The Influence of Functional Constraints on Sport-Skill Learning in a Senior Adult

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A large volume of research has focused on the benefits of appropriate health-related fitness activities for older adults (Spirduso, 1994). Although lifetime participation in sports is a common alternative to fitness activities, few studies have examined the subjective, personal experience underlying initial sport-skill development. The purpose of this study was to illustrate how dynamical-systems theory is a useful lens through which to examine the evolution of golf skill in 1 senior adult participant. Qualitative data collected over 7 months focused on a personal diary, formal and informal interviews, videotape analyses, and observational field notes. The development of golf skill was bounded by a series of functional constraints, as well as limiting factors connected to the task and the environment. The results illustrate the theoretical proposition (Newell, 1986) that skill learning arises from and is structured by a system of interacting constraints.

Key Words: qualitative research, motor performance, motor learning

The largest volume of literature on activity and aging associates the term physical activity with health-related fitness and exercise participation patterns (e.g., Shephard, 1995). To a lesser extent, research on physical activity and aging has examined skill-related fitness attributes such as reaction time (Seidler & Stelmach, 1995), power (Bassey, 1999), and balance (Shumway-Cook, Gruber, Baldwin, & Liao, 1997). In contrast to these studies, research on sport participation is relatively undeveloped (Housner & French, 1994; cf. Langley & Knight, 1996). In particular, recommendations (Anshel, 1989) for sport-skill instruction in older adults might be premature because of the lack of empirical studies on how older adults experience the learning process.

Research on motor-skill learning in adult populations has generally used a paradigm involving multiple group comparisons and a quantitative methodology (Christina, 1997; Schmidt & Lee, 1999). Although this approach has been highly informative in directing the field over the last century, few studies have specifically addressed the evolution of learning from the perspective of the participant (Langley, 1995). Rovegno (1995) emphasized the value of developing a knowledge base situated within this insider, or "-emic," viewpoint:

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Many of us have turned to more subjective, holistic... perspectives of knowledge to guide our research on... teaching, motor control, learning, and development. The results have given us not only alternative ways... about coming to know as researchers but also a deeper and richer understanding of physical education and physical activity. (p. 301)

Examining participant perspectives is congruent with the inherent individual nature of skill learning and requires detailed insight into the meanings, purposes, and methods that support the learning process (Griffey, 1991; Langley, 1995). Older adults are unique candidates for study because of two characteristics that accompany the aging process: the likelihood of reduced joint mobility and a relatively short time span for developing skill across the remaining years of participation. These two characteristics pose particular concerns, because optimal skill development requires both the freedom to move the limbs in relation to the demands of the task (Newell, 1986) and opportunities to engage in practice over an extended time span (Schmidt & Lee, 1999).

The purpose of this study was to illustrate how dynamical-systems theory is a useful lens to understand the evolution of golf skill in 1 senior adult participant. Specifically, the study outlines how functional constraints interact with the task and the environment to channel the evolution of his golf skill. The study describes the first 7 months of a longitudinal (5-year) case study aimed at exploring the age-related obstacles this participant encountered in learning how to golf and his capability to overcome those obstacles.

**Conceptual Framework**

This study represents an example of how qualitative research can use theory to generate interpretations of the data. The study was originally conceived to examine how skill learning evolved for a senior-age, beginning-level performer. Consistent with the inductive mode of qualitative research (Creswell, 1994), no explicit theory was advanced before data collection. My preference was to allow the simultaneous interplay of data collection and analysis to guide the conceptualization of the participant’s experience. Early in the study, analysis of the data indicated that the participant’s physical ailments were highly influential in directing the course of his practice routines. These ailments could be conceived as limitations, or constraints (Newell, 1986), and opened possibilities for understanding the participant’s evolving experience in terms of dynamical-systems theory (Kugler, Kelso, & Turvey, 1980).

The roots of the dynamical-systems approach lie at the intersection of physical biology and ecological psychology (Turvey, 1990), in particular the writings of Bernstein (1967) and Gibson (1979). Although a full introduction to this perspective is beyond the scope of this article, one essential concept—constraints—is central to the focus of this study. The term *constraints* refers to a system of boundaries or limitations associated with motor performance that require accommodation in order for skilled movement to occur (Kugler et al., 1980; Newell, 1986). Constraints have been categorized as those arising from the individual, the task, and the environment. In essence, movement outcomes are shaped by a system of
interacting constraints that are individual specific and context bound (Newell; Newell & McDonald, 1992).

Newell (1986) viewed the concept of constraints in reference to optimal patterns of motor coordination and control. I adopted Clark’s (1995) broader interpretation of constraints in the following way. First, individual constraints refer to a myriad of properties residing in the organism. These properties include functional factors (health-related fitness, chronic and temporary injuries), structural factors (height, weight, length of limbs), and the cognitive, psychological, and emotional attributes (decision making, motivation, expectations) that limit performance outcomes. Second, task constraints involve factors associated with task requirements, such as implements used to perform the skill, practice activities that shape the quality and quantity of performance, and various rules of the sport that specify how the task can be accomplished. Finally, environmental constraints involve both the physical environment (outdoor temperature, playing conditions) and resources in the sociocultural environment (e.g., practice partners) that provide the scaffolding for skill learning.

The major premise of this article is that individual, functional constraints took precedence in the way this senior participant designed his practice approach and developed skill as a golfer. The ongoing influence of functional constraints involved both immediate and long-term adaptations that were expressed in practice sessions and actual course play. In this sense, the process of learning how to golf for this participant was fundamentally connected to the way he adapted to these constraints.

Method

PARTICIPANT

Data were collected from 1 senior male participant (Jim—a pseudonym that is used throughout this report) who provided informed consent for the study. Jim was 60 years old at the beginning of data collection and served as an administrator in an academic unit at a comprehensive university in the Midwest. The primary reasons for procuring this participant involve his senior status, novice-level capabilities as a golfer, and commitment to learn how to golf over a lengthy time period. Jim’s recruitment is an example of purposive sampling, wherein the researcher identifies a critical case (participant) whose unique background experiences have the potential to challenge or extend theory on an issue (Yin, 1989).

DATA COLLECTION

Five broad forms of data over a 7-month period (September 15 to April 30) provided in-depth understanding of Jim’s ongoing experience and are described next.

DOCUMENTS

Participant Diary. A major source of insight into Jim’s progress as a golfer was a diary used for all practice sessions. The date, location, context of practice, activities, and “take home message” about learning the golf swing were chronicled. Information from the diary was sent via e-mail to me after practice and was used as
a catalyst for subsequent formal and informal interviews. Nineteen diary entries were obtained, and nearly all involved Jim’s practice at a driving range or on a golf course.

**Field Notes.** Observational field notes included documentation of statements made during Jim’s fall practice sessions in an audited university golf class and during the videotaping process. In addition, field notes were taken during one round of golf played at a local par-3 course during a university class session.

**INTERVIEWS**

**Formal Interviews.** Three audiotaped formal interviews were conducted over the data-collection period, each lasting 60–75 min. Each semistructured interview had an interview guide to focus the discussion. The open-ended format allowed me to explore related avenues based on the issue under discussion. All interviews were transcribed verbatim.

The first and third interviews involved a videotape analysis of Jim’s golf swing at two distinct points in time. The two interviews were separated by nearly 7 months and focused on changes in Jim’s swing mechanics. In the first interview, Jim viewed videotape of a professional golfer (Jack Nicklaus) and subsequently compared that swing with his own. Interview questions compared the stance, backswing, downswing, contact, and finish positions of both swings. The third interview compared the mechanics of Jim’s swing from his first videotape with a current videotape. Changes in the swing were noted, and reasons for these changes were explored in depth.

The focus of the middle (second) interview was derived from the data collected in the first interview, field notes, and Jim’s diary. These data forms indicated that a series of physical ailments had influenced Jim’s practice on the range and his course play. Therefore, the second interview examined chronic and temporary disabilities, methods of managing the pain, swing adaptations, and the overall effect of these constraints on course play and practice sessions.

**Informal Interviews.** Four informal interviews were conducted based on Jim’s practice schedule. These brief interviews (<10 min in length) involved clarifying and elaborating statements made by Jim and his instructor during instructional sessions in the fall. Documentation of the interviews consisted of field notes placed in a notebook based on the conversations held.

**Instructor Interviews.** Three informal interviews and one formal interview were held with the university faculty member who taught the 8-week (two meetings/week) class Jim audited during the fall. The interviews focused on Jim’s strengths and limitations as a golfer and the teacher-learner relationship that had been established during class sessions.

**Data Reduction and Analysis**

Coding procedures for all written documents were based on recommendations from Strauss and Corbin (1998), who suggest a detailed form of analysis in the early phases of an investigation to discover categories and uncover relationships between categories. First, the participant diary underwent a line-by-line microanalysis
whereby the perceived meaning of each sentence was examined. Incidents, events, or ideas in each entry were labeled as concepts and sorted into 10 categories broadly connected to performance errors. Categories were compared for similarities and differences to increase their clarity and distinctiveness. The primary focus of this analysis was to understand the essence of Jim's perspective after a practice session on the course or the range.

Second, the three formal interviews also underwent a content analysis similar to that conducted on the participant diary. The first and third interviews yielded concepts centered on Jim’s self-assessment or a comparative assessment of his capabilities. Analysis of the second interview centered on identifying the temporary and chronic physical conditions affecting Jim’s golf skills. After the coding of key concepts, nearly all of the categories that emerged from this interview could be associated with constraints arising from individual, task, or environmental sources. This connection is not surprising, because the generation of questions for this interview was focused on uncovering the limitations that influenced the development of Jim’s golf skills.

Data trustworthiness was established through three methods as outlined by Guba and Lincoln (1988). First, credibility was enhanced through long-term, persistent observation of Jim’s performance over a 7-month period. Second, the data were triangulated to examine consistency in interpretations and conclusions. Statements made from one source were checked for accuracy against other sources that dealt with the same topic or issue. Third, a member check occurred, in which Jim was asked to read the account and comment on the accuracy of the interpretation provided. After minor changes were made for textual clarity, Jim agreed that the account was an accurate representation of his current perspective on learning how to golf.

Findings

Guided by the theoretical framework and the evolving temporal nature of skill learning, data sources were combined to provide a chronological account of Jim’s golf experience. The results are described in the next four sections: (a) Jim’s entry into golf; (b) individual constraints influencing his performance; (c) the interaction between individual, task, and environmental constraints during initial practice; and (d) the interaction between these constraints during current practice.

ENTRY INTO GOLF

Near the end of summer, Jim accompanied his son-in-law, an accomplished golfer, to a local driving range and was encouraged to “try a few swings.” Jim had been searching for a less strenuous leisure activity to enjoy with his wife during his upcoming retirement. His initial success in hitting several balls encouraged him to audit a fall university golf class to learn the fundamentals of the swing. Jim’s instructor immediately noticed personal qualities that set him apart from the college students enrolled in the course—a strong task focus, enthusiasm, attentiveness, and “a more laid-back attitude than the others. Bad shots don’t seem to faze him as much.”
The 8-week class met twice per week, and Jim’s busy administrative schedule did not allow him to take full advantage of the instruction offered. Even on the days he was able to attend, Jim preferred to solve swing-related problems with minimal influence from the instructor. The importance of good mechanics, however, took a back seat to results. As he indicated, “I’ve seen some elderly people out there who look rather funny when they’re golfing, but they seem to get it where they want to. I’m more concerned with getting good than looking good.”

Jim’s long-term commitment to learn how to golf was a two-edged sword. On one hand, he could focus exclusively on taking small, measured steps during each golf season, working on one part of his game until he was satisfied. On the other hand, time was running out on the number of years he could actively participate, particularly because a set of chronic injuries and ailments often curtailed his practice schedule. These functional and other constraints are described next, followed by their influence on his skill development.

INDIVIDUAL CONSTRAINTS

Chronic and Temporary Physical Conditions. Although Jim’s outward appearance was healthy, a number of conditions were present that required accommodation to learn the golf swing. First, pain and soreness associated with arthritis in the two middle fingers of his right hand, his right elbow, and both shoulders were the most influential conditions affecting his swing. Jim’s finger pain was “constant. . . . Any time I hit the ball, they hurt. . . . for 2 or 3 days.” Stiffness and pain were also noticed in the elbow, particularly on cold days, and stiffness in his shoulder considerably reduced his joint mobility.

Hip and back problems had also plagued Jim for many years. Tenderness in his hips had bothered him over the last 10–15 years and was occasionally aggravated by his regular walking program. A neck injury had persisted since his mid-20s as the result of a diving accident and a work-related incident. Although back pain below the shoulder blades “comes and goes,” it had the strongest influence on his daily life and eventually resulted in his purchasing a chair to better support his back and head at work. Finally, an injury to Jim’s left foot had temporarily caused him to lay off his walking program for almost 4 weeks.

Jim believed he had a high pain threshold and took only nonaspirin to relieve discomfort or occasionally used a hot pad for his back pain. His overall pain-management strategy, however, was elementary—“Just grin and bear it and let it go.”

Structural Conditions. A number of the chronic physical conditions described began in Jim’s high school years as a sport participant. As a 125-lb running back, “I was just too small to play football, and I paid the price.” Although Jim currently had a medium build (5’10’’, 180 lb), his lowered strength levels and lack of flexibility because of the arthritic conditions directly contributed to his difficulties in generating power when swinging a golf club.

Motivation and Expectations. Jim’s enthusiasm for playing and diligence in practice provided a foundation for improving his skills. On the days he attended class, Jim would come early and stay late, hitting balls at a rapid, staccato pace that was characteristic of his personality. As he said, “Anyone that knows me knows I’m hyper. Everything I do is fast. . . . I have a lot of nervous energy.” Jim’s pace had
a practical consequence, as well—he could attempt a much higher number of practice shots than the other students enrolled in the course.

Continued early success was a key component for developing his commitment as a golfer. Within the first 4 weeks, Jim’s class was required to play on a 2,600-yd “executive” course where most holes were 80–140 yd long. Paired with two other beginners and one experienced golfer, Jim scored 5 over par for the eight holes he played—an excellent start for a beginner. Jim played an “old man” style of golf typical of many seniors. Balls were hit short and straight, and he relied on chipping and putting to score well. His compact but jerky swing was not pretty, but it was effective, and he easily outplayed the more experienced golfer who had classic swing mechanics but inconsistent outcomes. Despite this promising start, Jim had mis-hit enough balls in practice to appreciate the complexity of becoming skilled at golf. As he stated, “All I’m trying to do is get a decent game… I’m never going to be a 7 or 8 handicap… although I may surprise myself. But if I can just hit consistently straight, I think that’s what I need.”

INFLUENCE OF CONSTRAINTS ON INITIAL PRACTICE

Some of Jim’s functional constraints became evident during the swing motion, whereas others were observable when activity ceased. First, the early neck injury and sitting at a desk for years had resulted in a “humped back” posture during the address position, rather than a straight back. Coupled with an overly wide base and bent knees, strain on the back and neck was thereby reduced or eliminated. He held his arms in a slightly bent position because of his posture, and minor changes in all these joints across a practice session resulted in an inconsistent starting point to begin the swing motion.

Next, Jim’s arthritic conditions in his shoulders and elbow strongly influenced his backswing, forward swing, and finish. His abbreviated backswing was a necessary adaptation:

Because at some point, I just run out of mobility…. What I don’t know is how high I can go…. And the problem is, since it hurts, then I start bending things differently. And so the arthritic condition may affect my swing.

To develop distance, Jim attempted to swing faster, but faster swinging resulted in too much acceleration of the club head over the short forward swing. Viewing the first videotape was an eye-opener for him:

The tape shows that I’m not aware of what I am actually doing…. Two things…. surprise me. I felt I was going much higher when I started the swing…. and I was really surprised…. how jerky I looked. I was coming through much faster than I felt like I was.

By the end of his shortened stroke, Jim was left standing upright, with little follow-through or hip rotation. His foot problem contributed to an inability to shift his weight properly during and after contact—another factor that reduced distance on his shots. As he observed, “When I watch films of the good golfers,…. they sort of lean into the hit and roll their feet a little bit. I can’t roll my left foot.”
Jim employed various accommodations to generate the force that was missing from the shortened backswing. His instructor noted Jim's tendency to bend his wrists improperly at the top of the backswing and to straighten his legs quickly on the forward swing. Although these joint movements before contact produce rapid acceleration of the club head, none would be considered appropriate for eventual adoption in a mature golf swing.

Task constraints were observable in his choice of clubs for course play. A 6 iron was the longest iron he felt comfortable using yet was referred to as "my nemesis" because of the mis-hits that resulted from attempting to hit it too far. Physical and psychological tension were present whenever Jim needed to hit a longer club such as a wood. He had an initial misconception that "When you hit long, you have to really tense up." The driver had been an early casualty in his choice of clubs; instead, he relied on a 3 wood for teeing off. Yet the physical length of the shaft and the psychological belief that long hits required more body tension combined to cause severe problems with this club:

Going into the last practice I was terrified of it, because I knew I couldn't do it. . . . I am so tense when I try to hit with a wood, I can hardly bend. . . . That is just sort of like walking into a den of rattlesnakes.

Finally, the influence of environmental constraints could be noted in his selection of courses that could accommodate his lack of shoulder mobility and his overall current capabilities. The wide-open environment of the executive course suited him because "That's a short one and that's a good one to start on. I really don't want to go anywhere that has sand traps or water hazards." On this course, Jim only needed three clubs, and the emphasis on putting and chipping not only provided additional practice but also helped build his confidence as a player.

All of Jim's physical ailments contributed to many inconsistent performances on both the golf course and the driving range. Although his first round on the par-57 executive course had been exceptional, later rounds were marked by scores in the 80–90 range. Clean, well-hit shots were not uncommon but might be preceded by a topped ball or a severe slice to the right on a tee shot. On the range, Jim's 3 wood could carry 120–150 yd on occasion, straight as an arrow; alternatively, some balls nearly hit the ceiling of the hitting cage because the contact point was too far underneath the ball. Cognizant of his faults, Jim admitted, "I'm going to have to work within the realities of my body . . . I just need to learn to play within . . . my limitations." A few successful contacts, however, had the power to convince him of his potential as a golfer:

When I hit a really good one . . . that's what I'm working towards. Now whether I will ever be good enough that I can do it on a course, I don't know. I can do it on the practice tee because I can get four or five or six swings in a row.

Jim's strong motivation for improving his skills was evident in the goals he established for the upcoming spring and summer. One goal was to work through all his clubs on a regular basis at a driving range that was heated in the winter months,
although work and family commitments were likely to influence his practice schedule. Tension in his swing was considered a major problem that needed to be resolved in the forthcoming months. As he indicated, "I just want to work on relaxing and quit worrying about distance... I'm really not disappointed with where I am. I'm doing much more than I thought I'd be able to do."

**INFLUENCE OF CONSTRAINTS ON CURRENT PRACTICE**

Because of weather conditions, the time period between December 1 and February 15 resulted in only two opportunities to practice on either a course or a driving range. Despite Jim's passion for learning the game, daily or even weekly practice was not a practical option. A busy work schedule and the vicissitudes of winter and early spring weather combined to limit his playing opportunities. Still, Jim's overall goals had not wavered, and he eagerly looked forward to spring and summer weather, when he could work on his game.

Functional constraints induced by his many physical ailments continued to exert a powerful influence on Jim's development as a golfer. His right elbow began to hurt "much more than normal" after a practice session on the range in mid-April. The pain intensified to the extent that a practice session had to be cut short because he could not raise his right arm for the backswing. For the next few days, normal tasks such as opening a door or shifting gears in his car were painful. Worried that a long-term, persistent injury had occurred, Jim was dispirited:

> I just hope that I do not lose this whole summer. At my age I really think that the psychological aspects of such injuries is worse than it is with younger people because I am aware that I do not have the years left to waste.

Within a week, however, the pain had subsided, and cautious hitting on the range did not appear to aggravate his injury. Jim was back in full force and soon resumed his schedule of playing on the golf course with his wife.

A swing change for his persistent back problem had its origins in a tip offered by an older professional teacher on the Golf Channel:

> There was a man on there who... was saying everybody thinks they have to be a Tiger Woods—bend and twist their back. And he said it's not necessary... He [said to] keep the club as vertical to the ground as possible and broaden [your] stance.... And that has helped me a lot.

Another change in Jim's swing mechanics involved using his hips during the swing. Jim had kept his hips stationary because he missed the ball too much, and hip rotation "puts more pressure on my shoulders"—a definite liability because of his arthritis. Yet he was now willing to explore a swing that might involve some hip movement, saying "I still would like to see what happens if I torque the body [to] come around and hit the ball. I just have to believe that gives you a little bit extra distance."

Unexpected changes in his physical status, however, made it difficult to develop a stable, consistent swing pattern. Jim summarized this continuing dilemma succinctly: "The major problem that I face is that I develop golf swings that work
when I am having pain, and then when I am not having pain, I continue to use the adjusted swing."

Jim’s functional status influenced a number of task-related constraints, as well. He had recently purchased a new 3 wood and was considering graphite shafts for his clubs for the future because of their lighter weight and lower vibration. He had also begun to bring more clubs to the executive course than he had in the fall. He was using the 3 and 5 woods on a regular basis on par-4 holes, although the results were mixed. Based on his continued inconsistencies with the woods, Jim considered using a 5 iron or a 7 wood to reduce his need to hit the 3 wood. The 8 iron remained his favorite club because he was able to swing at a comfortable pace and still get the ball to travel an acceptable distance and trajectory.

Jim had also become aware of more appropriate practice methods on the range. "When I go out to hit," he suggested, "I have in mind something I want to do,... I don’t just hit for distance. I always try to hit an object or go over an object." Like many players, Jim had been used to hitting many shots with one club before practicing with another. Because his course play often involved hitting a single club once or twice before a different club was needed, Jim suggested a practice method to fit this playing sequence:

A more realistic approach for me would be to try to go through my set the way I might do it out on a golf course,... I probably should always start off with a 3 wood,... hit [another] 3 and maybe an 8 iron a few times. Then start hitting with [a pitching wedge], then go back to that routine.

Finally, there continued to be a connection between Jim’s physical constraints and various environmental factors. First, Jim’s course options were tied to both his inability to generate acceptable distance on his longer clubs and his current capabilities. As he suggested, "Right now I still have to concentrate on the shorter courses, because I just have no distance." He also believed that playing on more difficult courses was predicated on consistently attaining better scores (the upper 70s) on the par-70 executive course.

Second, Jim continued to bring his wife to the course as both a fellow player and a companion. Nearly every diary entry mentioned his enjoyment at "just being out there," regardless of the results. As he suggested, "I probably would not have as much fun if I played with people who were good golfers. That would make me too competitive." Although Jim’s pace of play was still rapid, it was counterbalanced by the number of shots that went awry or from his occasional strategy of playing two different balls on a hole. Consequently, Jim and his wife often played the course when it was least crowded to avoid having better players bunch up behind them during their round.

**VIDEOTAPE ANALYSIS OF SWING MECHANICS**

A second videotaping occurred at the end of April (over 6 months after the first taping) and provided a clear marker for Jim’s progress on his swing mechanics. As he examined his initial swing pattern, he laughingly admitted that it had “no future”:

I looked very awkward,... And I see a lot of this when I... play golf,... You can tell the beginners from the experienced ones. The beginners typically
have a shorter swing and they really look wooden. And that's what I want to get away from. I think I am getting away from it.

Although he had not practiced as much as he wanted, Jim's current swing was markedly different than his previous swing:

I've got a much fuller swing now [although] it's not where I want it to be.... It still looks to me like I'm rushing my swing too much. But that's a vast improvement. Two or three weeks ago I was still swinging like I was last year.

The longer swing was the direct result of a bent left elbow at the top of his backswing, and some increases in distance had resulted. He believed that keeping a straight left arm, based on observing Jack Nicklaus's swing, had been "overinterpreted.... And now I'm just not worrying about that anymore." Despite the value of a longer swing, Jim continued to be concerned with controlling the accuracy of his strokes. In fact, he suggested that direction "has more meaning than distance right now. I think having distance is sort of worthless if you don't know where the ball is going to land. And so I really don't have the deep need to start hitting long."

INSIGHTS INTO IMPROVEMENT

Continual practice resulted in new insights into his progress as a golfer. First, developing a routine to use before each swing was considered a key ingredient for improvement. Having watched a segment on the Golf Channel that dealt with the preshot swing routine, Jim had the following insight:

I need to sight down the line.... lay the club down and face it the way I want it to,.... make sure I've got my feet where I want to. I need to do those things so I know it's right. That will be my routine,... and it [will] slow me down.

Next, practice swings became a common method to tune his swing before hitting a ball:

I think it makes all the difference in the world. Because if I just step up there and swing with the wood I'm going to get a really bad one. If I do a practice swing or two I can see where the club is going by the ball, and then I know how to adjust it.

Although he had taken important new steps in learning the golf swing, Jim was not immune to setbacks in his development. Following a "disastrous" day on a local golf course, Jim concluded his diary entry with the statement "I can see how this game could depress a person who was really serious about it." Yet his analysis of that experience over a month later indicated his progress as a "self-directed" golfer:

I couldn't figure what I was doing wrong,... and I was really, really depressed.... I laid off a week or two. And then I went back out,... and I just tried to slow everything down. I think once I started doing that, things got better.... I think I'm beginning to get an idea on [how] to analyze what I do.
NEXT STEPS

Jim’s analytical capabilities provided him with clear insight into his next steps to progress as a golfer. He believed he needed to pay attention to keeping his back straight, having consistent rhythm, swinging on the proper plane, and shifting his weight. Confidence in his ability to analyze his swing and knowledge of how to practice efficiently led him to believe that the best was yet to come:

If I make as much progress over the next 3 years as I have over the last year, I’m going to be ecstatic. . . . When I started last year, I had no idea that I’d be where I am now. I didn’t think I would improve that fast. . . . I think I’m making a lot of progress.

FUTURE GOALS

Jim outlined a comprehensive set of immediate goals for the upcoming summer months. His goals were to slow down his swing, work on the longer irons and woods, learn to hit off the fairway rather than from tees, work more on chipping and putting, and “try to diagnose what I am doing wrong when I am having a bad hitting day rather than just continuing to hit the ball and hoping that something good happens.” Retirement was approaching, and he saw himself playing a lot of golf with his wife and friends in the upcoming years, barring any serious injuries:

My timetable is that in 3 years, I want to be able to golf well enough that I can go out with my friends in addition to my wife and not be too embarrassed. I don’t necessarily have to win. I just want to be able to go golf with them.

Discussion

Jim’s data suggest that powerful individual constraints involving his physical ailments were a driving force that directed his progress as a golfer. For example, Jim’s inability to generate distance was a continuing dilemma over the 7-month period. Physical ailments associated with producing distance were unlikely to be eliminated over time; on the contrary, the aging process was likely to exacerbate these conditions. The pain and soreness from arthritis and other injuries not only influenced his immediate swing pattern but were present for days afterward. Temporary swing adjustments were often necessary, and the lingering effects of these adjustments detracted from developing a stable, consistent swing pattern on the golf course. Practice time on the range was also a direct result of the status of his injuries. It is reasonable to assume that over months or years, the cumulative effect of lost practice time as a result of recovery from injuries could well have a bearing on his development as a golfer.

Task constraints that limited Jim’s development were also evident in his club selection and equipment. He occasionally avoided the woods and long irons altogether or was anxious enough about their use that inconsistencies were a trademark on both the course and practice range. Jim often selected his favorite club, the 8 iron, for use on the course, even though its distance was a limiting factor. Although he was investigating some adaptations in equipment to reduce the
potential for injuries, Jim had not yet developed a sophisticated knowledge base to explore the effect of larger and lighter club heads, longer shafts, and larger grip sizes on both skill development and reduction of arthritic pain.

Finally, environmental constraints represent a third important influence on Jim’s development as a player. His selection of golf courses was limited to one or two short courses that had few playing hazards to accommodate his growing skills. Jim also preferred the company of his wife and, eventually, friends who were close to him in ability rather than seeking out challenging courses or highly skilled players from whom he might learn shot-making or tactical skills. Practice on the range was often conducted in isolation, and he was keen on solving his own swing problems without much outside influence, although media such as television could occasionally serve as an instructional aid.

Jim’s swing pattern and his eventual progress as a golfer were predicated on his capability to manage the interactions between individual, task, and environmental constraints. These interactions should not be viewed as reciprocal or equal in their influence; the individual constraints of Jim’s physical ailments have been portrayed as an overriding effect on his development. Nonetheless, Jim’s management of the interaction between these three constraints is a proper way to describe his progress as a golfer. For example, his functional limitations set boundaries on the type of golf course he played and the clubs he brought to that course. Cold weather provoked more stiffness in his joints, limiting his swing length and making low scores on the course more problematic when he needed to use the woods. Jim’s early need to use a tee on his second or third shots on the fairway reflected his lack of confidence in hitting from a grassy lie and an opportunity to generate more distance—the concomitant effect being a potential lowering of his golf score.

Following the lead of other researchers (Bernstein, 1967; Fowler & Turvey, 1978), Newell and McDonald (1992) viewed skill learning as a process of searching for the optimal solution to a motor task. From this perspective, the ongoing search process must take into account the prevailing individual, task, and environmental constraints. Practice is considered “a form of exploratory behavior, a continually evolving search for task solutions” (p. 55). The solutions required to be successful at golf do not demand a precise specification of the motor pattern needed to achieve a goal. Although certain swing mechanics increase the likelihood of improving motor efficiency, consistently hitting the ball down the fairway toward the green is an obvious litmus test for being skillful as a golfer.

Jim was in the process of discovering which swing mechanics would achieve his goals more consistently than others. Over the 7-month period, changes in his capabilities reflect differing accommodation to the three constraints. For example, playing on new courses was predicated on being able to meet the demands for generating acceptable distance; he was attempting longer swing lengths, but they involved dubious adaptations (bent lead elbow); and he was considering new graphite shafts to reduce the vibration of stiffer steel shafts and their effect on his arthritis. Elements of Jim’s current form—a short overall stroke, rapid club acceleration—are consistent with the form used by legions of senior recreational golfers. Viewed through the present theoretical lens, the swing mechanics of senior golfers can be considered an emergent property grounded in the prevailing constraints that operate in the golf setting.
Limits in Qualitative Studies

Qualitative researchers recognize that there is always another story that could be told about the lives of their participants (Wolcott, 1995). Although Jim affirmed the accuracy of my interpretation of his experiences, one portrayal of this experience does not obviate the need to explore alternative theoretical renderings of his development. Both researchers and readers must acknowledge the difficulties and limitations of portraying events from the perspective of the participant. The relationship between experience and the participant’s expression of that activity is always problematic (Bruner, 1986); framing the experience from the researcher’s perspective necessarily adds another layer of interpretation. Yet qualitative researchers must confront the task of social inquiry within the practicalities suggested by their craft, as Geertz (1973) eloquently reminds us:

Cultural analysis is intrinsically incomplete. And, worse than that, the more deeply it goes, the less complete it is. It is a strange science whose most telling assertions are its most tremulously based, in which to get somewhere with the matter at hand is to intensify the suspicion, both your own and that of others, that you are not quite getting it right. (p. 29)

Conclusions

Jim’s functional constraints represent observable (but realistic) physical limitations that must be accommodated in developing motor skills in many older adults. The data suggest that Jim was realistic about his capabilities on both the course and the practice range and had astute insight into the constraints that governed his skill development. His comprehensive goal setting, perseverance in practice, and genuine enjoyment at playing on the course bode well for an extended future with golf despite his physical limitations. The likelihood of functional constraints in many older adults suggests that systematic inquiry is needed to uncover the manner in which they are accommodated during motor performance. Integrated with findings from conventional inquiry, researchers might uncover a more contextual and unified picture to portray older adults’ participation in sport activities.

References


