

## Novice and Experienced Physical Therapist Clinicians: A Comparison of How Reflection Is Used to Inform the Clinical Decision-Making Process

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**Background.** Prior experience informs clinical decision making and shapes how reflection is used by novice and experienced physical therapist clinicians.

**Objectives.** The aims of this research were: (1) to determine the types and extent of reflection that informs the clinical decision-making process and (2) to compare the use of reflection to direct and assess clinical decisions made by novice and experienced physical therapists.

**Design.** Qualitative research methods using grounded theory were used to gain insight into how physical therapists use reflection to inform clinical decision making.

**Methods.** Three participant pairs (each pair consisting of one novice and one experienced physical therapist) were purposively selected from 3 inpatient rehabilitation settings. Case summaries of each participant provided the basis for within- and across-case analysis. Credibility of these results was established through member check of the case summaries, presentation of low-inference data, and triangulation across multiple data sources and within and across the participant groups.

**Results.** Although all participants engaged in reflection-on-action, the experienced participants did so with greater frequency. The experienced participants were distinguished by their use of reflection-in-action and self-assessment during therapist-patient interactions. An intermediate effect beyond novice practice was observed.

**Conclusions.** The results of this study may be used by educators and employers to develop and structure learning experiences and mentoring opportunities to facilitate clinical decision-making abilities and the development of the skills necessary for reflection in students and novice practitioners.

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Health care providers face many challenges in the current health care environment. These challenges include an expanding body of medical knowledge, an explosion of technology, an aging population facing diverse health problems in large numbers, and shrinking financial resources for medical care. Within physical therapy, the scope of practice has evolved toward autonomous practice with legislation in 44 states that allows independent physical therapist practice.<sup>1</sup> These trends require that practitioners demonstrate a higher degree of independent clinical decision making specific to patient/client management.

### Theories of Reflection

Schön<sup>2</sup> identified 3 elements of reflection: active engagement in intellectual processes, exploration of problems or experiences, and a subsequent changed perspective or new insights. At the highest level of cognitive analysis, reflection integrates theory and practice, which is necessary to achieve a changed conceptual perspective.<sup>3</sup> Schön's stages of the reflection process (Fig. 1) represent component abilities that are necessary for lifelong learning and professional growth.<sup>4</sup> This process begins with the knowledge and skills (*knowledge-in-action* [KIA]) that a professional possesses and uses within a given context. Surprise occurs when an unexpected or novel problem is encountered, and experimentation arises when a solution to a problem is attempted. Within this

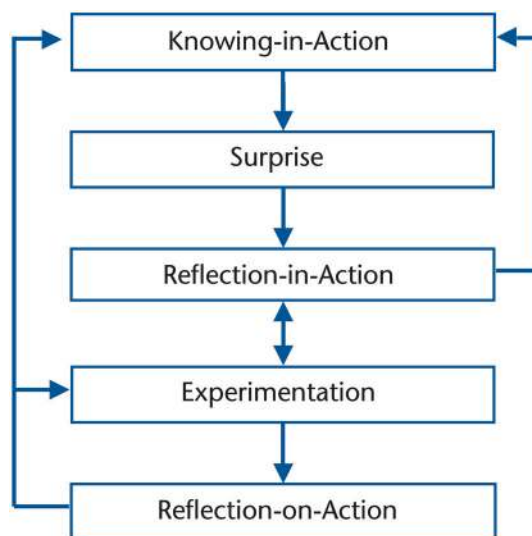


Figure 1. Schön's model of reflective practice.<sup>2</sup>

model, reflection guides and informs the clinical decision-making process. *Reflection-in-action* (RIA) is the ongoing meta-cognition about what is occurring during patient-therapist interaction and often informs the process of experimentation. *Reflection-on-action* (ROA) occurs as an individual looks back on what occurred and often results in a broadened or revised clinical decision-making framework. Progression through the 5 stages of this model may depend upon an individual's level of expertise, as well as the novelty of the clinical experience. For example, the stages of surprise and experimentation are most evident with novice learners.<sup>5</sup> As learners gain more experience, they are less likely to be surprised by novel situations because they have a greater breadth of prior experiences that provides an associative frame of reference. Thus, they have less need for experimentation and are surprised less frequently. Conversely, novel experiences cause surprise, uncertainty and experimentation in experienced as well as novice clinicians.<sup>5,6</sup>

There are skills that are necessary for effective reflection (Tab. 1).<sup>7</sup> These skills represent a progression from the foundation of self-awareness upon which critical analysis of information supports the ability to make value judgments. Differences in characteristics of novice and experienced clinicians influence how professionals engage in reflection and are likely related to their varied skill levels. Novices often start their reflection at the level of calculative rather than contemplative thinking.<sup>8</sup> Furthermore, the type of thinking that directs decisions may be related to the phase of a person's professional development.<sup>9</sup> This is evidenced in novice clinicians, who are prone to make errors in clinical decision making and have limited knowledge and decreased ability to recall what they have learned compared with expert clinicians.<sup>10</sup> Over time, there is a transition away from the hypothetico-deductive reasoning processes used by novices to the forward reasoning processes evidenced by expert clinicians. "Expert" knowledge is characterized by the development of causal networks of knowledge that evolve into illness scripts

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**Table 1.**  
Skills Needed for Reflection<sup>7</sup>

Skill	Description
Self-awareness	The ability to assess how the situation has affected the person and how the person has affected the situation.
Description	The ability to recognize and recall salient events.
Critical analysis	The ability to examine, identify, challenge assumptions, and imagine and explore alternatives.
Synthesis	The ability to integrate new knowledge with existing knowledge and to use knowledge to solve problems and make predictions.
Evaluation	The ability to make judgments about the value of something.

that guide clinical decision making as clinicians gain more experience.<sup>11,12</sup>

### Relationship Between Clinical Decision Making and Reflection

*Clinical decision making* is defined at the most basic level as “reasoning that results in action.”<sup>13(p10)</sup> Three important premises are assumed about clinical decision making: (1) thought leading to action requires deliberation about an appropriate course of action and occurs within a specific context, and there is an anticipated outcome; (2) the nature of the thought, as well as the subsequent action, is tied to prior personal and professional experiences of the learner; and (3) prior experiences provide the framework against which an appropriate plan of action is developed.

Clinical reasoning models incorporate these premises by explicating the cognitive processes and activities that are used to arrive at an appropriate medical diagnosis<sup>11</sup> or engage in the patient/client management.<sup>14</sup> How individuals within the health care professions develop the attributes of expert practice has been studied.<sup>9-12,15-32</sup> Research on clinical decision making in medicine has focused on reasoning processes used by practitioners,<sup>10,12</sup> studies within the nursing field have focused on quantifying the use of clinical decision making,<sup>21-26</sup> and studies within the field of physical therapy have focused on defining behaviors

and affective attributes of expert clinicians.<sup>18,19,27,28</sup>

Although “reflection” is not a term included in clinical decision-making definitions, it is integral to the thought processes of experts.<sup>30</sup> Just as effective clinical reasoning is seen to be central to professional autonomy, reflection is a necessary component of developing reasoning skills consistent with expert practice. Insight into how the skills necessary for effective clinical decision making and reflection evolve as individuals develop professionally provides insight into this crucial link between the 2 processes.

### Development of Clinician Decision Making and Reflection

Clinical decision-making skills evolve along a continuum as practitioners gain experience. The literature has identified clinical decision-making skills and abilities,<sup>9-12</sup> as well as the attributes of practitioners,<sup>27,28</sup> consistent with expert practice. Although previous studies have described attributes and performance levels across novice, experienced, and expert practitioners, there is limited insight into how expertise is developed. Within the field of medicine, the development of expertise has been tied to experience rather than the attainment of domain-specific knowledge<sup>11</sup> and is likely driven by noncognitive factors such as the nature of the knowledge domain, prior experience, and the

acquisition of established group norms.<sup>10</sup> The process of evolving expertise is theorized to occur in stages that are characterized by distinct knowledge and skills possessed by individuals with similar experience.<sup>9,10</sup> Progression from one stage to another (novice → intermediate → expert) occurs with experience as the knowledge and skills necessary to advance decision-making abilities are developed. This stage theory provides a framework to explain the differences observed between novice and expert practitioners. Steinberg<sup>31</sup> suggested that skills are components of abilities and that these abilities are the building blocks of expert practice. Furthermore, he proposed that study of abilities and achievements may prove to be an effective measure of developing expertise. These differences in abilities has been established in the study of novice and expert physical therapist clinicians.<sup>27,28,32</sup>

### Attributes of Reflective Practice

The attributes of self-assessment and autonomous behaviors exemplified by expert physical therapist clinicians illustrate the importance of reflection in clinical decision making. Expert physical therapists use more of their treatment time to engage in direct patient treatment, handle environmental interruptions without disrupting treatment, use social interaction as a means of eliciting information from the patient as well as providing information, and provide

**Table 2.**  
Novice and Experienced Participant Characteristics<sup>a</sup>

Pseudonym	Age (y)	Sex	Years of Experience as a Physical Therapist	Other Physical Therapy Employment	Entry-Level Education	Post-Entry-Level Education
Galway	26–30	Male	<1	No	DPT	No
Cavan	26–30	Female	<1	Yes	DPT	No
Kerry	26–30	Female	<1	No	DPT	No
Mayo	31–35	Male	8	No	MPT	No
Dara	31–35	Female	8	Yes	MPT	No
Cork	36–40	Male	8	Yes	MPT	t-DPT

<sup>a</sup> MPT=master of physical therapy, DPT=doctor of physical therapy, t-DPT=transitional doctor of physical therapy.

more frequent and integrated cues and encouragement.<sup>27,28</sup> They also engage in “dialectical reasoning,” characterized by the use and integration of a variety of knowledge paradigms to arrive at a clinical decision.<sup>33</sup> This higher level of reasoning is consistent with the illness scripts<sup>5</sup> and biomedical knowledge propositions<sup>10</sup> identified in the medical literature.

Although the clinical decision-making abilities of individuals at a given point on the continuum of clinical practice have been studied, there is a gap in the understanding of how clinical decision-making abilities evolve as an individual transitions from novice toward expert clinical practice. The underlying assumption that guides this research study is that reflection informs the clinical decision-making processes of health care professionals. The constructs of reflection described in Schön’s model defined the elements, as well as bounded this study.<sup>34</sup> There were 2 primary research aims. The first aim was to determine the types of reflection and to what extent reflection informs the clinical decision-making process of physical therapist clinicians. The second aim was to determine how reflection is used to direct and assess the clinical decisions made by novice

clinicians compared with experienced clinicians.

### Method

Grounded theory method<sup>35,36</sup> and data collection from the clinician’s perspective<sup>37</sup> within the phenomenologic philosophy were central to meeting the research aims of this study. The primary researcher (S.F.W.) gained insight into participants’ KIA and RIA and how they subsequently dealt with “surprise” and “experimentation” through observation of evaluation and treatment sessions. Insight into the participants’ use of ROA and self-awareness of their use of RIA was gained through semi-structured participant interviews.

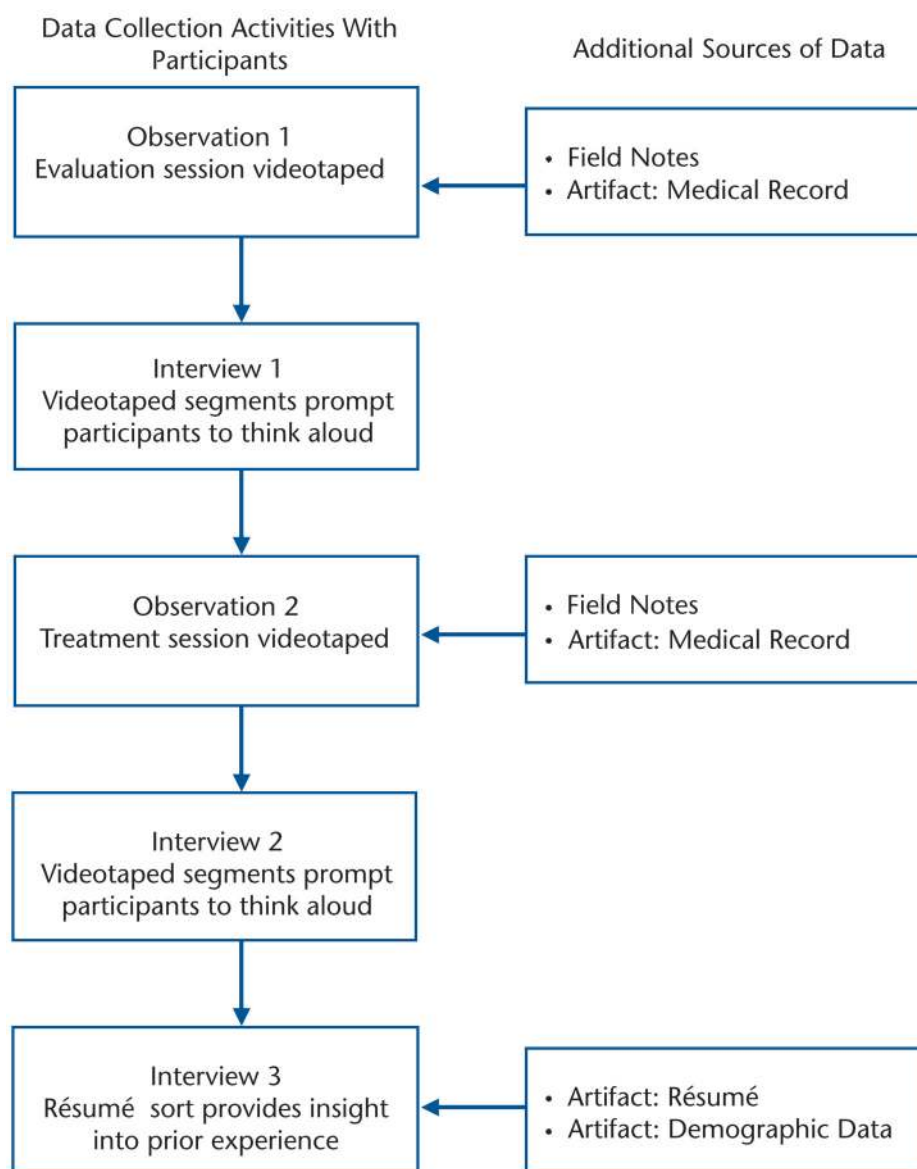
### Participants

Purposive sampling techniques<sup>37,38</sup> were used to elicit participation from 3 clinician pairs, consisting of 1 novice (<1 year of experience) and 1 experienced physical therapist (>8 years of experience),<sup>20</sup> from 3 inpatient acute rehabilitation centers (Tab. 2). These 3 participant pairs met the following inclusion criteria: currently treated patients following a cerebrovascular accident (CVA) and had primary clinical experiences in neurologic physical therapy in an inpatient rehabilitation setting. Fifteen clinical sites across 3 states were

contacted to yield 3 participant pairs meeting the inclusion criteria. Inpatient acute neurologic rehabilitation settings were selected for 2 reasons. First, less work is done on the development of expertise in these settings.<sup>20</sup> Second, the researcher’s primary clinical experience was with patients with CVA in these clinical settings. This shared knowledge facilitated insight into the participants’ clinical decision-making process. Selecting one pair from each clinical site served to minimize the effects of varied prior experience, while recruiting from 3 different clinical sites provided opportunity for observation across a breadth of clinical environments. Each clinical site afforded the participant pair unique clinical experiences, supervision structures, and mentorship opportunities.

### Data Collection and Management

Informed consent and permission to videotape were obtained from each therapist and patient, and additional permission to audiotape was obtained from the therapists. The sources of data and the sequence of the data collection process are detailed in Figure 2. The data collection process is detailed in Appendix 1. Two separate sessions, one evaluation and one treatment, between



**Figure 2.**  
Flow diagram of the elements of data collection process.

each therapist and patient after CVA were videotaped. Prior to each interview, the researcher used field notes to select portions of the videotape to view with each participant in separate audiotaped, semi-structured interviews (Appendix 2).<sup>39</sup> Videotaped segments included activities with which each participant began the session and transitions that occurred throughout each session. For example, each videotape review of an evaluation began with the patient

interview to prompt discussion of each participant's approach to evaluation. Subsequent preselected video clips were representative of impairments and functional limitations examined. Occasionally, comments made by the participants during the interview directed review of videotape segments not selected for review by the researcher, which affirmed that decision making from the participants' perspectives was recognized. A résumé sort was com-

pleted in a third audiotaped, semi-structured interview (Appendix 3). All 3 audiotaped interviews were transcribed verbatim. Interview data were triangulated with artifact data (medical records and participant résumé) and the researcher's field notes and reflective memos.

### Data Analysis

An iterative process of coding a subset of the data and discussion between the researcher and a peer ex-



**Table 3.**

Axial Code Category “Reflection,” Corresponding Open Codes, Definitions, and Sample Quotes

Open Code	Definition	Sample Quotes
Reflection-in-action (RIA)	Analyzing the effectiveness of one’s own cues, handling as well as patient performance and behaviors; decisions are made and interventions may be modified.	<ul style="list-style-type: none"> <li>• “Even when I do it, I’m thinking, ‘What am I doing?’”</li> <li>• “In order to reflect, you have to appropriately observe the activity.”</li> </ul>
Reflection-on-specific action (ROSA)	Thinking about clinician-patient interaction and performance once the treatment session is over. Affirm plan of care or modify it based on the assessment made.	<ul style="list-style-type: none"> <li>• “And then asking ‘Did this work? Did this not work? What should I try next time?’”</li> <li>• “So when I do an activity, I ask myself, ‘Why did that happen?’”</li> </ul>
Reflection-on-professional experience (ROPE)	Thinking about prior experiences that lead to ways of thinking about clinical decision making and professional practice that is broader than one-on-one practice	<ul style="list-style-type: none"> <li>• “A Fay Horak course . . . and it was just one of those mind-bending experiences. . . . I had a bunch of patients . . . I went on Friday and came back on Monday and treated them totally differently.”</li> </ul>

pert resulted in development and refinement of a coding scheme representative of the participants’ views. All subsequent data were read and coded line by line. Qualitative data management software (NVivo 6)\* was used during the process of open and axial coding. Through this iterative process of coding, themes representative of the types of reflection that participants applied to their clinical decision-making process emerged from the data. A case summary that integrated portions of the 3 interviews with demographic and artifact data, field notes, and reflective memos was developed for each participant. These case summaries provided the basis for thematic analysis and for within- and across-case analysis between the novice and experienced groups.

**Establishing Scientific Rigor**

Reliability of this coding scheme was confirmed by percentage of agreement among researchers of 86.4%, with a kappa value of .85, which represents excellent agreement.<sup>35</sup> Trustworthiness of the data was ensured through member checks of the case summaries and presentation of low-inference data.<sup>37,38,40</sup> Each participant reviewed his or her case

summary and affirmed that the researcher accurately represented his or her thoughts and words. Credibility of the data was ensured through ongoing peer assessment by an experienced qualitative researcher during all phases of the research study. Strategies to reduce researcher bias included reflexive bracketing and maintenance of a log that included memos, field notes, and a reflective journal.<sup>37,38</sup>

**Results**

The data presented here are part of a larger study of the differences in clinical decision-making abilities between novice and experienced clinicians.<sup>41</sup> These data illustrate the theme of reflection as it is used to inform the clinical decision-making process (Tab. 3). The participants described and engaged in 3 different types of reflection. Participants expressed ROA 2 different ways. *Reflection-on-specific action* (ROSA) included thinking back upon interaction with a specific patient for the purpose of affirming the plan of care or modifying it based on the assessment made. *Reflection-on-professional experience* (ROPE) encompassed broad comments about prior experiences that informed clinical decision making and professional practice. Although there were differences between novice and experienced clini-

cians, all participants demonstrated ROPE and ROSA. In contrast, all of the experienced participants and only one of the novice participants engaged in RIA in a manner consistent with Schön’s model.

**Reflection-on-Specific Action**

This type of reflection demonstrated the highest degree of consistency across the novice and experienced practitioners. When asked to define reflection, all participants gave definitions that were consistent with ROSA. Novice and experienced participants described using reflection to gain insight into their actions and thoughts. This reflection occurred away from the patient-therapist interaction and included assessment of their own performance (or thought process), as well as assessment of the patient’s performance. Their insights often were used to refine future actions or thought processes. The following excerpts illustrate how novice and experienced participants defined reflection:

Reflection would be after the fact, looking back on either your treatment sessions or your interactions with the patient, with co-workers . . . . Anything that you could have done differently to make your next session better. (Novice participant—Galway 3:20–24)

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Reflection to me is looking back at what just happened, or may have happened a long time ago. In order to reflect, you have to appropriately observe the activity. I think that comes with experience. You have to be a critical observer and know what you saw to be able to look back on it later while you're not currently looking at it. (Experienced participant—Mayo 3:43–47)

Across both groups, the participants' use of ROSA informed their clinical decision making. The examples below illustrate how both novice and experienced participants used these think-aloud processes with reference to the specific tasks observed on videotape during the interviews to assess, evaluate, and redirect their clinical decision making. Cavan exemplified the novices' use of ROSA within the context of specific therapeutic procedures as she described an ambulation activity:

I guess if I say "Step," I tried to move her hip if she wasn't moving her right leg forward. I kind of started backing off of the cues and just let her think, because I think it distracts her too much—the more you cue her, and then she doesn't always get it. And then she just wants to do her own thing anyway. So I've really backed off on it (verbal cues) unless it's really necessary. (Novice participant—Cavan 2:196–201)

Dara demonstrated how the experienced participants engaged in ROSA to explain treatment activities within the broader context of physical therapy goals:

Because her mobility was so limited and our goals are improving transfers and potentially getting standing a little more functional, she needs tons of repetition to get it. So I think that's why for her I did a lot of repetition and the same sequence of things so she knows what to expect. We may vary one thing, but we don't vary 6 things so that she can anticipate what is going to happen and that way not

be so frightened by 17 new things versus just one new thing that I add each time. (Experienced participant—Dara 2:79–91)

### Reflection-on-Professional Experience

Although both the novice and experienced groups reflected on their prior experiences and professional development, the experienced practitioners discussed this 3 or 4 times more often compared with their novice counterparts. During the semi-structured interviews, all participants engaged in meta-cognitive thinking beyond their reflection on patient/client management issues. The novice participants described their professional growth within the context of their evolving clinical decision-making abilities and hands-on skills. Novice reflections on professional growth are characterized by Kerry's and Galway's statements below:

I think maybe in a sense to have confidence in myself and that I've experienced a lot in the 6 months that I've been here. And I do think that there is a certain point where patients do plateau and . . . unfortunately not everybody is there with cognitive insight into what's what. But you still have to give it your best shot and go with your gut and just do the best you can. (Novice participant—Kerry 3:278–285)

I think that's one of our biggest jobs as physical therapists—to facilitate the patients learning it and figuring out differences in their gait or whatever functional test they're doing rather than giving them the answer every time. And I like to start to do that early on because if you start giving them answers right off the bat, then people are going to become dependent on that. That's my belief. (Novice participant—Galway 1:156–165)

As these 3 novice clinicians reflected on their own clinical practice, they provided a candid self-evaluation of their abilities as autonomous practi-

tioners. Kerry's comment exemplifies these novice views:

I think it's funny because when I first started, I felt like I was still a student because I had only started . . . 3 weeks after I was done with my last internship. And then when my mentor wasn't here any more, it was like, "Oh my gosh. I'm responsible for these patients now." I realize that I have to be responsible for my own learning. I can't just ask people for help all the time. It's more of a give-and-take. (Novice participant—Kerry 2:62–67)

The experienced participants reflected upon how they have evolved as clinicians and developed their clinical philosophy and approach in working with their patients. The experienced participants' reflections on practice included thoughts on their goals for interactions with patients and their philosophy about patient management, as detailed below:

I think that I develop a relationship with them [patients] once I meet them. I think you gain their confidence in you. I think once they're comfortable with you, they feel confident to move in front of you. It's like a friendly relationship. Then we talk about what we're going to do. It's sort of natural, actually. You just jump in there. I guess my main concern is to try to instill confidence in them, their confidence in me and my skills. Then, they'll be willing to take a chance. Once you establish that level of confidence, then no matter what you ask them to do or how you challenge them, they know they're going to be safe with you. (Experienced participant—Dara 1:16–28)

I like to repeat the same thing with the same patient because then I can see progress. The same order, the same exercises. Now some people say you should vary your treatment sessions. And I do agree with that to some extent. But for me to evaluate progress, it's really nice to do the same things. And also to be able

to . . . know when they're going to be safe. (Experienced participant—Mayo 2:434–444)

### Reflection-in-Action

The use of RIA was a discriminator between novice and experienced participants. Although all 3 experienced participants demonstrated RIA, only one novice participant (Galway) demonstrated RIA during the therapist-patient interactions. There were differences in how this novice participant used RIA compared with the experienced participants. Galway used RIA to assess a patient's performance relative to his expectations about the patient's abilities. The excerpt below illustrates Galway's think-aloud analysis of his thoughts during the therapist-patient interaction about the patient's need for an assistive device during ambulation.

Because I am taking the information that I got originally and use that to decide "Okay, I want to use the hemi-walker." Let's start off with that, and (the patient) presents a certain way with that. And I think to myself, "He's doing well. Let's see how he does with his original assistive device and see if there is any difference." And, if you recall, there wasn't much of a difference. (Novice participant—Galway 3:38–43)

The excerpt below from an experienced clinician illustrates similarities with Galway's use of RIA when addressing patient performance and direction of the treatment session:

Ambulation for her, as you saw, is not functional. In a sense, if you just saw that, even when I do it, I'm thinking "What am I doing?" sometimes. But it's motivating to her. So I almost do it as a way to provide some encouragement. (Experienced participant—Dara 1:213–216)

The experienced participants used RIA not only to assess their patient's performance as the novice partici-

pant did but also to assess their own thought processes and actions. These assessments were ongoing throughout the treatment session and effected change in the therapist-patient interaction as necessary. During an interview, Mayo described these thought processes as being very "fluid . . . not something that I was consciously thinking about." (Field note 2IE.) The following excerpts illustrate how RIA was used by experienced participants in ongoing self-assessment of their performance during interactions with patients:

And I just didn't understand why. Why was I not able to get him (the patient) to verbally do it? And show him. What wasn't I doing that would enable him to do the activity that I wanted him to do? There had to be something in the way I was saying it or the way I was showing it that was confusing him. I think that I tried to simplify it, but I'm not sure. I tried some different verbal and tactile commands. (Experienced participant—Mayo 2:123–128)

You know, the first time I see someone like her, maybe I would switch up every session and go "Wow, why am I getting nowhere?" . . . and let me think "If I keep these 7 things the same, will I get more carryover? (Experienced participant—Dara 2:101–104)

There was a point what I felt what I thought was clonus, but I wasn't sure that that was what I felt because I tested it and it was there, and then I tested it again and it wasn't. It was just a weird 2-beat sort of resistance. And then I also felt it on the left. So that might have been my "Huh." I wasn't expecting it, and I certainly wasn't expecting it on both sides. (Experienced participant—Cork 1 and 2:95–100)

### Discussion

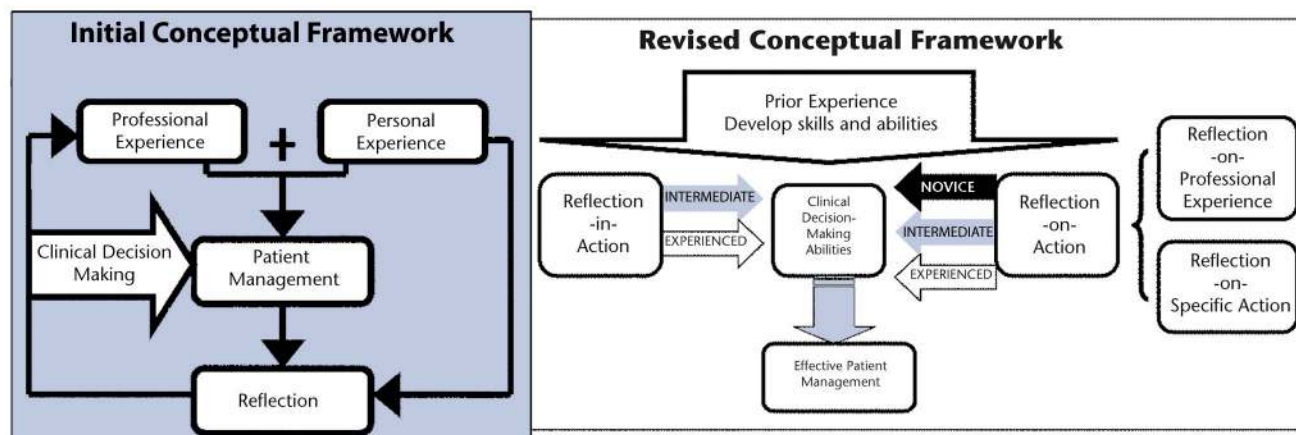
Schön's model of the reflective process<sup>2</sup> was the framework used to study the attributes and behaviors of the participants. Across-case analysis between the novice and experi-

enced groups identified similarities and differences in how these participants used reflection throughout the clinical decision-making process. Novice and experienced participants provided exemplar definitions that described activities that occurred away from the therapist-patient interaction and that affirmed or clarified a course of action. These exemplars were consistent with ROA activity and existing definitions of reflection.<sup>2,15</sup> Furthermore, these definitions were consistent with the attributes of moral imagination<sup>42</sup> and mindfulness<sup>43</sup> that are integral to the reflective process. What did emerge from the data was a differentiation between the types of ROA in which these participants engaged: ROSA and ROPE. Thus, these data support a more discrete delineation of ROA as described in Schön's model.

The factor of ROPE emerged from the remarks made by the participants about their professional development and abilities as clinicians. This factor and the participants' comments are consistent with Resnick and Jensen's definition of "reflection on practice."<sup>29</sup> Again, differences were noted between the novice and experienced groups. The novice participants' reflections were specific to themselves and their performance with patients. In addition to echoing the novice participants' comments, the experienced participants also were reflective about their abilities within the scope of contemporary clinical practice. The experienced participants demonstrated the ability to integrate and use information from multiple sources. The differences between the 2 groups about how they reflect on their professional experience are shaped by the depth and breadth of their prior experiences.

The most notable difference between the 2 groups was the use of RIA during the clinical decision-





**Figure 3.**

Evolution of initial conceptual framework to revised conceptual framework: the use of reflection to inform the clinical decision-making process within the patient/client management model.

making process. The experienced participants' use of RIA to assess their own performance is consistent with the results of a previous study<sup>19</sup> in which experienced pediatric physical therapists used self-monitoring twice as often as the novice therapists studied. Although the frequency of use of RIA by the novice participants in the current study did not equal that of the novice participants in previous study, the observed phenomenon is parallel. Despite the fact that the purposive sampling techniques did not attempt to select physical therapists that were identified as experts, the experienced participants demonstrated some abilities consistent with expert practice.<sup>9,19,25-28</sup> Galway, the only novice participant who engaged in RIA, demonstrated abilities that were more consistent with intermediate practice.<sup>10,30</sup> Galway's use of RIA is likely related to the nature and depth of his professional experience. Galway was employed in a physical therapist practice for 2 years prior to beginning his physical therapy education. He identified positive mentoring experiences and the length of time he spent in these clinical environments as essential to the development of his decision-making and reflective abilities (résumé sort, in-

terview 3). The other novice participants did not have the depth or breadth of such prior experiences. Although this does not indicate that the novice participants are not reflective during treatment sessions, it may indicate that they are not using ongoing, simultaneous reflective activities to evaluate their decision making during the therapist-patient interaction.

The evolution from the initial to the revised conceptual framework is illustrated in Figure 3. Throughout this study, the initial conceptual framework was revised to illustrate the different types of reflection used to inform clinical decision making across the spectrum of prior experience to achieve the outcomes of effective patient management. Although it is beyond the scope of this article to detail the prior experiences of these participants, the role that these experiences have on developing both reflective and clinical decision-making abilities is depicted. These reflective activities inform decision making with the outcome of each participant working toward achieving his or her perceived optimal patient outcomes through effective patient management.

The common thread in the differences between the types of reflection used by the novice and experienced participants is the depth and breadth of experiences in which each participant has had the opportunity to be engaged. At the most basic level, it is necessary to have sufficient time to engage in reflective activities.<sup>44</sup> The novice participants' experiences with mentorship seemed to have provided them with this opportunity. All of the novice participants benefited from mentorship on clinical affiliation or with their employment. These mentoring activities provided them with the opportunity to engage in ROA activities with their mentors. Cavan described her experience with mentoring in the following way:

No, I still need help. I still miss things. That's why I need Meath [Clinical Supervisor] and Monaghan [Clinical Specialist], to bounce ideas off of them . . . and maturing is a big part of it. (Novice participant—Cavan 2:229-231)

Insight into how clinicians use reflection is important because reflection is central the development of clinical decision-making skills consistent with expert practice. It has been recognized that the overemphasis on

knowledge and skill acquisition in curricula occurs at the expense of the development of the abilities and attributes consistent with reflective practice.<sup>45,46</sup> The development of these skills of reflection is necessary to take assessment and decision making in the clinical setting beyond textbook knowledge to patient management that recognizes the values, ethics, and preferences of the participants. Thus, there is a need for the development of attributes consistent with “indeterminate zones of practice,”<sup>10,12</sup> as well as those processes used by expert clinicians.<sup>2,9,28</sup> These data allude to the importance of experience to develop the skills necessary for intermediate and, ultimately, expert practice.

The participants all demonstrated skills consistent with Goodman and Boud.<sup>7</sup> The experienced participants were observed to use all of these skills during their interactions with patients. They applied these skills during think-aloud activities while observing themselves interacting with patients. In contrast, the novice participants are continuing to develop but have not yet mastered these skills. For example, when providing *description* about what they observe in their interactions with a patient, the novice participants often attend to one particular event rather than all of the salient events, or when *evaluating* a clinical problem, their limited experience may result in uncertainty about the judgments they make that affect patient care. The skill that most clearly differentiates the novice from the experienced participants is *self-assessment*. It is only through effective self-assessment that clinicians can effect change in their approach to patient management. The results of this study and earlier studies<sup>16,19,25,28,29</sup> reveal that reflection affects patient outcome.

Steinberg<sup>31</sup> suggested that abilities, such as those necessary for reflection,

can be taught. Furthermore, Atkins and Murphy<sup>3</sup> concluded that these skills and abilities should be taught so that reflection can be used as a learning tool during the education process. The opportunity and responsibility to provide the necessary experiences to develop these attributes lie with academic and clinical faculty involved in professional (entry-level) DPT education.

There are several factors that should be integrated into the education of students and the professional development of novice practitioners. First, curricula should establish *explicit* goals for decision-making processes and the practice of reflection and develop *intentional* instructional and assessment activities to meet these goals. Such instructional activities should incorporate metacognition through think-aloud processes modeled by faculty and put into practice by students.<sup>47</sup> Providing intentional learning opportunities in these skills may assist novice learners in mastering strategies for clinical decision making consistent with the strategies used by experts.

Because reflection requires active participation and commitment from the individual engaged in the activity, time is the second factor necessary for success.<sup>44,48</sup> The need to take time to reflect should be made explicit and modeled for novices. Too often traditional classroom and clinical settings do not afford the time necessary for the consideration of thoughts or feelings in the clinical decision-making process.<sup>45</sup> Allowing students the opportunity to develop these abilities and attributes while expanding their knowledge base may facilitate their effectiveness in patient/client management.

Third, benchmark performance should be assessed relative to established academic or clinical course objectives<sup>49</sup> or curriculum out-

comes. Finally, academic and clinical faculty should engage in their own professional development to prepare to teach these skills and model the appropriate behaviors.<sup>50</sup>

This study has provided a deeper understanding of how novice and experienced physical therapists use reflection to inform the clinical decision-making process. Although the research design afforded the opportunity to observe each participant with one patient over 2 physical therapy sessions, doing so may have narrowed the breadth of the participants' perspectives on clinical decision making, as the interviews were grounded in the participants' observations and think-aloud processes specific to the videotaped session. Observation and data collection in one type of clinical setting increased the likelihood of similar clinical experiences among the participants, but may have limited the extent to which these results may be applied to clinicians in other clinical settings. These limitations are not of a nature that prevent using the results of this study to lay the groundwork for further study of the use of reflection as it informs the clinical decision-making process.

Consistent with qualitative research methods, purposive sampling criteria for type and length of experience within this clinical setting were applied to recruit these 3 pairs of clinicians. Although in-depth study of their clinical practice revealed consistent themes between the experienced and novice groups, the generalizability of these results for clinicians of similar experience levels in other clinical settings must be determined by the reader.

Insight into the differences in abilities and the varied depth and breadth of experiences between the novice and experienced groups provides a framework to develop learn-

ing experiences and opportunities for students and novice clinicians. This research provides information to educators, novice clinicians, and the clinicians who mentor these novices that may facilitate the development of mature clinical decision-making abilities.

All authors provided concept/idea/research design. Dr Wainwright, Dr Harman, and Dr Stephens provided writing. Dr Wainwright provided data collection and project management. Dr Wainwright and Dr Shepard provided data analysis. Dr Shepard, Dr Harman, and Dr Stephens provided consultation (including review of manuscript before submission).

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## Appendix 1.

### Data Collection: Process and Sources

Data Source	Description
Observation	The researcher observed and videotaped 2 interactions (one evaluation and one treatment session) between each physical therapist participant and one patient who had a diagnosis of cerebrovascular accident.
Interviews	Three semi-structured interviews were completed with each participant. Interviews were audiotaped and transcribed. Videotapes of the 2 physical therapy sessions were used during separate semi-structured interviews (Appendix 2) that occurred within 1 to 2 weeks from the observed session to gain insight into the patient-therapist interaction with respect to reflection and clinical reasoning from the participant's perspective. In the third interview, participants were asked about their thoughts and use of clinical decision making and reflection and completed a résumé sort (Appendix 3).
Artifacts	Résumé: Each participant's résumé was used to structure a résumé sort. The purpose of the résumé sort was to understand how prior experience shaped each participant's abilities. The résumé sort required the participant to categorize his or her personal and professional experiences as they related to the development of clinical decision making.
	Medical Record: The medical record was used to explore each participant's clinical decision making through his or her documentation.
Demographic Data Form	Each participant completed a questionnaire outlining his or her age, sex, years of experience as a physical therapist, employment at other clinical sites, professional (entry-level) degree, and participation in pursuit of post-entry-level credentialing.
Field Notes	During each treatment session, the researcher made field notes specific to observations and personal notes <sup>35,39</sup> about the clinical environment and the interaction between the therapist and the patient. The value of these observations lies in the researcher's ability to note occurrences, activities, or environmental artifacts or contexts. <sup>36</sup>
Reflective Memos	Throughout the data collection process, the researcher recorded insights gained through observation of and interaction with the participants.



**Appendix 2.**

Semi-Structured Interview Question Guide: Think-Aloud Videotape Analysis Interviews

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These 2 interviews were conducted within 1 week of each videotaped session. The questions were presented in a nonscheduled, nonstandardized format.

Introduction: I have selected several portions of the videotape for you to review. I would like you to share your thoughts about what you were thinking while treating this patient. Do you have any questions?

1. What are you doing in this portion of the videotape?  
For what purpose are you doing this?  
What about this patient indicated that this would be an effective intervention?  
How did you come to know to try this? Where/from whom did you learn this?
2. I would like to move on to another segment. (This will occur numerous times throughout the interview.) Repeat questions above.
3. How does what is happening in this segment compare with what happened in the previous segment?
4. When do you opt to \_\_\_\_\_ as compared with \_\_\_\_\_?
5. Is this evaluation/treatment session indicative of a “typical” evaluation/treatment session?
6. How would you describe your clinical reasoning processes? That is, can you tell me step by step how you \_\_\_\_\_? How have these thought processes evolved?
7. If this is not a typical session, what was different about this treatment session?
8. Is there anything else you want to tell me about the treatment sessions and how you make clinical decisions?

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## Use of Reflection in Clinical Decision Making

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### Appendix 3.

Semi-Structured Interview Question Guide: Role of Prior Experience on Development of Clinical Decision-Making and Reflection Processes Interview

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Introduction: The purpose of this interview will be to gain insight into your thoughts about how your personal and professional experiences have shaped your clinical decision-making processes.

1. Tell me what you think clinical reasoning is.
2. What do you think *reflection* is?
3. How is clinical reasoning tied to reflection?

Résumé Sort Instructions: You have provided me with a copy of your résumé. I have placed each item on your résumé on a separate card. I would like you to place each card on 1 of 3 piles:

- Those experiences that have been *most important* in developing your clinical decision-making abilities.
- Those experiences that have been *somewhat important* in developing your clinical decision-making abilities.
- Those experiences that have *not been important* in developing your clinical decision-making abilities.

Résumé Sort Questions:

4. You have identified  X  experiences as being most important in developing your clinical decision-making abilities.
  - a. How were your clinical decision-making abilities developed during  X  experience?  Y  experience? Etc . . .
  - b. What similarities were there between these experiences that you identified as most important? What differences?
5. You have identified  X  experiences as being somewhat important in developing your clinical decision-making abilities.
  - a. How were your clinical decision-making abilities developed during  X  experience?  Y  experience? Etc . . .
6. You have identified  X  experiences as not being very important in developing your clinical decision-making abilities.
  - a. How were your clinical decision-making abilities developed during  X  experience?  Y  experience? Etc . . .

Exemplar Questions: I would like to you answer the following question.

7. Tell me about an instance when you used reflection to assess your clinical decision making through patient management.

Closing Questions:

8. What would you tell a coworker who was thinking of taking this job with the goal of improving clinical decision-making and reflection skills?
9. Is there anything else you want to tell me about your use of clinical decision-making skills and reflection in patient management?