best solutions for a trial period.

Even more optimal, is the ability to rent or borrow the chair being considered for an extended period of time. Training to use a power mobility device is often a long process for children. Therefore, it is important to give the child and therapist enough time to determine whether the child will be able to be safe and proficient in its use, and have adequate maneuverability in the chair. Determining the most appropriate features and settings, such as speed and input control sensitivity, all takes time and experimentation.

Aside from wheelchairs, there are numerous other AT solutions/pieces of equipment available to address the positioning and mobility needs of children. They include bicycles, tricycles, scooters, walkers, special chairs such as floor sitters and feeding seats, standers and mobile standers, cushions, mats, sidelyers, and wedges. Throughout the AT evaluation and selection process, it is important for occupational therapists to gather and apply knowledge of the latest products that are available, and continually revisit the goals of any positioning device. The seven steps in the process of evaluation from problem identification to follow-up described at the beginning of this section of the chapter, provides a guide for evaluation and selection regardless the type of assistive device being considered.

## **SCHOOL-BASED EVALUATIONS FOR PREPARING ADOLESCENTS FOR THE TRANSITION TO ADULTHOOD**

Students with disabilities are eligible to receive special education services if needed up until the age of 22 or until they graduate (see Chapter 1). Transition services are defined in the Individuals with Disabilities Education Improvement Act of 2004 (IDEA, PL 108-446)<sup>47</sup> and are required for all students receiving special education services by the age of 14 years. Transition services are defined as a coordinated set of activities for a student with a disability that

... Is focused on improving the academic and functional achievement of the child with a disability to facilitate the child's movement from school to post-school activities, including

postsecondary education, vocational education, integrated employment (including supported employment), continuing and adult education, adult services, independent living, or community participation; (B) is based on the individual child's needs, taking into account the child's strengths, preferences, and interests; and (C) includes instruction, related services, community experiences, the development of employment and other post-school adult living objectives, and when appropriate, acquisition of daily living skills and functional vocational evaluation. (§ IDEA 602, p. 26).

A statement of the transition service needs of each student should be included and updated annually on the child's Individualized Education Program (IEP). OT is often included as a related service for assisting in evaluation, planning, and delivery of transition services as occupational therapists are well suited for anticipating the kinds of challenges, and necessary services and skills required of young adults to successfully move into adult roles and responsibilities. Other team members, in addition to educators, may include case managers, social workers, and vocational rehabilitation counselors.

Person-centered planning is an approach that is well suited to guide the evaluation and intervention process in the delivery of transition services, as this team approach utilizes resources from the student, family, community, and school to put in place long-term community supports.<sup>49</sup> Person-centered planning is a way to identify a student's individual goals and to help students, families, and professionals craft plans that will support students as they strive to achieve their goals. This approach fosters positive working relationships between families and professionals, provides a way for educators and case managers from different agencies to better coordinate their services, connects families to adult service agencies before the student leaves high school, and assists in identifying and cultivating natural supports in the community.<sup>50</sup> Guiding principles of person-centered planning include: (a) the student is the focus of the planning process, and involved in decision making at every point in the process, including the determination of who is invited to participate, and in expressing his or her needs, desires and preferences; and (b) team members identify and foster natural supports, which

are those that are already in the person's social network prior to exploring more formal supports such as home care services or adult day services (Institute on Disability, [www.unh.edu](http://www.unh.edu)). Action steps using a person-centered planning approach to the delivery of transition services are summarized in Box 7-3.

It is critical for young adults with disabilities to actively participate in transition planning meetings. Therefore, one of the roles of occupational therapists might be to prepare students for active participation in the evaluation and intervention planning process, and advocate on behalf of students so

**Box 7-3****STEPS IN THE PERSON-CENTERED  
PLANNING PROCESS**

1. Choose a facilitator to oversee and facilitate the process.
2. Design the planning process, including generating a list of people to serve as members of the team, setting up a place, date, and time for the initial meeting, and identifying strategies for maximizing student participation.
3. Decide how information will be gathered and by whom. Develop a history or personal life story or occupational profile of the student by sharing past events in the person's life. The focus person's parents and family may share the largest amount of this information. Conduct agreed upon evaluation activities which result in a description of the student's life by exploring community participation, community presence, competencies, and personal preferences, such as likes and dislikes.
4. Review of the personal profile and identification of future or ongoing events that are likely to affect the focus person's life such as conditions that promote or threaten health. Visions for the student's future are shared through brainstorming, imagining ways to increase opportunities, identifying potential obstacles and opportunities. Strategies and action steps for implementing the vision are implemented and an action plan for follow-up is developed.

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Adapted from: Mount B, Zwernik E. *Making Futures Happen: A Manual for Facilitators of Personal Futures Planning*. St. Paul, MN: Governor's Council on Developmental Disabilities; 1994.

that all team members make conscious efforts to encourage and support students in expressing their dreams for the future. Although person-centered planning may be viewed as time intensive, this approach may be more efficient in the long run if the results truly reflect the student's and family's goals and motivations.

A number of person-centered planning tools have been developed that could be used in the transition process such as MAPs and PATHS by O'Brien and Pearpoint.<sup>51</sup> Other resources that might be helpful on person-centered planning can be found through the following websites:

- **PACER Center:** <http://www.pacer.org/tatra/resources/personal.asp>;
- **PEATC:** [http://www.peatc.org/NEXT\\_STEPS/Intro/brief.htm](http://www.peatc.org/NEXT_STEPS/Intro/brief.htm);
- **MPACT:** Transition to Empowered Lifestyles Project Person-Centered Planning: <http://www.ptimpact.org>;
- **Person-Centered Planning Education Site:** <http://www.ilr.cornell.edu/edi/pcp/>.

A case example is presented below to illustrate how a school-based evaluation for educational programming, including transition planning, might be conducted.

### **CASE EXAMPLE: MANDY**

At the time of the evaluation, Mandy was 16 years of age and beginning the 11th grade. She was spending approximately half of her school day in a special education classroom/program, and half of her day in regular education classrooms with the assistance of a full-time teacher's assistant. Mandy has Rett syndrome and a seizure disorder, with significant cognitive impairment and motor deficits. She was dependent on others to push her in a manual wheelchair and had little functional movement of the upper extremities. Mandy's education team included her special education teacher, mother, teacher's assistant, occupational, speech, and physical therapists, and school nurse. The team met with Mandy to plan her

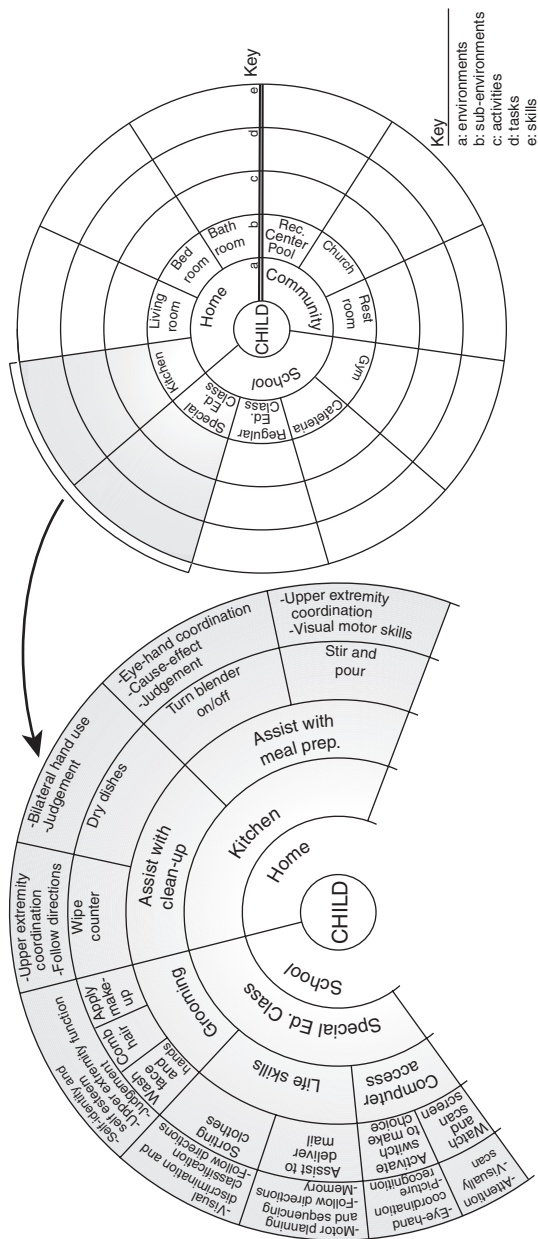
3-year evaluation, which is mandated under the IDEA, Part B. The team members were familiar with this student and had worked with her in the past, so little review of past records was necessary. However, a careful review of past IEP goals and educational strategies was conducted by her mother, teacher, and occupational therapist, so that team members had a good understanding of what she had worked on in the past and of the effectiveness of teaching strategies that had already been tried. Mandy's mother was helpful in sharing Mandy's medical concerns regarding the control of her seizures and her medication regimen. She also shared her concerns and needs in caring for Mandy, her wants and dreams for Mandy, and priorities for her educational program.

The team agreed to use the following evaluation activities: a parent interview, which was conducted during the planning meeting, a structured ecological assessment tool called a curriculum wheel, which was completed by her mother and teachers; completion of a form called a current-next-eventual form completed by her parents; and observations of Mandy during three school activities (feeding during lunch, computer time, and adapted physical education). These evaluation activities were conducted in a transdisciplinary, arena format. Transdisciplinary team evaluations of children with severe or multiple disabilities are helpful because it is often difficult to separate out the specific contributions of sensory, motor, communication, psychosocial, and cognitive factors on the performance of functional skills. An examination of her performance of relevant, school-related tasks in context, by professionals from multiple disciplines reduced redundancy during the evaluation process, and provided all team members with a common basis or experience from which to synthesize evaluation data for intervention planning.

The curriculum wheel is an ecological evaluation tool that was helpful for prioritizing the areas that were most important to the child and family while considering contextual factors and only relevant, meaningful functional activities. Evaluation guidelines by Orelove and Sobsey<sup>52</sup> provide a helpful framework for conducting ecological evaluations. They suggest starting the evaluation process by identifying the environments and subenvironments in which the child

functions, organized by the following four domains: home and self-care activities, school and educational activities, community activities, and recreational and leisure activities. For example, under the domain of home and self-care activities, the environment would be the family home and subenvironments might include specific rooms such as the bedroom and kitchen. At school, subenvironments might be the cafeteria, the gym, and specific classrooms. Then, within each subenvironment, the activities or tasks that the child is required to do, typically does, or would like to learn to do are identified. Finally, the specific skills that are required to perform the activities are identified. This process is similar to an activity analysis in that the specific component skills necessary to complete certain skills for occupational performance are identified. The end product of this type of ecology inventory resembles a map detailing the activities that need to be addressed in a program, where they need to be addressed, and what areas or underlying skills need to be targeted (see the curriculum wheel in Figure 7-1). This evaluation tool also uses the top-down system described in Chapter 2, as the process begins by identifying the contexts and activities supporting occupational performance that the child is expected to do, followed by a consideration of the task demands, specific performance skills, and body functions required to complete the activity.

The current-next-eventual form provided an opportunity for Mandy, and her family members to address issues of quality of life and to fully explore and share their priorities and dreams. The current-next-eventual form asks caregivers and student when able, to write down what the student currently can do and is expected to do. Then they are asked to think about and write down what they would like their child to learn to do next (within the next 1–2 years) and what they would like their child to eventually be able to do (within the next 5–10 years). This exercise is useful for uncovering parent priorities and values, and it encourages parents to think into the future. The timelines used to determine the “next” and “eventual” can be individualized. Although looking into the future is a difficult task, thinking about what is important for the child’s future provides essential guidance for developing effective individual programs and provides a basis for developing



**Figure 7-1** Curriculum wheel for a high school student, Mandy, with multiple disabilities.

and implementing transition plans. Mandy and her parents planned for her to remain in the family home post high school. However, adult programming and exploring ways for her to develop meaningful relationships and friendships, and participate as a valued community member were discussed.

Three separate education-related activities that were components of Mandy's program throughout her week at school were carefully selected as the basis of the arena assessment: feeding during lunch, computer time, and adapted physical education time. These specific activities were selected because they could be viewed in natural contexts and provided helpful information regarding social interactions with peers, sensory, motor, communication, cognitive skills, and social-emotional abilities. They represented activities of value to Mandy and her family. The team member that was primarily responsible for establishing her programming goals and objectives around these activities carried out the evaluation activity with Mandy while the other team members observed.

After the evaluation activities were completed, team members completed a written summary of their impressions and observations and prepared for a team meeting. During the team meeting, the team members, including parents, further synthesized the evaluation data and collaborated to identify the child's strengths, challenges, and programming needs. During this meeting, the intervention planning phase began by creating an initial draft of the child's IEP which included her transition plan. A representative from a community agency representing vocational rehabilitation services joined the team to share the types of programming options that would be available for Mandy after high school. After this meeting, the special education teacher, acting as case manager, compiled and integrated evaluation data from all of the team members involved and developed one comprehensive team evaluation report.

In summary, evaluations for the purposes of transition planning from adolescence to adulthood provide an opportunity to assure that students and their families are supported as the students move into adult roles. Person-centered planning

and other team collaborative models that are led by skilled facilitators over a series of meetings, and that apply visual representation of ideas or maps, are particularly useful evaluation methods in facilitating this process.

## Summary

This chapter provided information regarding techniques and considerations for the OT evaluation process involved in four specialty areas: children with ASDs; NICUs; AT, and evaluations for informing the transition process from adolescence to adulthood. Specific techniques unique to each of these areas were presented in part to increase your understanding and appreciation for the breadth and depth of knowledge and skills required in these, and other areas of OT pediatric practice. Although there are common elements to the OT evaluation process with children regardless of practice area, such as focusing on the child's ability to perform their desired occupations, there are also unique evaluation techniques and skills, and assessment tools designed specifically for whatever practice arena you find yourself in. Therefore, therapists are required to creatively tailor the OT evaluation process to comprehensively meet the needs of their clients in delivering evidence-based, quality evaluation practices across practice arenas. You must be prepared to address your professional development needs and skills whenever you enter a new area of pediatric practice, and on an ongoing basis learn to administer new assessment tools and techniques, as they become available.

## Questions for Discussion

1. National organizations like the AOTA offer opportunities for board and specialty certification. What are some of the advantages of obtaining pediatric specialty certifications, and at what point in one's career do you feel this would be most advantageous?
2. Why might policy makers be opposed to universal screening for ASDs during the first year of life? What role(s) might occupational therapists play in screening for ASD?
3. One common reason for prematurity, and behavioral state regulation challenges in premature infants, is prenatal exposure to drugs. Why might contextual assessments be vital in preparing to discharge such an infant home, and for providing family-centered, supportive, development care?

4. What steps can be taken throughout the evaluation process for recommending and procuring an assistive device for an individual to maximize its usability?
5. What factors are important to consider when deciding whether to recommend a power versus manual wheelchair for a young child?
6. The transition from adolescence to adulthood is an exciting but often difficult time for individuals with disabilities. What was most challenging for you as you entered adulthood? What was most helpful in preparing you for (a) success with postsecondary education? (b) For entry into the workforce, and independent living?; and (c) For managing your own finances, and health care?

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# A

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## Sample Evaluation Reports

### **A-1 INTERDISCIPLINARY EVALUATION IN AN EARLY-INTERVENTION SETTING**

#### **Context, Background Information, and Evaluation Process**

A referral sent by a developmental pediatrician was received by an early-intervention community agency to evaluate and provide family-centered services for a child 5 months of age with Down's syndrome. The team coordinator (a developmental specialist with a degree in developmental psychology) reviewed the medical information and interviewed the mother and the referring physician by telephone. The team (consisting of the coordinator, a speech therapist, a physical therapist, and an occupational therapist) then met to share relevant background and medical information and to plan the evaluation. The team decided on the following evaluation activities:

1. *Administration of the Hawaii Early Learning Profile.* The coordinator completed the personal/social, self-help, cognition, and communication domains, and the occupational therapist and physical therapist together completed the fine motor and gross motor test domains, along with clinical observations of movement, play behaviors, oral-motor control, and postural control factors. Although the Hawaii Early Learning Profile was used in this case, other developmental screening and evaluation tools are available to evaluate multiple domains of development and are useful for interdisciplinary, early-intervention teams (see Chapter 4).

2. The occupational therapist interviewed the parents regarding their priorities, the child's occupations, and needs.
3. The coordinator, occupational therapist, and physical therapist observed the child during unstructured, free play with a variety of play materials and toys, and during interactions with her parents.
4. After the evaluation activities were completed, each discipline completed a written summary of their impressions and clinical observations and prepared for an interdisciplinary team meeting. During this meeting, the team members, including the parents, further synthesized the evaluation data and collaborated to identify the child's strengths, challenges, and programming needs. During this meeting, the intervention planning phase began by creating an initial draft of the individual family service plan. After this meeting, the coordinator compiled and integrated evaluation data from all of the team members involved and developed one comprehensive team evaluation report that provided the formal documentation of the team's evaluation (see below). Components of the evaluation were also used to complete the IFSP electronic form.

## Evaluation Report

(This evaluation is based upon a real case, although some content, names, and other identifying information have been fabricated to ensure confidentiality and for illustrative purposes.)

### INTERDISCIPLINARY DEVELOPMENTAL EVALUATION

Northeast Community Family Early Supports and Services  
26 Crane Dr., Dover, NH (603) 888-1111

**Child's Name:** Johnny Dobbins

**DOB:** 7/5/2012    **Age:** 5 months

**Date of Evaluation:** 12/5/2012

**Referring Physician:** Dr P. Brooks, pediatrician

**Diagnosis:** Down's syndrome; developmental delay

**Evaluation Team:** Pat and Jake Dobbins, parents; Jane Smith, OTR/L; Mark Brown, DPT/L; Heather Jones, SLP; and Joanne Young, family coordinator, developmental EI specialist.

**Evaluation Process:** Phone interview with Dr Brooks to review medical history and status; home visit to complete parent interviews, observations of play, bottle feeding, sensory and motor skills, and administration of the Hawaii Learning Profile; and team meeting to share information, synthesize evaluation data, and begin to develop the IFSP.

**Background Information:** Johnny resides with his parents and 6-year-old brother Max. Johnny was a born a term infant; his mother had no complications with her pregnancy or the delivery. His condition of Down's syndrome was recognized immediately by typical facial features, and abnormally low muscle tone. Later genetic testing confirmed trisomy 21. Johnny's health has been good and his height and weight are within the 25th–50th percentiles for children with Down's syndrome. Johnny's family recently moved from Maine where he had been receiving early-intervention services on a weekly basis. His parents would like early-intervention services to continue to help support them in parenting Johnny, and in promoting his development of motor, language, feeding, and play skills. His mother works part time as a receptionist, and his father is a mechanic. Johnny has just enrolled in a new child care, center-based program 3 days per week, while his mother works.

### **Assessment Results based on Observations, Interviews, and HELP Strands**

**Sensory regulation and responsiveness:** Johnny is easily comforted when held or drinking from the bottle. He rarely self-calms, and would prefer to be held. He has extended periods of 3–4 hours when he is awake and alert. He shows an active interest in the environment, bright toys, and people, and has recently begun to smile. At times he appears somewhat more lethargic or passive than typical infants his age. Parents report no major sleep difficulties, and with an average of 5–6 hours of sleep at any one time. He was able to follow a moving object with his eyes and orient his head to toward an auditory stimulus quite consistently.

**Cognition:** Cognitive skills involve observing and learning about how an infant learns, plays with toys, and solves problems.

Johnny's skills in this area fell within the 3–4 months' age range. Johnny uses his hands and mouth to explore objects and his understanding of simple cause and effect is emerging. He reaches for objects within his reach, and will repeat a learned activity like shaking a rattle, or banging a toy. He is not yet able to imitate simple gestures or movements.

**Language/Communication:** Johnny is not babbling, but his cries and occasional vocalizations vary in pitch and volume, with skills in this area falling in the range of 2 to 4 months. He is able to express himself when hungry or distressed with facial expression and crying. He will squeal, smile, or coo when happy.

**Motor skills:** His gross motor skills were assessed to fall within the 3–4 month age range. He exhibits minimally lowered muscle tone throughout his body. In prone, Johnny can lift his head and chest and bear weight through his forearms. In supine, he can kick reciprocally maintain his head in midline briefly, and bring his hands together in midline. And he bears little weight through his lower extremities in supported standing. He requires moderate assistance to maintain a sitting position on the floor. He is not yet able to roll over, and the Moro and ATN reflexes were present. He demonstrated complete head lag in a pull to sit from supine. In the fine motor area, he demonstrated skills in the 3–4 month range. He reaches for objects, and holds objects typically with an ulnar palmar grasp. He is not yet able to grasp and hold tiny objects nor does he have controlled release of objects, although he no longer exhibits a grasp reflex. He can clasp his hands together, and bring his hands to his mouth.

**Social and Emotional:** This area includes observing and learning about the infant's emotional responses, sense of self as an individual, attachment to, and interrelationship with others. Johnny does not display separation anxiety and is reported by his parents as being an "easy baby." He seems interested in adult faces and will smile and squeal to display happiness or excitement, with skills in this area ranging from 4–6 month level.

**Self-Help Skills:** Mom reported that feeding has been challenging. She nursed Johnny for 3 months and then switched to bottle feeding owing to her work schedule. She has just tried to introduce baby foods, but Johnny has shown no interest, and will scream when she attempts to spoon feed him cereal or fruit. Observations indicate that he is not yet able to hold his bottle. He has excessive drooling, the rooting reflex is present, and tongue movements were noted to be sluggish.

Suck-swallow-breathing was adequately coordinated during bottle feeding.

**Summary:** Johnny is a healthy infant who appears to be well attached to his parents, and who is ready to explore and learn. His skills across developmental areas are slightly delayed ranging from 3 to 6 month levels, with a relative strength in the area of social-emotional development. He is eligible to receive family-centered early supports and services, and his IFSP is being developed collaboratively with his parents. He lives within a supportive family, who are managing his care without difficulty, and they are becoming more connected with the resources and supports and services in their new community. On the basis of this evaluation, the FESS team has made the following recommendation: weekly home visits by the developmental specialist, with monthly consultation from the SLP and OT. In addition, a weekly play group is offered. Programming will focus on the development of his skills in the areas of fine motor, gross motor, feeding, play, and communication. Support will also be provided for his family such as consultation with his day care provider and linking them up with other community support services that may be of benefit to them.

Signatures (all members)

## **A-2 EXAMPLE OF AN INTERDISCIPLINARY TEAM EVALUATION OF A CHILD WITH DYSPHAGIA**

### **Context, Relevant Background Information, and Evaluation Process**

Danny, a 7-year-old child with cerebral palsy and spastic quadriplegia, was referred to a specialized feeding clinic for the evaluation of dysphagia and feeding difficulties. He was referred by his pediatric neurologist after his school occupational therapist and mother expressed concerns about Danny's ability to swallow and his poor nutritional intake. The interdisciplinary team consisted of his parents, the speech/language pathologist (who also served as the case coordinator), the clinic occupational therapist, (the school occupational therapist came to observe),

a nutritionist, a radiologist, and a radiology technician. The morning of the evaluation, the team met briefly so that the speech language pathologist could share background information and finalize the evaluation activities, which included the following: discipline-specific evaluations by the nutritionist and the occupational therapist, and videofluoroscopy to be conducted by the speech/language pathologist, occupational therapist, radiologist, and technician. After the evaluation activities, the team coordinator and nutritionist met with the child and his parents and school occupational therapist to share immediate concerns and recommendations. A full report followed a couple of weeks later with the results of the team evaluation and more specific recommendations (see below).

## Evaluation Report

(This evaluation is based upon a real case although some content, names, and other identifying information have been fabricated to ensure confidentiality, and for illustrative purposes.)

### INTERDISCIPLINARY FEEDING/DYSPHAGIA EVALUATION

New England Community Hospital

**Child's Name:** Danny Clark

**DOB:** 9/15/2005   **Age:** 7 years, 4 months

**Date of Evaluation:** 1/15/2013

**Referring Physician:** Dr J. Kelley, pediatric neurologist

**Diagnosis:** cerebral palsy, dysphagia

**Background and Reason for Referral:** Concerns expressed by parents and school occupational therapist who addresses Danny's feeding skills at school; Question of aspiration during oral intake; frequent upper respiratory infections, weight loss and poor nutritional intake.

**Evaluation Team:** Todd and Barb Jones, parents; Jane Smith, OTR/L; Heather Door, SLP; Dr Jonah Lee, radiologist; and Catherine Lynn, nutritionist.

**Evaluation Process:** Preliminary data collection by Heather Door, including gathering relevant medical background information from Dr Kelley, parents, and school OT; Interdisciplinary meeting to share preliminary information; discipline-specific evaluations by OT, nutritionist; videofluoroscopy by OT, SLP, and radiologist and technician; oral-motor and feeding assessment by SLP and OT.

### **Assessment Results:**

**Oral-motor control and Self-feeding:** Danny is usually positioned in his power wheelchair when feeding, which includes lateral head supports, a lower extremity abductor pad, and a chest strap to assist with positioning his trunk upright and symmetrical. He used both hands together to lift a sport-type drinking bottle with a straw to drink on his own. He is able to self-feed finger foods using his right hand, although his release of foods into to the mouth is poorly controlled, and he often uses his lips to assist in moving food from his hand into his mouth. He uses an adapted, angled spoon, with a built-up handle. Pureed or soft foods are typically eaten from a lipped bowl with a suction cups, and with minimal assistance to support his right forearm. He requires occasional cues to sit upright and to flex his neck slightly forward when swallowing. Danny's oral-motor movements are poorly controlled, which affect both his ability to chew and swallow and his articulation. His tongue movements are restricted by a tight frenulum, which is placed slightly more forward than is typical.

**Swallowing:** The oral initiation phase is characterized by front-to-back tongue movements to propel the food to the back of the tongue. As food or liquid reaches the back of the tongue, the soft palate lowers to create a seal. The feeling of the bolus against the back of the tongue and soft palate triggers a series of contractions that begin the pharyngeal phase of the swallow. Danny accepts food without difficulty and, with effort, is able to propel food to the back of the tongue. For all food consistencies, he had a humped rather than a bowled tongue configuration. Liquids spilled throughout his mouth, inside his cheeks, and seeped under his tongue. He experienced some difficulty with chewing, and tended to use weak up-and-down movements, and no rotary chewing motions with a cookie. He used his tongue and jaw movements to mash foods

against the roof of his mouth, and occasionally extended his neck to assist food in moving to the back of his molars. Danny was largely reliant on neck hyperextension to move the bolus to the back of the tongue. He was able to effectively elevate his tongue to initiate the swallow reflex, which was often delayed.

The pharyngeal phase is characterized by the closing of the epiglottis to prevent food from entering the trachea. The esophageal sphincter relaxes, and the base of the tongue, soft palate, and the walls at the back of the throat push the food in to the pharynx and seal the passage to nasal cavity. Peristaltic action pushed the food into the esophagus. Danny's reliance on neck hyperextension caused food and drink to spill prematurely into the pharynx. The swallow was initiated at the level of pyriform sinuses for puree, crunchy/solid, and thickened drinks. For thin liquids, the swallow was initiated later, often once liquid had penetrated behind the epiglottis, and aspiration was noted with thin liquids on one occasion. For the nectar consistency, penetration occurred inconsistently and did not occur for honey-thick consistency drink. Puree food particles stayed in the pyriform sinuses and valleculae after the swallow, creating a further risk for aspiration. When this solid food was alternated with honey-consistency drink, the food particles were effectively cleared from these sinuses. The esophageal phase is characterized by the transport of the bolus through the esophageal sphincter into the stomach. Danny's upper esophageal sphincter relaxed once the swallow reflex was triggered, allowing food and drink into the esophagus, and food and drink appeared to move smoothly through the upper esophagus.

**Nutrition Evaluation:** Data were collected from parent interview, measures of height and weight, and a 3-day food intake record. Danny's height was at the 10th percentile, and weight at the 5th percentile, compared with other children his age with cerebral palsy. His weight based on height, fell at the 3rd percentile. Danny's per-day diet consisted of fruit juices and milk (8 oz, 5 times); Pediasure supplement (10 oz); three meals; and two snacks, mostly of pureed and soft foods such as yogurt, apple sauce and other smashed fruits, vegetables, pasta, and rice. He could manage graham crackers and tiny bits of meat. Based on the 3-day food intake, his energy intake of 15 calories per centimeter of length was low and growth parameters indicated that he was slightly underweight. His family was concerned about lack of progress with his ability to manage solid foods,

and with frequent coughing during mealtimes, especially with thin liquids. Behaviorally, Danny was reported to enjoy eating for the most part, although he often got bored or tired before completing his meals. The length of time for completing a meal with minimal assistance averaged about 45 minutes.

**Summary and Impressions:** The findings from today's evaluation indicate that Danny has significant oral-motor dysfunction and mild-moderate pharyngeal phase dysphagia. His dysphagia results from his neuromotor disorder and limited tongue mobility caused by a tight frenulum. Danny cannot bowl his tongue or lift his tongue adequately to initiate the swallow reflex efficiently. He relies most on neck hyperextension, which effectively uses gravitational forces to propel the bolus and initiate the swallow reflex. This creates premature spilling of food into the pharynx and places him at high risk for aspiration with thin liquids and nectar-consistency drinks. He could manage honey-consistency drinks without difficulty. The pharyngeal phase also demonstrated reduced peristalsis, which results in residue being left in the pharynx. This residue was effectively cleared away by alternating solid food with sips of honey-consistency drinks. Danny requires minimal to moderate assistance overall for feeding because of limited upper-extremity function and decreased oral-motor control. He is motivated to participate in self-feeding as much as he is able, although it takes excessive amounts of time and energy to complete a meal, and he effectively uses some adapted feeding utensils. His caloric intake is slightly lower than it should be ideally given his height and activity level, and his growth should be monitored on a regular basis.

**Recommendations:** To minimize the risk of aspiration, Danny's drinks should be thickened to a honey-thick (shake) consistency. For example, juices can be thickened with blended fruits yogurt, or thickening agents such as Thick-it. Consultation with an ear-nose-throat specialist is recommended for further evaluation and possible surgical treatment of the attachment of the frenulum. Continued therapy intervention to address his oral-motor skills is recommended, with an emphasis on developing his ability to bowl his tongue, improving chewing abilities, gradation of jaw movements, and coordinating lip closure. His diet should be regularly monitored with ongoing support from a nutritionist. It is recommended that his diet

consist mainly of pureed foods, honey-thick liquids foods that easily form a bolus, and quick-to-dissolve crunchy foods. Mixed consistency food such as soups and thin liquids should be avoided. During meals, solid foods should be alternated with sips of drink. Continued programming to support his posture, and positioning needs during feeding, and for promoting self-feeding should also be ongoing.

Further questions regarding the information in this report can be directed to Heather Door, SLP, team coordinator, at 603 999-9999.

Team Member Signatures

## **A-3 OCCUPATIONAL THERAPY EVALUATION IN AN OUTPATIENT CLINIC**

### **Context, Background Information, and Evaluation Process**

Pat, a 15-year-old, ninth-grade student was referred by his pediatrician for an occupational therapy evaluation to determine whether sensory integration problems may be contributing to learning and behavior challenges. A phone call was made to the mother to get clarification of the reason of referral, and to gather more background information. She expressed concerns at a recent check-up that he was experiencing academic challenges at school and behavior problems such as inattention, disorganization, and apathy. A 1.5-hour evaluation session was scheduled to gather information to construct an occupational profile and occupational analyses using sensory integration as a guiding frame of reference.

### **Evaluation Report**

(This evaluation is based upon a real case although some content, names, and other identifying information have been fabricated to ensure confidentiality, and for illustrative purposes.)

**NORTHEAST PEDIATRIC THERAPY SERVICES****Occupational Therapy Initial Evaluation****Child's Name:** Pat Baker**Parents:** Holly and James Baker**DOB:** 4/25/97    **Age:** 15 years, 8 months**Referring Physician:** Dr K. Weeks, MD**Date of Evaluation:** 1/10/2013

**Reason for Referral:** Pat was referred by his pediatrician for an occupational therapy evaluation to determine whether sensory integration problems may be contributing to learning and behavior challenges. His mother was concerned that Pat was experiencing academic challenges at school and behavior problems such as inattention, disorganization, and apathy, and she was looking mostly for strategies that assist with his learning and social skills.

**Methods of Evaluation:** Pat was evaluated during a 1.5-hour evaluation session. He attended the session with his mother. Evaluation methods included parent and child interviews, which were conducted separately. Clinical observations of sensory processing and motor skills and computer use were made during a number of tasks and motor play. Pat completed the Touch Inventory for Elementary School children as a measure of tactile defensiveness, a handwriting sample, a computer task requiring him to research a topic, and the Test of Visual-Motor Skills-3, a design copy test measuring visual-motor integration was administered.

**Occupational Profile:** Pat was diagnosed with ADHD at 11 years of age, and bipolar disorder last year. He is presently taking medication (Wellbutrin, an antidepressant, and Risperdal) to assist in managing his behavior (mood swings, agitation), and is followed regularly by Dr Gray, child psychiatrist, for his mental health disorders. Pat's medical history is unremarkable for other major illnesses, and he has never been hospitalized. He appears slightly taller and heavier than an average 15-year-old. Pat is an only child who lives with his parents in a rural area. Pat was able to identify the name of one friend he sometimes spends time with outside of school. As a family, they vacation together 1 to 2 times a year and attend Church

together on Sundays. Both parents work outside the home, and Pat looks after himself after school. He enjoys watching TV, playing videogames, reading, and learning about cars and computers. He completes all of his basic self-care skills independently and takes pride in his appearance. He does not have set chores around the home, although he will help out when asked. He currently is not involved with any extracurricular activities outside of school. Pat attends Rocky High school as a freshman, and receives some special education support, including two periods of study skills where he receives specialized instruction, extra time, and assistance to complete homework and other class assignments. He reports that he enjoys school and is satisfied with his academic performance. He currently receives occupational therapy services at school on a consult basis to address sensory and motor deficits that may be affecting his school performance, including decreased physical endurance, sensory hypersensitivities, and inattention.

**Behavior during the Assessment:** Pat was pleasant and cooperative throughout the evaluation. He initiated very little conversation, but willingly answered my questions. He seemed somewhat anxious at times, with fleeting eye contact, and frequent fidgeting with his hands. Overall, his affect was flat, and his movements were somewhat slow and sluggish, and he slumped in his seat. When conversing, he was slow to respond to questions and needed a few more seconds than is typical to come up with a response. He appeared to put forth good effort and honesty when completing the assessment activities, and in answering questions.

**Results from Child Interview and Touch Inventory:** Pat reported that his main problems at school were with handwriting, and with needing more time to get things done. He feels that his study skills periods are very helpful, and described school as being "OK" and a good way to pass the time. He also stated that he does not get along well with most other kids at school, but that he did not see social relationships as being particularly troublesome. He described himself as a person with fluctuating moods, who tends to be more on the anxious side than laid back, and somewhere in the middle of being happy and sad. He reported that the medication he is taking helps with self-control, levels his mood swings, reduces aggressive feelings, and overall helps him get things done, and concentrate. He reported that

he knows his physical motor skills are weak, but that he manages what he needs to do for gym class, and in completing his daily activities. He did state that he gets pain in both ankles when walking after about half an hour, and that he does not participate in any regular physical activity. His leisure interests are sedentary in nature, such as playing video games, watching TV, using the computer, and reading. Results from the Touch Inventory revealed no significant tactile defensiveness. In questioning him about other behavioral responses to sensory input, he did state that loud, busy environments such as assemblies or going to a crowded mall sometimes make him feel agitated.

**Results from Parent Interview:** Pat's mother, Holly, reported that her main concerns regarding Pat were related to the sensory and motor area, and she felt that these challenges were impacting his ability and desire to participate socially with peers and to develop friendships. In the motor area, she described his decreased physical endurance and motor clumsiness as significant problems. She expressed that he becomes overstimulated very easily, such that he is unable to concentrate, and becomes agitated around groups of people or in busy environments. She also reported being concerned regarding his emotional well-being and self-esteem, although she felt that the medication he was on was effective in managing his mood swings. She felt that his education programming was adequate, although she would like school personnel to work more toward giving Pat more responsibility to complete his work and decrease the amount of special education support he requires.

### **Results from Handwriting sample, TVMS-3, Observations of motor skills, computer use**

Pat's handwriting of a short paragraph he was asked to print was borderline legible, with poor spacing of letters and words. He complained of fatigue while printing, and the amount of time and effort required was much more than would be expected of a child his age. He was able to type the same paragraph much more quickly, had adequate dexterity and upper extremity control to work the mouse, and sufficient knowledge of basic word processing. He was able to navigate the Internet and use Google search to explore a topic and gather information. His standard score of 83 on the TVMS-3 fell significantly below average at the 13th percentile. Pat was able to replicate

most of the designs, although he lacked attention to detail, and lines were shaky and poorly controlled.

During gross motor activities and skills, it was noted that Pat's muscle tone was minimally lowered globally based on lack of resistance felt on passive movement, and hyperextensibility of many joints. Basic balance and postural reactions were present, although slow to be initiated at times and inefficient when challenged, such as when walking heel-toe on a line. Motor movements were generally poorly graded, and decreased coordination was noted on finger-to-nose testing, and when asked to perform rapid alternating forearm supination-pronation movements. He tended to rely on vision a great deal when moving, perhaps because of weak proprioceptive processing. He experienced difficulty performing sit-ups, pushups, and jumping jacks.

**Summary:** The evaluation indicates that Pat has some underlying sensory integration deficits that are impacting the performance of daily occupations at home and school. More specifically, deficits with vestibular and proprioceptive processing were noted, and although subtle, they impact his physical endurance. He is able to complete everyday motor tasks such as showering and dressing, and he participates in physical education at school. However, his leisure activities are all very sedentary in nature, and social participation with peers and family is limited. His physical endurance for physical activity, including walking, is limited to about half hour, and of concern are complaints of foot pain after very little physical activity. Visual-motor integration concerns were also identified, and impact his handwriting, and other fine motor activities. Pat has a significant mental health history including inattention and bipolar disorder, which also places him at high risk for antisocial behavior, and decreased feelings of self-worth.

Despite these challenges, the assessment revealed that Pat was engaging at times, and he reported being satisfied with his school performance. With structure, and special education support, he has maintained adequate academic performance. He was able to identify some interests such as working on computers and liking cars, however, he lacks participation in purposeful activities related to those interests. He seemed to have a positive outlook despite the challenges he faces in managing his behavior, and in compensating for his sensory motor deficits.

#### Recommendations:

1. School programming: Pat continues to benefit from special education services, including occupational therapy services at school. It is suggested he continue to receive occupational therapy services to address sensory and motor concerns, handwriting, and keyboarding. Suggested areas for additional programming or support for consideration include addressing his social skills, assisting him in developing his interests in cars and mechanics or computers by encouraging his involvement in clubs or activities with peers who share his interests. Monitoring of his behavior and self-esteem is also important through regular meetings with the school counselor.
2. In addition to occupational therapy services at school, short-term, clinic-based OT services are recommended to explore avenues to improve his motor skills, physical fitness, and leisure skills, work skills, and social participation. It is important for Pat to engage more frequently in activities that he finds useful, satisfying, productive, and enjoyable, and that develop his ability to perform important life skills. Specific therapy goals will be identified collaboratively with Pat if it is decided that he would like to pursue this intervention.
3. Consultation with an orthopedic specialist is recommended to address the pain he describes in his feet and ankles, and possible need for foot orthotics.

It was a pleasure meeting Pat and his mother, and if you have any questions about the information in this reports, feel free to contact me at 869 1122.

Susan Martin, MS OTR/L

## **A-4 SAMPLE OT EVALUATION OF AN ELEMENTARY, SCHOOL-AGED CHILD, SCHOOL SETTING**

### **Context, Background Information, and Evaluation Process**

An occupational therapist serving an elementary school received a referral to evaluate Carly, a third-grade student. Her teacher had initiated a focus of concern, as Carly had not

received any special education services in the past. There was little information provided in the referral, except that the teacher expressed concerns regarding her fine and gross motor skills. Phone calls were made to Carly's mother and teacher for clarification of the reason of referral, and to gather a little more information about how she was doing in school, and how her motor skills were impacting her performance throughout the school day. This evaluation was conducted to assist in determining eligibility for special education and related services, as well as to assist in the development of her individualized education program.

### OCCUPATIONAL THERAPY INITIAL EVALUATION

**Name:** Carly Clark

**DOB:** 2/5/2004    **Age:** 8 years, 2 months

**Test Dates:** March 23, April 6, 2012

**Grade:** 2nd, **Teacher:** Mrs Beatrice, 2/3 class

**Focus of Concern:** Carly's teacher expressed concerns regarding Carly's fine and gross motor skills. Carly is currently in a regular 2/3 split classroom, and has not received special education services in the past. This assessment will be used to assist in determining if Carly would be eligible for special education services. She was also evaluated by the school psychologist.

**Methods of Evaluation:** Carly was evaluated during two 1-hour sessions using the following procedures and assessment tools:

- The Bruninks-Oseretsky test of Motor Skills-2 (BOT-2)
- Sensory Processing Measure (SPM), Classroom, and Home forms
- Interviews with Carly, her mother, and teacher
- Naturalistic observations on the playground and classroom; Clinical observations sensory and motor functions

**Occupational Profile:** Carly lives with her parents and twin sister Cory, who is in a different second-grade classroom. Carly was born 4 weeks early with no significant complications, and

her medical history is unremarkable with the exception of frequent ear and upper respiratory infections. Early developmental motor milestones were reported to be achieved within the age appropriate ranges, and she walked by 14 month of age. Her mother did describe Carly as being a fussy baby, and that even today she is not an easy child to raise. She stated that Carly is emotionally sensitive, frustrates easily, and had trouble following through with simple requests at home. Carly received speech therapy for a short time when she was 4 to 5 years of age owing to delayed language and poor articulation, although her mother reported that she no longer has problems in those areas. Currently extracurricular activities include swimming lessons once a week, and she has taken dance classes in the past. Although her mother reported that Carly's motor skills are not a strength for her, she enjoys gross motor play such as jumping on a trampoline and riding her bike. She plays well with her sister and enjoys school, especially art.

**Behavioral Observations during Evaluation Activities:**

Carly was pleasant and cooperative throughout my interactions with her. She was friendly and talkative, and very comfortable with an unfamiliar adult. She often required encouragement to continue to a task when challenged, and she was easily distracted by the visual stimuli in the therapy room, and noise from an adjoining room. Her activity level was slightly higher than one would expect, although she settled well for short periods of time to do fine motor and pencil activities at the table. She rarely stayed with the same activity for more than about 3 minutes unless coaxed to do so. She carried on a conversation well, and appeared to be a happy child who was eager to please and who wanted frequent feedback about she was doing. She followed directions well during motor testing, and standardized test results obtained are believed be a good indicator of her true abilities.

**Assessment Results:**

**Sensory Processing Measure—Home Form:** This parent questionnaire examining sensory processing behavior was completed jointly by her mother and father. They are asked to rate the frequency of a number of behaviors that are believed

to relate to sensory processing abilities. Based on her parents' ratings, Carly's scores were as follows:

Sensory scale	T-score	Interpretation
Social Participation	60	typical
Visual	54	typical
Hearing	61	some difficulties; easily distracted by noise
Touch	52	typical
Body Awareness	69	difficulties, uses too much or too little force
Balance and Motion	72	difficulties, clumsy, falls frequently
Planning and Ideas	53	typical

These scores indicate that Carly processes information from her visual and tactile sensory systems in ways typical of school-aged children. Her motor planning skills and social participation also were found to be typical. However, her profile suggests mild difficulties with auditory processing (attending to salient auditory information), and significant difficulties with processing proprioceptive and vestibular sensory information impacting her body awareness, balance, and coordination.

**BOT-2 measuring fine and gross motor skills:** Scores were as follows:

Subtests	Scaled Score (Mean=15, SD=5)	Standard T-score (mean=50, SD=10)	Age Equivalent (year- months)	Percentile; Interpretation
Fine Motor Precision	12		6-9 to 6-11	
Fine Motor Integration	11		6-6 to 6-8	
<b>Fine Manual Control</b>	<b>23</b>	<b>42</b>		<b>21, average</b>
Manual Dexterity	14		7-9 to 7-11	

Upper-Limb Coordination	10		6-6 to 6-8	
<b>Manual Coordination</b>	<b>24</b>	<b>42</b>		<b>21, average</b>
Bilateral coordination	6		5-0 to 5-1	
Balance	9		5-6 to 5-7	
<b>Body coordination</b>	<b>15</b>	<b>32</b>		<b>4, below average</b>
Running Speed and Agility	9		5-10 to 5-11	
Strength	9		5-8 to 5-9	
<b>Strength and Agility</b>	<b>19</b>	<b>36</b>		<b>8, below average</b>

Her scores indicate that her gross motor skills are significantly below average, with deficits in the areas of balance, strength, agility, and motor coordination. Her composite motor score in consideration of both fine and gross motor skills was 34, falling significantly below average at the sixth percentile. Despite challenges in the motor area, she moves about the classroom, hallways, and playground without difficulty. Observations and testing did reveal that ball play (catching, tossing kicking) was below average, but other hand skills and fine motor control were within the average range. Carly's muscle tone was assessed to be within the average range. Her gross motor movements were poorly graded at times. She was able to stand on one foot, but was only able to hop on one foot for three consecutive times. She had difficulty coordinating both sides of her body, and she was unable to perform jumping jacks or skip. Carly was able to imitate simple body postures and enjoyed playing on the swings and other therapy equipment, demonstrating adequate motor planning. She watched carefully how her body was moving which may indicate poor body awareness. She enjoyed playing with a variety of tactile-based activities such as finding objects in the sensory table filled with beans and moving around in the ball tunnel. She moved quickly from activity to activity.

**Classroom Observations:** Carly was observed in her classroom for 30 minutes, while the students were working in small groups on a math assignment of two worksheets involving

of money problems. Her classroom was quite a busy environment with much artwork and photos on the walls and hanging from the ceiling. Desks were arranged in groups of four. The teacher and one other adult, a teacher's assistant, were in the room, and her class has 22 students. Carly was working well with the other students completing her work sheet and using the manipulatives that they were given. She stood up while she worked, while most of the children were sitting. On occasion she did sit, and when sitting, she often put her head down on the desk and was quite fidgety. She was able to complete her first work sheet, while most of the other children completed both. When asked to put their math work away and line up to go outside for recess, Carly began to order the other children to help and took charge of the cleanup effort. The other children seemed a little annoyed with this. Carly was one of the last students to get in line. Her teacher reported that Carly is doing average work in the second grade curriculum, although she needs more cues and frequent encouragement to get her work done. She tends to work slowly and gives up easily when challenged. The PE teacher reported that she experiences difficulty keeping up with the other children in gym class and often asks to sit out.

**Summary:** Evaluation data from standardized testing, interviews, and observations indicate that Carly has some sensory and motor deficits that are impacting her daily life and school performance. In the gross motor area, balance and coordination are weak and her skills were assessed at a level that is about 1 year below age expectations. Although she does manage to move about the playground and other school environments adequately, she does experience some difficulty participating in physical education. Fine motor skills were assessed to be within the average range. She is easily distracted with visual and auditory stimulation, and she tends to seek out movement (is fidgety). Although she has been described by others as somewhat "bossy," during my interactions and observations of her, she appeared to be a fun, friendly, and compassionate individual who is eager to please others. She does become easily frustrated and often needs encouragement to persist at a task when challenged. With frequent teacher contact and encouragement, she has been successful in school-related activities. Carly would benefit from occupational therapy support regarding her gross motor skills if she qualifies for special

education services, and to provide some suggestions to manage her sensory processing differences as they impact her roles as a student.

**Recommendations:** Information will be shared at an upcoming team meeting, and if she qualifies for special education services, a program with specific goals will be developed by the team, including her parents.

1. Carly should be provided with opportunities to develop her gross motor skills as part of her education program, including the development of skills in the areas of balance, bilateral coordination and strength, including consultation to support her participation in physical education.
2. Carly would benefit from support to assist with her ability to attend and complete assignments, and organize her work. Because she does best with a great deal of sensory input (she likes movement), hands-on learning, options to stand (rather than sit) and move around in the classroom during learning activities would be helpful for her. At times when quiet seat work is expected, minimizing distractions and occasional cueing to help keep her focused and to provide encouragement would be helpful.
3. Carly would benefit from extracurricular activity that is very physical in nature. Swimming lessons is a good activity for her. Other examples of physical activity that is not necessarily competitive nature that she might enjoy include gymnastics, martial arts, dance, or skiing.

I can be reached at 899-1111 if you have any questions about the information shared in this report.

Sue Kelly, MS/OTR/L

## **A-5 INPATIENT ACUTE HOSPITAL SETTING, EVALUATION OF A 3-YEAR-OLD**

Hannah was referred to occupational therapy on the acute rehabilitation floor, when she was transferred from the intensive care unit. She had received occupational therapy services briefly while she was in intensive care unit for bed positioning needs. However, she was not seen regularly as she was

medically unstable, and unresponsive for much of that time. Prior to evaluating Hannah, the occupational therapist working in the acute unit spent a great of time reviewing her medical chart which included a thorough account of her medical condition, details about her accident, previous evaluations, and previous services and progress since her accident which had occurred about a month prior to her transfer to acute rehabilitation. Because of the wealth of information provided in the medical chart, the amount of background information provided in the OT report is limited, as it would be redundant to include much of the information already gathered and recorded in the medical chart. The evaluating occupational therapist also spoke with the occupational therapist who saw her while she was in intensive care.

### OCCUPATIONAL THERAPY INITIAL EVALUATION

**Patient Name:** Hannah Greene

**DOB:** 5/5/2009 **Age:** 3 years 6 months

**Date of Evaluation:** 11/5/2012

**Referring Information:** Hannah was involved in a motor vehicle accident on Oct. 8 in which she was a pedestrian, resulting in significant head trauma. She is medically stable and was transferred from the Intensive Care Unit this week. She requires constant respiratory and cardiac monitoring, had G-tube placed for feeding, and has not fully regained consciousness. Brain imaging revealed diffuse encephalopathy with enlarged ventricles and more pathology in the right frontal and occipital areas, and post-parietal regions. She has opened her eyes at times and exhibits some spontaneous movement.

**Evaluation Methods:** Functional bedside evaluation with physical therapist; Interviews with mother and nursing staff, Glasgow Coma scale, child version

**Occupational Profile:** Hannah lives with her mother who is a single parent, and her 6 year old brother. Her biological father is not involved in her care. Prior to the accident, Hannah attended day care during the day at a center-based program while her mother worked as a store manager. Her medical history was

unremarkable, and she had been developing normally. She enjoys playing with other children and with her brother, and she loves music and dancing. She was independent with feeding, simple dressing tasks such as taking a shirt on and off, and was toilet trained. Her mother spends a great deal of time at the hospital at her bedside and appears to be coping as well as can be expected. She would like to be doing more for Hannah and reports at times feeling helpless.

**Evaluation Results:** Hannah was unresponsive to simple verbal requests such as “squeeze my hand,” and her eyes remained closed for the 30-minute period we were with her. She did not make any vocalizations, and exhibited a weak, disorganized withdrawal response in response to a noxious stimulus. Her score on the GCS was 5, indicating severe head trauma. Passive range of motion of the limbs was full, although muscle tone in the lower extremities was increased, and as well as increased tone in the right upper extremity. Nursing reports that she will open her eyes for short periods and has made some vocalizations (moaning), and has been able to tolerate a supported sitting position for about 30 minutes. She dependent for all of her self-care needs and has not taken any food orally.

**Summary and Recommendations:** Hannah’s recovery to date has been slow, and she has not regained consciousness. Although she exhibits little spontaneous movement and increased muscle tone, she has maintained full range of motion of the extremities. Her mother is very supportive, and is eager to do as much as possible for Hannah. Hannah is not yet ready for active rehabilitation. She will however be seen by OT 5x per week for cognitive stimulation, to monitor her level of consciousness, to address range of movement, any positioning concerns, and for parent support. Training in activities of daily living, motor, and play skills will commence once her level of consciousness improves.

Molly Feine, MS OTR/L

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