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Promoting a Collaborative Approach With Recreational Therapy to Improve Physical Activity Engagement in Type 2 Diabetes

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Abstract

A collaborative small convenience sample survey of 26 adults with Type 2 Diabetes found increased minutes of leisure-time physical activity (LTPA) when the following were experienced within LTPA: a sense of connection/belonging with individuals/groups, a sense of connection/belonging within the self, attributes that come from feeling a sense of connection/belonging with individuals/groups (e.g., feeling loved), a sense of building one's identity, control/power over one's self and things, competence/mastery, positive emotions of escalation (e.g., enjoyment), positive emotions of well-being (e.g., feeling self-satisfied), hope/optimism, and a continuation of one's personal growth and development. Systemically structured leisure counseling, provided by a recreational therapist (RT) early in the disease process, aimed at identifying, exploring, and enhancing the experience of such personal meanings in LTPA may prove helpful in diabetes management. Suggestions for the inclusion of RT as a collaborative member are provided to highlight our possible role in preventative medicine for chronic disease management.

Keywords: *Type 2 Diabetes, physical activity, recreational therapy, collaboration, Leisure Meanings Gained and Outcomes Scale, chronic disease management, personal meaning*

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Type 2 Diabetes (T2D) is a growing health problem within the United States and abroad. Within the United States there are approximately 10.5 million people who have diabetes and an estimated 5.5 million more who have not yet been diagnosed (Healthy People 2010, 2000). Globally there are approximately 135 million people with diabetes, and this number is projected to increase by 122% to 300 million by the year 2025 (King, Aubert, & Herman, 1998). Within the United States, approximately 800,000 people are newly diagnosed with diabetes every year, or 2,200 every day (Clark, 1998). Of those who are diagnosed with diabetes, 90–95% have T2D (American Diabetes Association, 2004a), 50% already have complications of the disease at the time of diagnosis (Chaturvedi, 2007), and 90% are overweight (American Diabetes Association, 2004b). Deaths related to diabetes are high. In 2002, diabetes was the fifth leading cause of death by disease in the United States (Diabetes Care, 2003). Most of these deaths were related to diabetes-associated cardiovascular disease (Healthy People 2010, 2000).

Weight loss and exercise are touted as being the most important "modifiable" lifestyle behavior in managing diabetes (Helmrich, Ragland, Leung, & Paffenbarger, 1991; Helmrich, Ragland, & Paffenbarger, 1994; Horton, 1988). "The combination of endurance and resistance exercise training in this patient population may prove to be the most useful approach for diabetes management" (Castaneda, 2000, pp. 352–353). Cardiovascular/endurance exercise can decrease the risk of secondary complications such as cardiovascular disease and amputation, as well as decrease blood pressure and cholesterol, while resistance training helps to maintain/develop skeletal muscle. Maintaining and improving muscle mass is a vital component of exercise training for people with T2D because skeletal muscle accounts for 70–85% of insulin stimulated glucose removal (Cartee, 1994). Muscle also demands higher caloric energy, thus increasing the amount of calories burned per task contributing to weight loss. When body weight is reduced (even 10–20 pounds) and glucose uptake is improved, the need for diabetic medication can be reduced or eliminated. In some cases diabetes can be reversed. For these effects to continue, however, engagement in physical activity must be consistent. If exercise training is ceased, the beneficial effects of exercise will gradually be lost and will be completely lost within two weeks (Ivy, 1997).

Unfortunately, very few people who have T2D engage in physical activity on a regular basis. In 2003, the Medical Expenditure Panel Survey was conducted. This was a nationally representative survey of the U.S. population aimed at gathering health information. Findings indicated that 61% of people with T2D do not engage in regular moderate physical activity compared to 42% of adults who do not have diabetes (Morrato, Hill, Wyatt, Ghushchyan, & Sullivan, 2006). Referring to people with T2D, Morrato et al. stated, "[T]here is a great need for efforts to target interventions to increase physical activity in these individuals" (p. 203).

Researchers recommend a collaborative approach to helping people with T2D increase physical activity (Wolf et al., 2011). A collaborative approach calls upon the implementation of individual, albeit systemic, strategies aimed at conquering the problem from

various viewpoints (e.g., counseling by physicians, promotion of physical activity by diabetes educators, policies for more open space for outdoor exercise). Despite calls for increased collaborative practice (King, Stokols, Talen, Brassington, & Killingsworth, 2002; Stetson et al., 2011; Wolf et al., 2011), consistent transdisciplinary practice is uncommon in everyday practice. Consequently, "it is becoming increasingly clear that without such concerted bridge-building efforts across disciplines, the greater challenge of stemming the physical inactivity epidemic will remain increasingly out of reach" (King et al., 2002, p. 24).

Indeed, an effective collaborative approach to changing lifestyles among persons with T2D ought to include cross-discipline communication between and among the myriad health professionals who share a commitment to reducing the health consequences of T2D. Ideally information and resources would be exchanged and used interchangeably so that persons with T2D would hear consistent messages from physicians, health counselors, and therapists about the importance of physical activity and various strategies that increase the likelihood of making and maintaining a physically active lifestyle (Wolf et al., 2011). Without such education and interventions, increased hospitalizations and decreased quality of life are expected. Research conducted by Yach, Stuckler, and Brownell (2006) indicates that individuals with diabetes receive only a fraction of the collaborative preventive and chronic care they need (especially strategies for obesity), resulting in diabetes-related hospitalizations that could have been avoided and diabetic complications that otherwise diminish quality of life (Wexler et al., 2006). Consequently, despite non-definitive evidence for collaborative strategies to reduce obesity in this population, calls are being made to act now, as the reduced life expectancy and rising health care costs associated with inaction should be motivation enough for "urgent action" (Yach et al., 2006, p. 66).

Recreational therapists can actively contribute to the collaborative treatment of people with T2D by promoting meaningful, physically active recreation and leisure. This can be done by designing, implementing, and disseminating information about promising and efficacy-based lifestyle change programs. Collaborative action can also be accomplished by conducting and disseminating relevant research. Therefore, the purpose of this exploratory study was to examine the effects of meaning-centered physically active leisure behavior and its relevance to initiating and adhering to a regimen of physical activity as part of diabetes self-management.

Enjoyment and Physical Activity Adherence

In the late 1990s, evidence for the construct of enjoyment as a predictor for physical activity engagement/adherence emerged. DiLorenzo, Stucky-Ropp, Vander Wal, and Gotham (1998) conducted a study of 111 boys and girls and found that enjoyment of physical activity (one of 24 variables within the study) was the only consistent predictor of engagement in physical activity for fifth and sixth grade students. Similarly, Johnson and Heller (1998) found that although knowledge of physical activity health benefits motivated

initial physical activity engagement for people with cardiac conditions after leaving the hospital, enjoyment of physical activity was more predictive of continued adherence 6 months post discharge. Outside of predictive studies, enjoyment was found to be a motivator for physical activity adherence. For example, Lindgren and Fridlund (1999) conducted a qualitative study of 12 inactive Swedish women and found enjoyment of physical activity to be a primary motivator for physical activity adherence. Also, Tsai (2005) conducted a survey of 927 Hong Kong and 1,018 Australian university students and found that "having an interest in activities was an important condition that led to enduring engagement in active recreation" (p. 385). Other studies have also shown support for enjoyment as a mediator for physical activity engagement, including Dishman et al. (2005) who purposefully manipulated physical education classes for adolescent girls based on knowledge of developmental likes/dislikes to promote enjoyment and Williams et al. (2006) who implemented a motivational intervention to increase physical activity in 238 healthy low-active adults.

Within all of the above studies, the influence of enjoyment of physical activity was examined through a variety of methods including case studies (Lindgren & Fridlund, 1999), self-report questionnaires (DiLorenzo et al., 1998; Johnson & Heller, 1998; Tsai, 2005), and use of the Physical Activity Enjoyment Scale (Dishman et al., 2005; Williams et al., 2006). The Physical Activity Enjoyment Scale, however, does not attempt to determine what a person finds enjoyable about physical activity, but rather it finds whether it is enjoyable (i.e., "It's no fun at all," "It is very pleasant"). In order to extend this line of inquiry, the authors of this paper theorized that the identification of the underlying causes of enjoyment might be key to understanding the influence of enjoyment and ultimately then to developing effective interventions.

Despite the recognition of the importance of enjoyment to initiating and sustaining engagement in physical activity, its explicit consideration is minimal within common health care practice aimed at improving engagement in physical activity (Porter, 2009). For example, within the Diabetes Self Management Education program (DSME), an eight- to 10-week educational program for people with diabetes, only one of the 10 core criteria recommended for review within the program is related to exercise (incorporating physical activity into lifestyle) (Mensing et al., 2004). Within this one segment, it is commonly suggested that participants choose a form of physical activity that is personally enjoyable; however, there are no attempts to help participants identify forms of physical activity that have the potential to be personally enjoyable.

What Causes Enjoyment?

In order to assist people with T2D in achieving enjoyment in LTPA (in the hopes of increased engagement), an understanding of what brings about the feeling of enjoyment is needed. A comprehensive literature review (Porter, 2009; Porter, Iwasaki, & Shank, 2011) found that enjoyment is an outcome of personally meaningful experiences. In other words, when a person engages in an activity that produces something that is personally meaningful (e.g., a feeling of connection with

a loved one), the positive emotion of enjoyment is felt. The study found that people search for five overarching meanings within leisure activities (including LTPA): connection/belonging, identity, freedom/autonomy, control/power, and competence/mastery. It was also found that when people experience personal meaning in leisure activities, they reap the particular outcomes of positive emotions (including enjoyment), hope and optimism, strength, creativity, and human growth and development (see Table 2 for definitions). This paper describes an exploratory research study conducted in collaboration with a diabetes counseling center. The study examined the relationship among the experience of personal meaning, the outcomes that are experienced from obtaining personal meaning (including the construct of enjoyment), and LTPA engagement for adults with T2D.

Methods

Individuals with T2D were recruited for this study through a collaborative arrangement with a private diabetes education and counseling program in Southeastern Pennsylvania. The program was identified as a possible collaborator through conversations with the Center for Obesity Research and Education (CORE) at Temple University. The counseling program participated in prior interdisciplinary research studies with CORE and was known to value collaborative practice. The director and owner of the counseling program, a Certified Diabetes Educator, was eager to participate in the proposed study in the hope of identifying a new approach to improve client engagement in physical activity. Thus, the program's active client list was utilized to identify possible participants. To be included in the study, participants had to be adults (18 years of age or older) who had Type 2 Diabetes (T2D) and had to engage in some form of LTPA regardless of frequency, intensity, or duration. Within the program, 229 people met the inclusion criteria. All were asked to voluntarily participate in the study via a direct mailing. The initial mailing consisted of a letter of endorsement from the Program Director of the center and an introductory letter from the researcher explaining the study and requesting participation. Included in this mailed packet were materials for study participation and a stamped self-return envelope to be used by those who agreed to complete the survey.

A cross-sectional mailed survey was designed for this study and was approved by the University's internal review board for human subject research. The survey materials included a questionnaire about demographic information and frequency of LTPA engagement and the *Leisure Meanings Gained and Outcomes Scale* (LMGOS) developed by Porter (2009) to measure the strength of meanings and emotions experienced within current LTPA. Through a 10-person expert panel the LMGOS was found to have good face and content validity. It was also tested with a convenience sample of 163 university students and was found to have good reliability. Overall scale reliability score was .984. In addition to this overall score, each of the subscales exceeded the acceptable threshold Cronbach's alpha score of .7. Subscale reliability scores included .978 (meanings gained), .929 (positive emotions), .936 (positive thought-action), and .905 (human growth and development).

The participants were instructed to complete the questionnaire independently or with assistance from another person if needed (e.g., those who have visual impairments). As an incentive to complete the survey, respondents were provided with the option to receive a personal profile of the meanings they experienced in LTPA. The profile could be used by the participant as a tool to identify those leisure meanings that are personally important and motivating for engagement in LTPA as well as a tool to identify other forms of LTPA that house those specific inherent characteristics/opportunities. Reminder postcards were sent to nonresponders. Completed survey forms were numbered and corresponded to each specific study participant. The participant list was kept separate from the surveys and was used to identify nonresponders to receive reminder cards. Completed surveys were returned to the researcher, kept in a locked drawer, and accessed only by the researcher. All identifying information was destroyed at the conclusion of the study.

Results

Of the 229 surveys sent with follow-up postcard reminders, 31 were returned, of which 26 were usable. This equals an 11.3% return rate, which, although quite low, falls within the typical range of 5–40% for mail survey return rates (Wimmer & Dominick, 2005). Demographic data of the study participants are displayed in Table 1. Of the 26 participants, 14 (54%) were women and 12 were men with a median age of 63 (range = 40–84). The majority of participants were White (n = 20), married (n = 21), retired (n = 12), able to walk without a device (n = 20); had a household income equal to or greater than $65,000 (n = 14); had Type 2 Diabetes for 10+ years (n = 20); and self-reported health as being very good to fair. Participants, on average, reported LTPA engagement 3 (to almost 4) days a week (M = 3.73, SD 1.91) for approximately 45 minutes each time (M = 3.31, SD 1.38; 3 = 45 minutes at a time) and have been following that routine for two to three years (M = 7.65, SD 2.19; 7 = 2–3 years).

The most frequent form of LTPA reported by respondents was walking/treadmill (N = 16), followed by biking/spinning (N = 7), yoga (N = 5), swimming (N = 4), golf (N = 4), gardening/lawn care (N = 4), weight lifting (N = 4), and tennis (N = 2).

Data from the LMGOS were entered into Microsoft Excel and then were transferred into SPSS. No reverse coding was needed. After each survey was entered into Microsoft Excel, the data were double-checked to make sure there were no errors in data input. Upon entering the data, each survey was carefully examined for responses that might be questionable (e.g., repetitive responses, unanswered questions). None of the surveys had apparently repetitive responses. Across all of the surveys, 21 items total (0.6%) were not completed. The blank items were filled in with the mode for each item. Prior to running the analyses, the data were reviewed to make sure that numbers entered into each cell reflected the proper coding structure for that cell. No errors in data input were found.

Table 1

Participant Demographics

ITEM	RESPONSE	ITEM	RESPONSE
Gender	Female = 14 Male = 12	Marital Status	Married = 21 Non-Married = 5
Age	Median = 63.12 Range = 40-84	Mobility Status	Walk without a device = 20 Walk with a device (such as a cane or walker) = 5
Annual Household Income	Less than $15,000 = 1 $15,000 – $25,000 = 0 $25,000 – $35,000 = 2 $35,000–$45,000 = 1 $45,000 – $55,000 = 1 $55,000 – $65,000 = 3 $65,000+ = 14 Missing = 4	Employment Status	Full-time homemaker with children living in the house under the age of 18 = 1 Retired = 12 Unemployed greater than 3 months = 1 Employed part time (less than 32 hours a week) = 3 Employed full time (32 hours or more a week) = 9
Race	White = 20 Black or African American = 4 Asian = 1 Hispanic or Latino = 1	Self-Report Health Status	Very Good = 8 Good = 8 Fair = 6 Bad = 3 Very Bad = 0 Missing = 1
How long have you had Type 2 Diabetes?	Less than 1 year = 1 1–3 years = 2 4–6 years = 5 7–9 years = 3 10+ years = 14 Missing = 1	On average, how many days a week do you do leisure-time physical activities?	1 day a week = 4 2 days a week = 3 3 days a week = 6 4 days a week = 4 5 days a week = 4 6 days a week = 2 7 days a week = 3
On average, how many minutes do you do leisure-time physical activities?	15 minutes at a time = 3 30 minutes at a time = 4 45 minutes at a time = 8 60 minutes at a time = 5 120 minutes at a time = 5 More than 120 minutes at a time = 1	In the question above, you told us about how many days a week you do leisure-time physical activities. How long have you been following this type of schedule?	Less than 1 month = 1 1–3 months = 1 3–6 months = 0 6–9 months = 0 9–12 months = 1 1–2 years = 3 2–3 years = 2 4–5 years = 3 5 or more years = 15

Due to the small sample size prediction analyses were unable to be run; however, Spearman Rank Correlations indicated numerous significant linear relationships at the .05 and .01 level (see Table 2 and 3). Between the 14 personal meanings and the eight outcomes that were reportedly experienced from obtaining personal meaning, 112 significant linear relationships were found (see Table 2). Definitions of meanings and outcomes are provided in Table 2. These definitions were established in previous research reported elsewhere (Porter, 2009). The sheer number of the significant linear relationships indicates strong relationships among personal meanings and outcomes of personal meanings. In other words, when the extent of personal meaning experienced within LTPA goes up (e.g., sense of *connection and belonging*), outcomes from the experience of personal meaning go up (e.g., *positive emotions, human growth and development*). In regard to the construct of enjoyment, 13 of the 14 personal meanings had a significant linear relationship with *positive emotions of escalation* (which houses the emotion of enjoyment) at the .05 and .01 level. This means that when the experience of personal meaning increases, the extent of enjoyment increases.

Additional significant linear relationships with LTPA minutes performed were also found at the .05 and .01 level (see Table 3), including *connection and belonging within the self, attributes that come from feeling a sense of connection and belonging with an individual or group, building one's identity, control and power over self or things, competence and mastery, positive emotions of well-being, and hope* and *optimism*. Specifically, (a) when a sense of *connection and belonging within the self* in LTPA increased, the number of LTPA minutes increased; (b) *when attributes that come from feeling a sense of connection and belonging with a group* (e.g., feeling loved) in LTPA increased, the number of LTPA minutes increased; (c) when feelings of *building one's identity* increased, the number of LTPA minutes increased; (d) when feelings of *control and power over one's self or something* increased, the number of minutes of LTPA increased; (e) when feelings of *competence and mastery* increased, the number of LTPA increased; (f) when *positive emotions of well-being* increased, the number of LTPA minutes increased; and (g) when *feelings of hope and optimism* increased, the number of LTPA minutes increased.

No significant linear relationships were found among personal meanings or outcomes from experiencing personal meanings with the number of days performing LTPA. In regard to the length of time that participants have been following their LTPA routines, significant linear relationships were found at the .05 level with *internal balance, control and power over self or things, control and power reflected to others,* and *human growth and development in a new or different direction*. This means that participants who have been following their LTPA routine longer experienced higher levels of *internal balance, control and power over self or things, control and power reflected to others,* and *human growth and development in a new or different direction* than participants who have not been following their routine as long.

Table 2

Spearman Correlations for Personal Meanings and Outcomes From the Experience of Personal Meanings

Personal Meaning	Outcomes From the Experience of Personal Meaning							
	Positive Emotions of Escalation	Positive Emotions of De-Escalation	Positive Emotions of Well-Being	Hope & Optimism	Creativity	Strength	Human Growth & Development – Continuation	Human Growth and Development – New or Different Direction
Connection/Belonging Within the Self	.768**	.543**	.719**	.646**	.620**	.717**	.735**	.840**
Internal Balance	.588**	.723**	.660**	.665**	.787**	.719**	.598**	.779**
Connection/Belonging With Individuals and Groups	.648**	.592**	.734**	.756**	.676**	.739**	.713**	.696**
Connection/Belonging (Attributes)	.604**	.483**	.605**	.618**	.622**	.720**	.560**	.723**
Connection/Belonging With Animals or Nature	.347	.493*	.425*	.432*	.613**	.607**	.304	.561**
Connection/Belonging With a Higher Power or Spirit	.588**	.556**	.558**	.602**	.619**	.552**	.555**	.734**
Connection/Belonging With One's Culture or History	.567**	.618**	.651**	.537**	.543**	.596**	.545**	.597**
Identity – Reflection and Expression	.725**	.749**	.826**	.754**	.824**	.751**	.747**	.757**
Identity – Building	.841**	.655**	.842**	.741**	.651**	.711**	.797**	.720**
Identity – Transforming	.521**	.485*	.684**	.619**	.622**	.685**	.639**	.694**
Freedom/Autonomy	.807**	.810**	.888**	.876**	.805**	.829**	.842**	.840**
Control/Power Over Self and Things	.587**	.591**	.663**	.623**	.577**	.494*	.595**	.532**
Control/Power Reflected to Others	.683**	.717**	.780**	.796**	.838**	.878**	.734**	.797**
Competence/ Mastery	.607**	.481*	.656**	.685**	.716**	.737**	.650**	.623**

* = p ≤ .05., ** = p ≤ .01

Table 3

Spearman Correlations for Personal Meanings and Outcomes From the Experience of Personal Meanings With LTPA Engagement

Personal Meanings	Definition	LTPA		
		Mins	Days	Time
Connection/Belonging Within the Self	Sense of wholeness or completeness, of being less fragmented (more together, at peace)	.481*	-.175	.349
Internal Balance	Being connected to one's valued self-perceptions, and a sense of inner harmony (no internal struggles that make a person feel unbalanced) that comes from self-reflection, contemplation, and knowing where one is in life and can lead to new perspective taking and sense-making	.129	.197	.389*
Connection/Belonging With Individuals and Groups	Connection with other individuals (such as a friend, family member, peer, neighbor, etc.) and groups (such as cultural groups, global citizenship, formal or information social circles, community groups, family, etc.) to achieve valued attributes that grow from these connections (e.g., friendship)	.514**	.063	.343
Connection/Belonging (Attributes)	Benefits that are obtained from a sense of connection/belonging with individuals or groups (e.g., trust, friendship, love)	.430*	-.037	.301
Connection/Belonging With Animals or Nature	Connection and belonging with animals/nature that allows for the expression of the relationship and to gain/enhance the growth of the relationship (e.g., pet companionship, experiencing nature)	-.034	-.093	.012
Connection/ Belonging With a Higher Power or Spirit	Connection and belonging with a higher power/spirit for coping with stress, spiritual renewal, and/or soul fulfillment that can trigger new perspectives, changes, or renewed appreciation for life	.177	.047	.145
Connection/Belonging With One's Culture or History	Connection and belonging with one's heritage and past	.302	-.066	.049
Identity – Reflection and Expression	Convey or mirror one's internal self	.287	-.010	.155
Identity – Building	Construction of the self (self-confidence, self-esteem, self-respect, self-acceptance)	.471*	.008	.277
Identity – Transforming	Alteration of one's internal self	.242	-.121	.205
Freedom/Autonomy	Being unrestricted, unconstrained, and self-governing that evolves from, or within, the context of leisure	.328	.068	.273
Control/Power Over Self and Things	To be in command of one's self or over some thing	.421*	.081	.481*
Control/Power Reflected to Others	To have leadership and display one's command	.299	.236	.418*
Competence/ Mastery	To be proficient or adept in an ability or task that evolves from, or within, the context of leisure	.482*	.149	.205
Outcomes From the Experience of Personal Meaning				
Positive Emotions of Escalation	Amused, joyful, excited, exhilarated, fun, happy, playful, pleasure	.590**	-.088	.284
Positive Emotions of De-escalation	Inner calmness, peace of mind, relaxation, serenity, tranquility	.177	.063	.288
Positive Emotions of Well-Being	Psychologically renewed, rejuvenated, satisfied, personally fulfilled, self-gratified	.398*	-.004	.242
Hope & Optimism	A disposition or tendency to look on the more favorable side of events or conditions and to expect the most favorable outcome; to wish for something with expectation of its fulfillment	.421*	.217	.258
Creativity	A kind of mental process that yields an adaptive or original idea or product	.015	.019	.187
Strength	The psychological quality of being strong; the inherent capacity to manifest energy, to endure, and to resist	.306	.203	.334
Human Growth & Development – Continuation	To develop, maintain, progress, or improve an aspect of one's self or life	.527**	.042	.285
Human Growth & Development – New Direction	To learn something new or interesting, to nurture new growth in others	.294	.060	.425*

* = $p \leq .05$., ** = $p \leq .01$

Key: LTPA: Min (# of min engaged), Days (# of days engaged/week), Time (# of months/years person has been following his/her LTPA routine)

Limitations

The small sample size and utilization of one diabetes counseling center limit the generalizability of the findings. Regression analyses were initially planned; however, the small sample size prohibited predictability explorations. It is important to note, however, that these relationships do not indicate causality. That is, the data do not indicate that length of time engaged in LTPA predicts greater meaningful experiences. Nevertheless, these numerous significant linear relationships do hold promise and are worth closer examination in more controlled studies.

The low response rate could have been due to the length of the LMGOS, potentially causing response fatigue. Another possibility might be due to the population surveyed. The survey population was from a private diabetes counseling service where the owner believed that many of his clients engaged in regular physical activity although he did not keep statistics on the physical activity level of the clients. This physical activity level assumption is in conflict with national statistics that indicate that the majority of people with T2D do not exercise regularly. Therefore, it is plausible that many of the people who received the survey did not actually participate in physical activity regularly and therefore did not fill out the survey because it was based on engagement in physical activity. Conversely, those who did complete the survey may have been unusually active. In fact, the 26 respondents reported higher than usual levels of LTPA as compared to national data. Consequently, this small group of respondents is unlikely to be a representative sample of adults with T2D.

Discussion

Within the limitations of this study, findings indicate that participants engaged in increased minutes of LTPA when they experience personal meaning within LTPA, specifically a *sense of connection/belonging with individuals and groups, connection/belonging within the self, connection/belonging attributes, identity (building of the self), control/power over self and things*, and *competence/mastery*. The experience of these meanings in LTPA also coincided with the experience of higher *positive emotions of well-being, positive emotions of escalation* (which includes enjoyment), *hope and optimism*, and *human growth and development (continuation)*. As stated earlier, these findings can only be considered relational and not causal. Nevertheless, the findings reported herein are an example of the kind of research that would benefit the collaborative efforts to reduce T2D and the possible fit for recreational therapists in this public health challenge.

The connection between the feeling of enjoyment in LTPA and LTPA adherence has been documented in professional literature; however, this study expands upon this finding and identifies underlying personal meaning as a modifiable variable for effecting the experience of positive emotion and subsequent LTPA engagement. It was also found that the longer the participants engaged in their LTPA routines, the more they experienced *internal balance, control/power over self and things, control/power reflected to others,* and *human growth and development in a new direction,* indicating that personal meanings can be further enhanced through long-term LTPA engagement.

Systematically structured leisure counseling to identify, explore, and enhance personal meanings within physical activity appears to be a suitable role for recreational therapists in primary preventative care. Recreational therapists already provide such counseling in inpatient physical rehabilitation for those with diabetes-related amputation; however, if provided earlier in the disease process, minutes of engagement in physical activity might improve, potentially reducing diabetes-related amputation and improving disease management. Several health care trends in recent years may present opportunities for recreational therapy practice to become more visible and active in diabetes education programs. These trends include the emergence of Medical Homes (Rosenthal, 2008) and the increased use of the Chronic Care Model, which takes a proactive approach rather than a reactive approach to promoting health and preventing disease (e.g., Bodenheimer, Wagner, & Grumbach, 2002; Hung et al., 2008). Given the call for "a dedicated primary health team member with the time, enthusiasm, and skills needed to assist patients in making sustainable physical activity behavior changes" (Fortier et al., 2007), the opportunity is ripe for recreational therapy to highlight the role it can play in preventative medicine for chronic disease management.

The growing epidemic of worldwide obesity and resultant health conditions, especially T2D, highlights that current approaches to its management are not effective. New and innovative approaches are needed. Current active living agendas tend to focus on increasing LTPA engagement through manipulation of the environment such as building more parks and open spaces (Godbey, Caldwell, Floyd, & Payne, 2005), whereas public health campaigns focus predominantly on education about the risks and benefits of LTPA (Henderson & Bialeschki, 2005). Individual counseling by health professionals often utilizes the tactics of negotiation, phone contacts, behavioral contracts, physical activity logs, supervised exercise programs, and exercise prescription (e.g., Clark, Hampson, Avery, & Simpson, 2004; Clarke, Crawford, & Nash, 2002; Hillsdon, Thorogood, White, & Foster, 2002; Norris, Grothaus, Buchner, & Pratt, 2000; Perri et al., 2002; Rejeski et al., 2003; Speck & Looney, 2001). Furthermore, health behavior theories focus on changing people's behavior in stages by addressing attitudes, behaviors, thoughts, confidence, self-efficacy, control, knowledge, skill, expectations, and/or social support related to the desired behavior change (Glanz, Rimer, & Lewis, 2002).

There is currently no active living agenda nor a health behavior model that integrates the notion of what a person is searching for in life (i.e., meaning-searching or meaning-making) as a key motivator or incentive for promoting active living or health behavior change. Cognition is only part of the human psyche. To ignore these meaning-searching or meaning-making processes, including the role of psychological and emotional experiences that are meaningful to an individual, is to ignore the holistic and humanistic nature of people and their behaviors. This innovative approach to integrating the search for meaning with the initiation, maintenance, and promotion of active living and healthy behavior could contribute to an active living agenda and offers a holistic and humanistic perspective of health behavior change.

Future research on the experience of personal meaning and how it relates to active living and health behavior via LTPA could help to open new doors to transdisciplinary meaning-based interventions and approaches. Given the small sample size and limited generalizability of this study, it is recommended that in the future researchers across disciplines work collaboratively and utilize a larger sample with various and diverse population groups. It will also be important to examine predictive abilities of meaning-based constructs in explaining LTPA and other leisure-oriented, active living, or health behavior-related constructs, especially for those who have, or are at risk for, chronic disease related to LTPA behavior (i.e., obesity, T2D). For example, the following ideas may be considered: (a) cross-sectional survey, cross-cultural, and longitudinal studies of LTPA behaviors in people with or at risk for chronic disease related to personal meaning to further our understanding of LTPA behaviors and contribute to the development of effective interventions and (b) studies to determine if the strength of personal meaning experienced within/from LTPA correlates/predicts with percentage of weight loss, mortality risk, quality of life, and medical status (e.g., glucose levels).

There are multiple methods by which recreational therapists can advance collaborative action aimed at effective self-management of T2D with particular emphasis on meaningful physically active leisure. Each of the actions mentioned below draws on the research findings reported herein and thus underscores the contributions of research to evidence-based interventions. Collaborative action initiated by recreational therapists might include the following: (a) designing transdisciplinary interventions aimed at the identification, exploration, and enhancement of personal meaning in physical activity for clients with T2D, framed within the Leisure Well-Being Model based on positive psychology (Hood & Carruthers, 2007); (b) delivering presentations at multidisciplinary conferences on diabetes prevention, management, and education to share information about research such as that reported in this article and associated leisure-related interventions; and (c) designing and disseminating self-management strategies and resources that reflect meaning-centered leisure engagement.

Currently, recreational therapists predominantly practice in rehabilitation, acute care, and residential care settings due in part to health care insurance restrictions. It is hoped that collaborative meaning-centered active living and health behavior research will provide support for the integration of recreational therapists as collaborative members in primary prevention health care and provide evidence for the value of such collaborative approaches. If further research in this area advances understanding of the importance of meaning-based leisure counseling as a primary prevention approach to increasing LTPA, the role of recreational therapists may begin to grow into primary prevention care.

Leo Schubert, a professor at The American University, stated, "Science itself is non-disciplinary. Man devised the disciplines for the sake of convenience, but such a decision is an artifice contrary to the way nature behaves" (as cited in Jette, 1994, p. 380). Through collaboration, recreational therapists may be able to make a more significant

difference in the health of the nation than they already are, especially in the arena of multifaceted lifestyle disease. Recreational therapists are encouraged to seek out new and innovative collaborative approaches, such as meaning-based interventions, which may represent a unique contribution of this discipline to health promotion and disease prevention and management.

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