Measuring the Impact of a Medical Specialty Camp

Using Self-Determination Theory

Eddie Hill
Ryan Gagnon
Ron Ramsing
Jennifer Goff
Betsy Kennedy
Taylor Hooker

Abstract: Type 1 diabetes is one of the most common chronic illnesses facing youth. The American Diabetes Association (2012) states camps for children and youth that are focused on diabetes are invaluable. Medical camp programs for youth with illnesses have been shown to increase self-esteem, self-image, and motivation. Grounded in self-determination theory, this medical specialty camp took place in the eastern portion of the United States in the summer of 2014. Campers reported significantly higher levels of perceived competence of diabetes knowledge from pre ($M = 5.11, SD = 1.05$) to post-camp ($M = 5.15, SD = 1.02$), a mean increase of .04, 95% CI [4.78, 5.68], [$F(1, 11) = 8.56, p = .014$, partial $\eta^2 = .438$]. This data is useful as CTRSs, recreation therapy students, and other healthcare professionals continue to program for medical specialty camps. This evidence-based medical camp can create a standard for diabetes camps to better prepare youth to manage their diabetes as they transition to healthy young adults.

Keywords: diabetes, medical specialty camp, self-determination theory, youth, outcome-focused programming, recreation therapy

Eddie Hill is an assistant professor in the Human Movement Sciences Department at Old Dominion University. Ryan Gagnon is a PhD student in the Department of Parks, Recreation, and Tourism Management at Clemson University. Ron Ramsing is an associate professor in the Department of Kinesiology, Recreation and Sport at Western Kentucky University. Jennifer Goff is a PhD student in the Department of Human Movement Sciences at Old Dominion University. Betsy Kennedy is a senior lecturer in the Department of Human Movement Sciences at Old Dominion University. Taylor Hooker is a recreation therapy undergraduate student at Old Dominion University. The authors would like to give special thanks to the Lion’s Club District 24 for years of support at Family Diabetes Camp. Please send correspondence to Eddie Hill, ehill@odu.edu.

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Type 1 diabetes is one of the most prevalent chronic diseases among youth, regardless of widespread prevention efforts, (Whiting, Guariguata, Weil, & Shaw, 2011). It is well established that with proper management and care, individuals diagnosed with Type 1 diabetes can lead fulfilling lives and decrease their risk of long-term health complications that are typical of poor diabetes management (Colberg & Riddell, 2013). In spite of this evidence, youth diagnosed with Type 1 diabetes who manage their own care often do so poorly (McAullife-Fogarty, Ramsing, & Hill, 2007; Santiprabhob et al., 2008).

One solution to alleviate this poor self-care is the use of medical specialty camps: A recreational therapy approach that allows for the traditional camp experience (e.g., canoeing, fishing, horseback riding) while providing the care that these youth need; for example the close monitoring of blood glucose, insulin dosage, and carbohydrate intake (Carlson, Carlson, Tolbert, & Demma, 2012; Santiprabhob et al., 2008). These medical specialty camps use various theoretical underpinnings to inform their practices. Using a theoretical framework is essential to provide stakeholders a rationale behind the approach, to help in obtaining funding, and to create an engineered experience (Hill, Milliken, Goff, & Clark, 2014; Hill & Sibthorp, 2006).

One promising theoretical approach is the use of self-determination theory (SDT), a motivational approach to behavior change. The self-determination theory has been successfully used in recreational therapy, the health care industry and more recently in medically orientated camps (Ramsing & Sibthorp, 2008; Taylor, Piatt, Hill, & Malcom, 2012). In this study we investigate the efficacy of a diabetes camp as a mechanism of change for youths’ motivation for diabetes management, specifically in terms of their competency, autonomy support, and relatedness.

**Type 1 Diabetes**

Self-management education is critical to prevent or delay complications associated with diabetes (Haas et al., 2013). In a longitudinal trial investigating diabetes over 30 years, researchers found that proper diabetes management is the most important factor in the prevention of complications of Type 1 diabetes (Gubitosi-Klug, 2014). Complications associated with poor diabetes management have been shown to lead to impaired interpersonal relations (e.g., family conflict). Additional complications are mood disturbances, eating disorders, antisocial conduct, anxiety, depression, micro and macrovascular stroke, and death (Bryden, Peveler, Stein, Neil, Mayou, & Dunger, 2001; Chiang, Kirkman, Laffel, & Peters, 2014; Gonzalez, Fisher, & Polonsky, 2011; Larranaga, Docet, & Garcia-Mayor, 2011; Tonoli et al., 2014). Furthermore, an already challenging situation (proper management of diabetes) is further compounded for maturing youth with the influence of hormonal changes due to adolescence (Bryden et al., 2001). Proper diabetes management includes but is not limited to monitoring diet, exercise, and glucose levels; and needs to be properly managed at home, school, work, leisure time, and in camp settings.

**Medical Specialty Camps**

The American Diabetes Association states “camps for children and youth focused on diabetes are invaluable” (2012, p. S75). It has been estimated that nearly 30,000 children with Type 1 diabetes annually attend camping programs in North America (American Diabetes Associa-
tion, 2012). Theory-based camping used for therapeutic purposes among adolescents with disabilities and illnesses has been shown to increase self-esteem, self-image, and motivation (Brannan, Fullerton, Arick, Robb, & Bender, 2002; Hill, Ramsing, & Hill, 2008; Hill & Sibthorp, 2006; Mahon, 1994; Marsh, 1999; Taylor et al., 2012).

Medical specialty camps (e.g., diabetes camps) have long been considered beneficial to participants (American Camp Association, 2005). These camps provide active mediums for peer support, whereby campers are encouraged to share experiences, develop self-management, and participate in the realistic practice of exercise, glucose, diet, and injection control in an authentic medium (Hill & Sibthorp, 2006). With the increased levels of activity in a camp setting (e.g., hiking, rock climbing, canoeing) campers’ blood sugar levels are impacted. Diabetes camps provide a safe and effective environment for youth to manage (e.g., adjust insulin) their own diabetes and to provide insight to their peers on how to improve their self-care under the supervision of health care professionals. Additionally the camp setting offers participants the opportunity to share common experiences, form meaningful friendships, and make decisions about behaviors that impact their diabetes (Garst, Browne, & Bialeschki, 2011).

Unfortunately, medical specialty camps for families (e.g., Family Diabetes Camps) are even more rare. There is limited research on the impact of medical family camps, but based on Bowen’s family systems theory, it suggests that individuals cannot be understood in isolation, but rather as a system (Bowen, 1978; Hooper, 2007). One can speculate that it might be even more effective to address some of these medical concerns as a family unit, and camp might be an appropriate place to explore some of the motivational challenges of managing diabetes. Limited research exists on family medical specialty camps, and diabetes family camps has to have even less evidence-based research. However Taylor et al., (2012) found desired outcomes of campers and parents at a family diabetes camp. Taylor, et al., at the three-month follow-up with participants, reported parent responses such as, I now “ask” about insulin dosages rather than “tell.” This slight shift in language is a fundamental component to the self-determination theory.

Self-Determination Theory

Diabetes camps allow for campers to engage in positive learning environments while also managing their conditions. The creation of a positive learning environment is instrumental in fostering positive types of motivation (Levesque-Bristol et al., 2010). Motivation, or a force that drives, can be complex and often difficult to comprehend. Self-determination theory (SDT) states that behaviors are autonomously motivated to the extent that people experience a true sense of volition and choice (Deci & Ryan, 2000; Taylor et al., 2012; Williams, Rodin, Ryan, Grolnick, & Deci, 1998). The SDT is a complex, meta-theory actually made up of six mini-theories.

The Cognitive Evaluation Theory, Organismic Integration Theory, Causality Orientations Theory, Basic Psychological Needs Theory, Goals Contents Theory, and Relationships Motivation Theory all work together to address motivation within the umbrella of SDT. Collectively these six theories address motivation under the assumption that people are active agents, but also need social support. According to Deci and Ryan (1985), for a learning environment to be perceived as
positive, three basic psychological needs must be met: autonomy, competence, and relatedness. Autonomy is defined as choice and not independence, competence as a sense of mastery, and relatedness as the sense of connectedness that is provided by the learning environment (Levesque-Bristol et al., 2010).

**Competence, Autonomy, and Relatedness**

The central goal of this study was to determine the efficacy of a diabetes camp in terms of its development of camper competency, autonomy, and relatedness. Camper competence is defined as a sense of mastery and relatedness as the sense of connectedness to the learning environment (Levesque-Bristol et al., 2010). The diabetes camp setting is prime for competency for a variety of reasons. The strongest reason is that all youth in the same setting are having to learn and manage their diabetes. Learning and mastery of knowledge is occurring organically partly because of the social connectedness. Autonomy refers to the perceived origin or source of one’s own motivation (deCharms, 1968; Deci & Ryan, 1985; Ryan & Connell, 1989). Offering individuals even “perceived” choices can be both powerful and effective. For example, youth with diabetes may choose to eat certain foods, but then a parent or camp counselor can encourage options to manage the food intake (i.e., exercise or insulin). Relatedness refers to the feeling of connection, and the ability to care for and be cared for by others, giving a sense of belongingness with other individuals and with one’s own community (Baumeister & Leary, 1995; Bowlby, 1979; Ryan, Plant, & O’Malley, 1995). This aspect of camp is likely the easiest to foster because of the near spontaneous relationships that build at camp (Taylor et al., 2012). The goal of this camp was to foster a positive learning environment that allowed campers to engage fully in the traditional camp environment and thereby develop improvements in their competency, autonomy, and relatedness. Prior investigations into diabetes camps indicate that enhancements in competency and relatedness lead to better diabetes management for campers (Taylor et al., 2012). Self-determination theory posits the key to motivating healthy behaviors is not only instilling these three psychological needs, but also stresses the importance of providing an autonomy supportive environment.

**Autonomy Supportive Environments**

Autonomy supportive environments have three criteria: rational provision, perspective taking, and choice provision (Sheldon et al., 2003). Research supports the importance of individuals satisfying their need for competence, autonomy, and relatedness, as well as having an autonomy supportive environment, in order to internalize behavior (Deci & Ryan, 2005; Hill & Sibthorp, 2006; Ramsing & Sibthorp, 2008; Taylor et al., 2012).

Even a few selected choices (at the parents’ discretion) offer some ownership to the individual making the decision. Perspective taking often requires a paradigm shift of the practitioner, physician, counselor, or educator. Taking a step back and thinking about things from the participant’s view offers a sense of understanding and empathy (Hill & Sibthorp, 2006, p. 109).

The three needs identified by Deci and Ryan all relate and rely on one another. For example, if an individual is competent, yet is not given choice, he or
she may not make an internalized decision (i.e., making a decision that is best for quality of life). In addition, if the same competent individual does not feel connected to others or decisions he or she makes are unsupported by others; he or she is still unlikely to internalize behavior (Hill & Sibthorp). Researchers support the provision of an autonomy supportive environment as the best way to satisfy the three needs, thus leading to internalization (Sheldon, William, & Joiner, 2003). Research suggests that providing an autonomy supportive environment over that of a controlling environment is more effective in settings such as managing employees, working with athletes on a team, encouraging proper healthcare, and parenting (Grolnick & Apostoleris, 2002). In fact, research indicates that autonomy supportive parenting styles have lasting impacts on children to make appropriate decisions not just because their parents ask, but also because it’s the “right” decision (Sheldon, Williams, & Joiner 2003). Additional research at medical specialty camps (i.e., diabetes) using SDT as a framework found increases in parent autonomy support after the camp experience (Taylor et al., 2012).

Figure 1 illustrates the essence of extrinsic motivation based on the SDT (Hill & Sibthorp, 2006). At the far left of the figure behaviors are represented that are externally motivated, and on the far right is intrinsic motivation. Thus, the middle section of the continuum represents various forms of extrinsic motivation. Extrinsic motivation occurs on a continuum (shown in Figure 1) with four levels: external regulation, introjected regulation, identified regulation, and internalization regulation (Deci & Ryan, 2002). The most self-determined form of extrinsic motivation is integrated regulation or internalization (Deci & Ryan, 2000). At this point the individual’s behavior is mirrored by one’s values and needs (Deci & Ryan).

Internalized regulation is the most autonomous and an internal form of extrinsic motivation (Deci & Ryan, 2000). Even though these types of behaviors appear to be self-directed, they are conceptualized as falling under extrinsic motivation. Certain behaviors may never be intrinsically motivated. The behaviors (i.e., self-administering insulin shots) continue to be dependent on extrinsic motivation. It is unlikely giving oneself an injection will ever be done for the enjoyment itself (Hill & Sibthorp, 2007), but internalized regulation is the most autonomous form of extrinsic motivation.

Self-determination theory provides a framework to explain and determine the degree of motivation needed for diabetes self-management behaviors to become internalized through a camp setting.

<table>
<thead>
<tr>
<th>Extrinsic Motivation</th>
<th>Type of Motivation</th>
<th>Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Regulation</td>
<td>Introjected Regulation</td>
<td>Identified Regulation</td>
</tr>
</tbody>
</table>

**Figure 1.** The Self-Determination Continuum. Adapted from Deci and Ryan (2002).
Therefore, the following research questions were examined:

1. To what extent does a medical specialty camp have on diabetes competence among youth?
2. To what extent does a medical specialty camp have on relatedness among youth?
3. To what extent does a medical specialty camp have on autonomy support regarding diabetes management?

**Methods**

**Setting**

Data were collected from a three-day family diabetes camp in southeastern Virginia. Campers and parents completed self-report surveys immediately prior to the diabetes camp beginning and immediately upon its completion. Only camper data are presented in this study. Campers were required to have an adult family member present with them at all times. The camp had many components of a traditional camp (e.g., canoeing, challenge courses, archery, movie night, etc.), and additionally had workshops that focused on the development of self-determined behaviors and proper diabetes self-management. For example, before each meal, the amount of carbohydrates was posted (and verbally shared) to allow the campers to adjust their insulin (thus emphasizing the traits of autonomy and competence). Other fostered self-determined behaviors were targeted through activity level. Camp was designed to keep campers highly active throughout the entire day; this activity required them to continuously monitor their blood sugar levels and adjust as needed (competence). This was an opportunity not to “tell” the campers to check their blood sugar and adjust, but rather take initiative to do this on their own, or follow other campers who are modeling this type of positive behavior (fostering autonomy support). This provided opportunities for experiential education of diabetes management for campers and their family members.

The camp also had sessions for younger campers who wanted to practice giving their own insulin injections for the first time (fostering competence, autonomy, and relatedness). This again was a choice or self-determined behavior, not forced. Other campers were encouraging as the younger, more inexperienced campers considered giving their own insulin injection. Additionally, the traditional camp setting fostered friendships, and allowed campers to participate in recreation activities and discuss daily challenges with campers who also have Type 1 diabetes (fostering relatedness). Finally, the teens at camp had a chance to meet in the evening for their own social and talk with the recreational therapy (RT) students, establishing bonds, sharing challenge, and even allowing the campers to use their glucometer to test the RT students’ blood sugar (fostering autonomy supportive environments). See Table 1 for a list of example activities and their intended outcomes.

**Parent/Family Component**

The family component was critical to the success of this camp. Many parenting strategies about managing their child’s diabetes are often counter-productive, or the parents do not have the correct knowledge about their child’s diabetes. These can be addressed throughout camp as a family or specifically while at the parent support groups. Additionally, the family component of camp gives the families fun recreational opportunities together, while all are learning about diabetes. Families
are able to canoe together, rock climb and participate in the high challenge course as a family unit. While being physically active, diabetes management needs addressing; camp activities provide experiential learning in a supervised setting to make this highly beneficial. Family challenges or parent questions (from camp or home) can be addressed in the parent/guardian only support groups.

Two parent-only sessions were held at camp with the medical personnel, counseling team, and university faculty. These sessions, which were rooted in SDT, allowed parents to ask questions, talk with other parents about similar challenges with their children, and to learn new parenting techniques using an autonomy-supportive approach. The sessions included an interactive presentation on the major components of promoting self-determined behavior (i.e., competence, autonomy and relatedness), and built heavily on providing autonomy-supportive environments (i.e., rationale provision, choice provision, and perspective taking) as a parent of a child with diabetes. This provided an opportunity to share and connect with other parents dealing with very similar daily challenges.

**Camp Counselors and Staff**

This medical specialty camp operates 100% off volunteers, including the
Lion’s Club District 24. Many healthcare professionals (e.g., diabetes educators, nurses, social workers, endocrinologist) associated with the local diabetes center also volunteer their time at camp. This volunteer group includes the RT students who received no course credit, but simply dedicated their time and skills at camp. Additionally, the camp’s partnership with a local university provides an opportunity to have a CTRS included in the planning and programming, as well as college students to volunteer for the camp. Although the APIE process was not fully operational at this camp, recreational therapy students (supervised by a CTRS) who volunteered at family diabetes camp receive a hands-on experience working directly with youth diagnosed with Type 1 diabetes. This allows them to plan and lead programs that help to facilitate competency in diabetes self-management and provides opportunities to interact with members of a treatment team in a nonclinical setting. As a facet of service-learning experiences vital to developing competent and confident future recreational therapists, camp also allows RT students to implement a variety of psychosocial activities. With guidance from camp directors, a CTRS, and other allied health professionals, RT students have the opportunity to practice both clinical and relational skills in a supportive environment. Counselors take part in program planning and facilitation of group activities. For example, campers take part in cabin challenges, horseback riding, archery, high challenge course, and other camp activities. The challenge-by-choice focus allows for counselors to experience first-hand how participants advance through activities that evoke levels of both excitement and anxiety. Working with a specialized population like youth with diabetes, RT students have the unique opportunity to talk with campers about their experience and its impact on their illness. These moments of rapport-building are skills that are emphasized in the classroom but are only truly solidified in practice.

Participants

Participants attended the family diabetes camp during the spring of 2014. The three-day family diabetes camp included parents, siblings of campers, and campers. Due to the campers’ life-threatening illness, it might be the first time these youth have participated in such camp activities. Permission to participate in this study was granted by the camper and parent through assent and consent forms. Campers’ ages ranged from 6–17 years ($M = 10.63$ years). Campers were primarily male (46.7 % female), had an average of 3.61 years since their Type 1 diabetes diagnosis ($SD = 2.84$ years), and their last known HbA1C level averaged 7.78 ($SD = 1.49$). HbA1C levels are used to monitor glucose levels over extended time periods (three months is common), a score lower than six is typically optimal. For data analysis, campers were divided into three groups based on their time since diagnosis in years and on their self-reported level of experience managing diabetes (low experience, 0–24 months; moderate experience, 25–48 months, and highly experienced, 49–160 months). Due to some campers and their families arriving after check-in had formally ended, some pretests were not completed, which led to some campers and parents only completing the posttests. A total of 23 campers completed the pretest and 34 completed the posttest. All participants in this study were diagnosed with Type 1 diabetes.

Measurement

The Family Diabetes Camp Questionnaire contained four subscales: Dia-
Measuring the Impact of a Medical Specialty Camp

Diabetes Competence, Autonomy Support, Camper Relatedness, and Camper Satisfaction. Data were collected from camp participants and parents (although only camper dependent variables are reported in this paper). We used the three-item Basic Psychological Needs Scale (BPNS) to measure camper relatedness, the four-item Perceived Competence Scale (PCS) on their perceptions of their own diabetes management, the 4-item Diabetes-Specific Parental Support for Adolescents (DSPSA) questionnaire camp, and a camper satisfaction scale.

The BPNS and DSPSA were administered as a posttest only, as they are a retrospective design and have been used similarly in prior diabetes camp studies (Hanna, DiMeglio, & Fortenberry, 2005; Hill, Ramsing & Hill, 2008; Taylor et al., 2012). The DSPSA asked a series of questions about the level of parental autonomy support, and the helpfulness of the parental behavior. The scale was scored on a 0–4 (None of the Time–All of the Time) Likert-type scale and included questions such as “Since camp began, how often have your parents asked you what needs to be done about your insulin?” This subscale autonomy support is an underpinning of SDT. The PCS, administered as a pre-/posttest for camp, has been previously validated as an accurate measure of diabetes competence, with competence being one of the three psychological needs within self-determination theory (Hill, Ramsing & Hill, 2007; Williams, Grow, Freedman, Ryan, & Deci, 1996; Williams, Rodin, Ryan, Grolnick, & Deci, 1998). The PCS had Likert-type questions on a 1–6 (Not True–Very True) scale that included such questions as “I feel confident in my ability to manage my diabetes.” Examples of the camper satisfaction questions were items such as “I enjoyed diabetes camp” and “I plan on returning to diabetes camp next year.” Finally, through the BPNS, data were collected relating to relationship development with fellow diabetes diagnosed campers including questions such as “While at camp I felt cared about” and “I made new friends at camp” targeting the psychological need of relatedness.

Results

Perceived Competence Scale and Basic Psychological Needs Scale

Participants were surveyed on their perceived competence, relationship development with peers, level of autonomy support, and program satisfaction using a self-report survey method. Strong internal consistency was found for the PCS items (α= .904), a weaker score for the BPNS items (α= .49), and strong internal consistency for the DSPSA items (α = .968). All scales have been validated in prior studies (e.g., Deci & Ryan, 2000; Taylor et al., 2012; Williams, Rodin, Ryan, Grolnick, & Deci, 1998). A Pearson’s correlation (see Table 2) was conducted to determine if there was a statistical relationship between pre-diabetes camp and post-diabetes camp participant perceived competence levels (PCS) and if a deeper analysis was warranted. Results indicate a strong relationship between pre and post PCS levels ($r = .662$, $p = .014$).

Gains in Perceived Competence

The next analysis examined if there was a difference between groups in terms of camper perceived competence at post camp. Campers were divided into three groups based on their time since diagnosis in years based on their self-reported level of experience managing diabetes (low experience 0–24 months, $n = 9$; moderate experience 25–48 months, $n = 10$, and highly experienced 49–160 months, $n = 9$). This was done by exam-
ining frequency tables and histograms for “natural” breaks in the data. There were no outliers, and the data were normally distributed for each group, as assessed by box plot. There was homogeneity of variances as assessed by Levene’s statistic ($p = .075$). PCS scores were statistically different between the different experience level groups, $F(2,24) = 5.25, p = .013$, partial $\eta^2 = .44$. PCS scores decreased from low ($m = 5.61, SD = .55$), to moderate ($m = 5.31, SD = 1.01$), to high experience ($m = 4.25, SD = 1.15$) in that order. Tukey post-hoc analysis revealed the decrease in PCS score from low to high (1.36, 95% CI (.26 to 2.46)) was significant ($p = .013$) and the moderate to high experience group indicated a decrease in PCS score (1.06, 95% CI (-.045 to 2.16)) at a level approaching significance ($p = .062$) (See Table 3). No other group differences were statistically significant.

### Table 2

**Pearson Correlations between Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>DPSA</th>
<th>Satisfaction</th>
<th>Pre-PCS</th>
<th>Post-PCS</th>
<th>BPNS</th>
<th>Age</th>
</tr>
</thead>
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<tr>
<td>DPSA</td>
<td>1</td>
<td>.253</td>
<td>-.342</td>
<td>-.223</td>
<td>-.08</td>
<td>-.275</td>
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<tr>
<td>Satisfaction</td>
<td>1</td>
<td>-.009</td>
<td>.328</td>
<td>.485**</td>
<td>.133</td>
<td>.363</td>
</tr>
<tr>
<td>Pre-PCS</td>
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<td>.662*</td>
<td>.443*</td>
<td>.205</td>
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<tr>
<td>Post-PCS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BPNS</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level
** Correlation is significant at the .01 level

(DPSA) Diabetes Specific Parental Support for Adolescents
(PCS) Perceived Competence Scale
(BPNS) Basic Psychological Needs Scale

### Table 3

**One-Way ANOVA Results with PCS and AS by Participant Experience Level (N = 28)**

<table>
<thead>
<tr>
<th></th>
<th>Low Experience</th>
<th>Medium Experience</th>
<th>High Experience</th>
<th>$F$</th>
<th>$\eta^2$</th>
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<tbody>
<tr>
<td>PCS</td>
<td>$n$ 9 M 5.61 SD .55</td>
<td>$n$ 10 M 5.31 SD 1.01</td>
<td>$n$ 9 M 4.25 SD 1.15</td>
<td>5.25*</td>
<td>.44</td>
</tr>
<tr>
<td>AS</td>
<td>$n$ 9 M 1.61 SD 1.35</td>
<td>$n$ 10 M 2.28 SD 1.22</td>
<td>$n$ 9 M 2.13 SD 1.21</td>
<td>.367</td>
<td>-</td>
</tr>
</tbody>
</table>

PCS (Perceived Competence Score)
AS (Autonomy Support)
* $p = .013$
Competence and Relatedness

A linear regression was performed (see Table 4) to examine the effect post program perceived competence (PCS) had on relatedness (BPNS). This regression established that a participant’s perceived competence level could statistically significantly predict participant relatedness level, $F(1, 30) = 7.32, p = .011$ and PCS level accounted for 16.9% of the explained variability in relatedness levels (Cohen’s $f^2$ effect size = .20).

To examine the relationship between camper satisfaction and relatedness (BPNS) a linear regression was performed (See Table 5). This regression demonstrated that a camper’s relatedness level was a significant predictor of their satisfaction level, $F(1, 30) = 9.21, p = .005$ and that relatedness levels accounted for 21% of the explained variability in camper satisfaction levels (Cohen’s $f^2$ effect size = .26).

**Autonomy Support**

A one-way ANOVA was conducted to determine if levels of autonomy support were different for groups with different levels of experience managing their diabetes. Campers were divided into three groups based on their time since diagnosis in years based on their self-reported level of experience managing diabetes (low experience 0–24 months, $n = 9$; moderate experience 25–48 months, $n = 10$, and highly experienced 49–160 months, $n = 9$). There were no outliers, as assessed by boxplot; data were normally distributed for each group, as assessed by Shapiro-Wilk test ($p > .05$); and there was

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE(B)</th>
<th>β</th>
<th>t</th>
<th>Sig. (p)</th>
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<tbody>
<tr>
<td>Relatedness</td>
<td>.252</td>
<td>.093</td>
<td>.443</td>
<td>2.705</td>
<td>.011*</td>
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*significant at or below .05  
$R^2 = .169$.  

<table>
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<th>Variable</th>
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<th>SE(B)</th>
<th>β</th>
<th>t</th>
<th>Sig. (p)</th>
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<tbody>
<tr>
<td>Satisfaction</td>
<td>.310</td>
<td>.102</td>
<td>.485</td>
<td>3.035</td>
<td>.005*</td>
</tr>
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</table>

*significant at or below .05  
$R^2 = .209$.  

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Table 4

Linear Regression Results for Perceived Competence Predicting Relatedness

Table 5

Linear Regression Results for Relatedness Predicting Camp Satisfaction
homogeneity of variances, as assessed by Levene’s test of homogeneity of variances ($p = .913$). Autonomy support score increased from the low ($M = 1.61, SD = 1.35$), to moderate ($M = 2.28, SD = 1.22$), to high ($M = 2.13, SD = 1.21$) experience groups, in that order, but the differences between these physical activity groups was not statistically significant, $F(2,13) = .367, p = .70$ (refer to Table 3). An additional one-way ANOVA indicated there was no significant difference in terms of autonomy score between groups based on their HbA1C levels.

**Discussion**

The current study tested the use of self-determination theory within a family diabetes medical camp. Over the three-day camp, campers reported an increase in perceived competence with regards to managing their Type 1 diabetes, and individuals who had the newest diagnosis of Type 1 diabetes (those with low levels of experience between 0–24 months) gained the most from camp. This supports research question one. Through this enhanced competence, it was also found that improvements in campers’ perceived confidence predicted relatedness levels. We also found that when campers had higher levels of relatedness (connections with others), they were more likely to be satisfied with their camp experience. This finding supports research question two. Research question three explored the impact of camp on autonomy support. Findings indicate campers who have had diabetes longer, demonstrate higher levels of autonomy support, but did not significantly vary among experience levels. Although minimal gains were made, the researchers suggest if the RT process could be completely integrated into this medical specialty camp, more significant gains could be seen. Even though we were unable to fully implement the RT process for this diabetes camp, a similar, nonmedical process known as outcome-focused programming was used. The results from this camp can be used to support the need for the RT process to be included at medical specialty camps to ensure the best fit of programming and evaluation. It also supports the need of having Certified Therapeutic Recreation Specialist on staff and the inclusion of RT students to aid in the development of self-determined behaviors, self-efficacy, competence, and relationships, particularly for those impacted by chronic diseases like Type 1 diabetes (see Figure 2).

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**Figure 2.** Medical Specialty Camp Model for Campers with Diabetes
Limitations, Strengths, and Future Directions

Although this study met minimally acceptable amounts of participants for statistical analysis, the group examined was relatively small. In addition, 1/3 of the sample did not complete the pretest as a result of their late arrival to camp. Because campers and parents often arrive late (the camp begins on a Friday afternoon), the pretest data collection limitation will need to be addressed for future years. As such, the statements made about the efficacy of self-determination theory as mechanism of change for diabetes camps are limited, but promising. Internal consistency of the Basic Psychological Needs Scale was weak (α = .49); this should be further tested for reliability. Additionally, while not reported, the group of participants was relatively homogenous in terms of racial and ethnic breakdown, further examination into the efficacy of diabetes camps for diverse groups will only further benefit the field, especially considering that the diagnosis of Type 1 diabetes in multiple ethnic and racial groups is on the rise (Whiting et al., 2011). This study would also have benefited from indicators relating to socio-economic status. Several participants were scholarship recipients, an examination of how these groups may have benefited differently would have been a worthwhile endeavor. Future studies should explore this area.

Type 1 diabetes is frequently hereditary (Whiting et al., 2011), as such an examination of multi-generation diagnosed diabetes patients and the efficacy of medical camps may illuminate areas that are unknown to current research. This study also further demonstrated the efficacy of the Basic Psychological Needs Scale and Perceived Competence Scale as measures of relatedness and competence. As a primary goal of research is to replicate prior studies, this study helps to reinforce these measures as both valid and reliable indicators for youth with diabetes. Finally, it is recommended to include an effective measurement to determine the need for autonomy-supportive environments not only from parents, but health care providers and camp counselors as well would fully embrace SDT as a theoretical framework. Previous studies have used measures to examine the relationship between perception of autonomy support and the management of Type 1 diabetes as an outcome (Hill et al., 2008; Hill & Sibthorp, 2006; McAuliffe-Fogarty et al., 2007). With a qualitative approach and small sample sizes, other studies have been successful using the 4-item Diabetes-Specific Parental Support for Adolescents questionnaire; therefore, this instrument should be further considered for family diabetes camp (Hanna et al., 2005; Taylor et al., 2012).

Implications for Practice

The APIE process was not fully operational in this camp study, but the RT student impact, desired outcomes, and highly positive feedback from parents have provided the groundwork for its need. With the use of university RT students, medical specialty camps could include increased student involvement in the assessment, program planning, and program evaluation components to fortify understanding of the APIE process in action. While important, focus currently remains on the implementation stage and has the potential to serve as a multifaceted educational experience for these young professionals. The addition of a CTRS and RT students at diabetes camp also offers a “learning lab” experience with a unique population of participants who could greatly benefit for the students to begin understanding the RT process.
The benefit of a partnership with a local university has relieved the diabetes camp administration from the financial burden associated with staffing while providing real world experiences for future RT professionals. The benefit of university and community partnerships has been known and appreciated in the RT field for many years. This Diabetes camp provides a developing model of a successful alliance between higher education and community partners to meet both sectors’ growing needs. This partnership has also allowed data on motivation of diabetes management, something not yet collected from this camp until our partnership. This family diabetes camp values socio-emotional evidence-based practice even more since our involvement.

Conclusion

Camps nationwide are a driving force for positive youth development (ACA, 2013; Sibthorp, Bialeschki, Morgan, & Browne, 2013) and could be a highly effective “classroom” for motivating better diabetes management. Unfortunately, youth with diabetes have limited access to traditional camps due to the need for accessible medical staff (McAuliffe-Fogarty et al., 2007; Sibthorp, Paisley, & Hill, 2003). Therefore diabetes camps, and even more uncommon family diabetes camps, need to be further evaluated for program efficacy. Diabetes camps and family diabetes camps have a great opportunity to address some of the motivational challenges of youth suffering from this illness (Hill et al., 2008; Taylor et al., 2012). Grounded in self-determination theory, this study adds to the limited body of knowledge on family diabetes camps.

Family systems theory supports the need and potential impact of including families at medical specialty camps. Studies show promise of the long-term impact among autonomy supportive parents involved in diabetes camp (Gagnon, Hill & Goff, 2014; Taylor et al., 2012). The camp experience has a “magic” and fun to it, which makes it a great opportunity to learn about managing a child’s chronic illness. Using a prescribed camp program (i.e., theory-based) can offer benefits to the campers, parents, and family members involved. Although parent data were not reported in this study, numerous parents were observed embracing their child giving himself/herself an insulin injection for the first time, watching him complete the zipline, or being unafraid to test her blood sugar out of embarrassment…because everyone at diabetes camp understands. These experiences are grounds for excitement and celebration. A simple “congratulations” or “I’m proud of you” begins to instill the competence need of SDT. Campers have also made new friends and connected with old friends they might only see at camp, and for a short time were around people who had all had diabetes. As parents take back these small successes of their children, and begin to utilize the autonomy supportive parent techniques learned at camp, it is possible more internalized or self-determined behaviors will occur.

Other studies have explored the impact of RT summer camps among youth with neurofibromatosis and their social adjustment with peers (Allsop, Negley & Sibthorp, 2013). The study of youth with neurofibromatosis and the current study both provide evidence of the need for RT in medically specialty camps. These therapeutic camps provide a supportive environment that leave campers feeling more self-efficacious, autonomous, and wanting more of the same camp experience. This study examined a three-day camp, the potential of longer camps is
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obvious and has many potential benefits for both campers, longitudinal research, and bridging the gap between research and practice.

The need for evidence-based camp practice, traditional and medical specialty, must be pursued to ensure desired outcomes are achieved (McAuliffe-Fogarty et al., 2007; Ramsing & Sibthorp, 2008; Taylor et al., 2012). This is a prime opportunity for CTRSs and RT students to join the healthcare teams treating youth with diabetes. CTRSs and RT students, using the RT process, have the skill set to effectively program for outcomes in a diabetes camp setting. Diabetes camps as a mechanism of change for youth with Type 1 diabetes have been shown in this study and prior research to improve not only diabetes management, but also to develop relationships with peers that help these youth realize they are not alone in their struggle to overcome and manage their chronic diseases (Hill & Sibthorp, 2007; Ramsing & Sibthorp, 2008). This study and others using evidence-based programs can create a standard for diabetes camps to better prepare youth to manage their diabetes as they transition to healthy young adults (Carlson et al., 2013).

References


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