WHAT'S ON THEIR MINDS? AN EXAMINATION OF DISEASE-SPECIFIC MEDICAL SPECIALTY CAMPS AS AN INFLUENCE ON BASIC PSYCHOLOGICAL NEEDS AND BODY APPRECIATION IN ADOLESCENTS WITH TYPE I DIABETES

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ABSTRACT

This thesis focused on the influence of a disease-specific medical specialty camp on the well-being of adolescents with Type 1 diabetes. The study was conducted in the Summer of 2019 at Camp Kudzu in Georgia, USA. Data on well-being was collected both pre- and post-camp from a total of 537 campers. Well-being in this study is operationalized as the satisfaction of basic psychological needs (BPN). The indication of well-being is supplemented by body appreciation (BA) scores to explore the relation that the participants have with their bodies. Two standardized measures were used: the Basic Psychological Needs Satisfaction (BPNS) or Frustration (BPNF) Scale and the Body Appreciation Scale 2 for Children (BAS-2C). The researchers approached questions surrounding the relationship between BPNSF and BA; specifically it was found that there was an increase in BA from pre- to post-camp (mean difference = 0.189, SD = 0.731, p = 0.000) and that pre-camp BPNSF items positively moderated that increase (autonomy satisfaction [β = .0927, 95% C.I. (-.0956, .2810, p = 0.334]; relatedness satisfaction [β = 0.096, 95% C.I. (0.049 to 0.056), p = 0.000]; competence satisfaction [β = .101, 95% C.I. (0.059 to 0.114), p = 0.000]; autonomy frustration [β = 0.096, 95% C.I. (0.056 to 0.136), p = 0.000]; relatedness frustration [β = 0.048, 95% C.I. (0.013 to 0.083), p = 0.008]; competence frustration [β = 0.054, 95% C.I. (0.021 to 0.088), p = 0.001]. Gender was also explored as a moderating factor, and it was found to significantly moderate the relation between pre- and post-camp BA [+1 SD, gender = female; β = 0.795, SE = 0.073, p = 0.000, 95% CI (0.652 to 0.939); -1 SD, gender = male; β = 0.868, SE = 0.080, p = 0.000, 95% CI (0.709 to 0.939)]. These findings indicate that even without explicit

programming toward doing so, an MSC may be a place to cultivate feelings of body appreciation. It was also found that it is difficult to separate BPN and BA (post-hoc correlation analyses were run) and that future studies may further analyze the interrelatedness between the measures.

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CHAPTER ONE

INTRODUCTION

Chronic illness can impact the biological, social and psychological health of adolescents (Suris, Michaud, & Viner, 2004). Beyond the normative stresses of growing up, adolescents with chronic disease often report disease-related stresses (Suris et al., 2004). One common chronic disease among adolescents is Type I Diabetes (T1D). T1D is an autoimmune disease in which the pancreas produces insufficient insulin or stops producing insulin all together (Mayo Clinic, 2018). Lack of proper insulin leads to poor blood sugar regulation, which can have adverse effects in short-term and long-term. For instance, short-term bouts of hypoglycemia (low blood sugar) can lead to fatigue, dizziness, fainting, blurred vision, and at times coma or death (Wood & Peters, 2018). Prolonged poor blood sugar levels can lead to health complications such as cardiovascular disease, kidney damage, foot damage, blindness, nerve damage, and coma (Mayo Clinic, 2018; Martinez, Frazer, Dempster, Hamill, Fleming, & McCorry, 2018; Wood & Peters, 2018). An estimated 1.25 million Americans live with T1D, of which approximately 200,000 are youth (Juvenile Diabetes Research Foundation [JDRF], n.d.).

A strong body of research has explored the complex relation adolescents with T1D have with their disease (ADA, 2018; Davidson, Penney, Muller, & Grey, 2004; King et al., 2017; Wood & Peters, 2018), where for many, the daily management of diabetes is often described as emotionally taxing and inescapable (Davidson et al., 2004; King, King, Nayar, & Wilkes, 2017). Due to these and other stressors, adolescents with T1D are at higher risk for depression and elevated emotional distress (Birmaher et al.,

1996; Davidson et al., 2004; Di Battista et al., 2009; Herzer & Hood, 2010; Kanner et al., 2003; Weissber-Benchell & Antisdel-Lomaglio, 2011). For instance, compared to nondiabetic youth, the prevalence of major depression has been suggested to be at least 2-3 times greater in adolescents with T1D (Grey, Whittemore, & Tamborlane, 2002; Kovacs et al., 1997). Further, the poorer rates of mental health in this population have been associated with worse glycemic control, more complications due to short-term unregulated blood sugar, higher health-care costs, and increased frequency of adverse events (e.g. extremely low blood sugar leading to fainting) (Herzer & Hood, 2010; Lawrence et al., 2006; Leichter & See, 2005; Yi et al., 2008b).

Beyond these more generic physical and mental health issues, the complex relationship adolescents with chronic disease have with their bodies can also harm their body image (Araia et al., 2017; Troncone, Prisco, Cascella, Chianese, Zanfardino, & Iafusco, 2016; Wing, Nowalk, Marcus, Koeske, & Finegold, 1986). For example, adolescents with T1D tend to have worse body image than their peers without a chronic illness (Araia et al., 2017; Troncone et al., 2016) and higher instances of eating disorder symptomology than the average adolescent (Wing et al., 1986). The negative concerns adolescents with T1D have with their body image (Troncone, 2016) may lead to poorer disability management (Wing et al., 1986). Correspondingly, poorer management may have direr health consequences in the short- and long-term ranging from dizziness to coma (Mayo Clinic, 2018; Martinez et al., 2018; Wood & Peters, 2018). Thus, an understanding of what settings and factors promote greater rates of positive mental health and body appreciation in adolescents with T1D remains an important area of inquiry.

One mechanism to mitigate the emotional challenges in adolescents with T1D may be the use of structured out of school time (OST) experiences, such as medical specialty camps (MSC). Typically, these camps are staffed with counselors and medical professionals that understand the unique needs of someone with a certain illness or disease. MSCs have been linked to enhanced youth development (Gillard & Allsop, 2016; Gillard, Witt, & Watts, 2011; Gillard & Watts, 2013; McAuliffe-Fogarty, Ramsing, & Hill, 2007; Meltzer et al., 2018; Sendak, Schilstra, Tye, Brotkin, & Maslow, 2018) and improved disease management (Hill et al., 2015; McAuliffe-Fogarty et al., 2007). Some MSCs have been linked with improvements in socioemotional outcomes (Gagnon, Garst, & Townsend, 2019). A growing body of literature has explored the socioemotional aspects that may improve diabetes management in adolescents (Johnston-Brooks, Lewis, & Garg, 2002; Luyckx, Rassart, Aujoulat, Goubert, & Weets, 2016; Martinez et al., 2018). One socioemotional theory commonly explored is that of basic psychological needs (BPN); the factors of BPN – autonomy, relatedness, and competence—have been linked to improved diabetes management (Austin, Senécal, Guay, & Nouwen, 2011; Williams, McGregor, Zeldman, Freedman, & Deci, 2004). Given the unique challenges facing adolescents with T1D, the following study examined how an MSC can influence socioemotional development in parallel with body image in a sample of adolescents with T1D. In the proceeding sections the guiding research questions and hypotheses are described, the study is presented, and the findings are explored. To guide the reader in the review of literature, the primary research questions and hypotheses are presented in the next immediate section along with the operationalization of key terminology.

Research Question 1

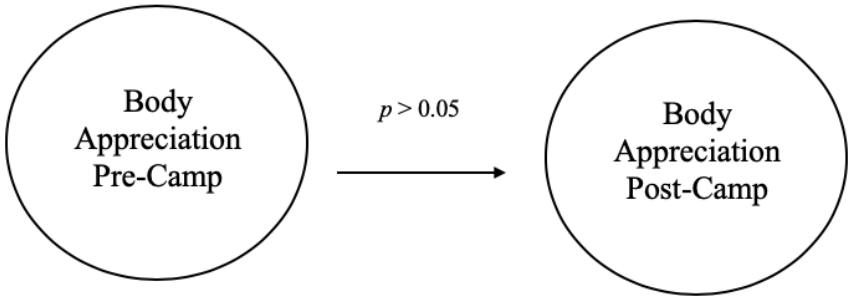
Does body appreciation change when no deliberate programming on body image is present in a medical specialty camp?

Hypothesis1

H1: No significant change in body appreciation scores will occur from pre-to post-camp (see Figure 1).

Figure 1

H1: No Significant Change in Body Appreciation Scores



Research Question 2

Do pre-camp basic psychological needs scores moderate any changes in body appreciation?

Hypotheses 2

H2A: Autonomy satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

H2B: Relatedness satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

H2C: Competence satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

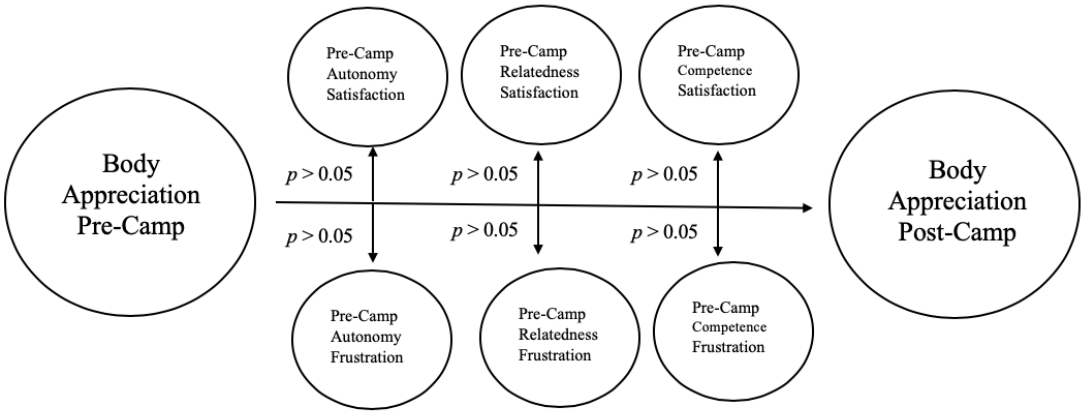
H2D: Autonomy frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

H2E: Relatedness frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

H2F: Competence frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp (see Figure 2).

Figure 2

H2: Pre-Camp BPNSF Will Not Moderate Any Changes in BA



Research Question 3

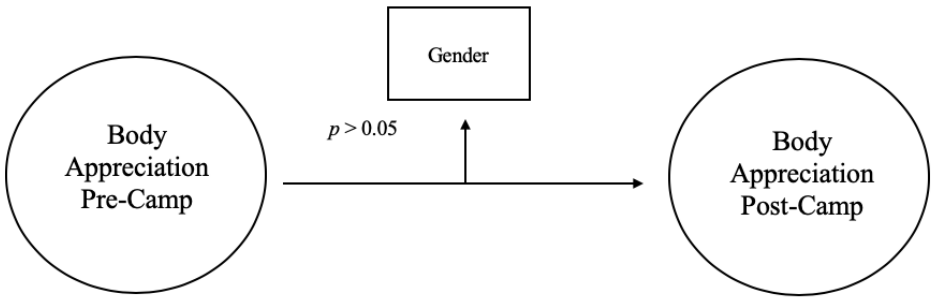
Does gender play a meaningful role in the change of body appreciation pre-to post-camp?

Hypothesis 3

H3: There will be no gendered effect on change of score pre-to post-camp (see Figure 3).

Figure 3

H3: Gender Will Not Play a Meaningful Role in Change



Definition of Primary Study Constructs

Basic Psychological Needs: fulfillment of three needs (autonomy, competence, and relatedness) lead to well-being evidenced by psychological growth, integrity, and self-motivation; frustration of the needs lead to ill-being and diminished self-motivation (Deci & Ryan, 2000)

Body Appreciation: the intentional choice to accept the body despite imperfections, to respect and attend to the body's needs with health-promoting and preserving behavior, and to resist or refocus beauty standards (Avalos, Tylka, & Wood-Barcalow, 2005)

Type I Diabetes: a chronic condition in which the pancreas creates insufficient or no insulin, creating complications with blood sugar balance and potential other health complications if left untreated (Mayo Clinic, 2017)

CHAPTER TWO

LITERATURE REVIEW

Socio-Emotional Development

Self-Determination Theory (SDT) represents a framework for understanding youth development, as it offers a perspective on human development which assumes individuals have a natural tendency for growth (Deci & Ryan, 2000). More specifically, SDT posits that satisfaction of three basic psychological needs (BPN) – autonomy, relatedness, and competence – is vital for a person's well-being (Deci & Ryan, 2000; Ryan & Deci, 2000b). Importantly, these BPN are not just preferences on wellbeing, but necessary requirements for psychological growth (Ryan, 1995). The following definitions of the three needs are paraphrased from Ryan & Deci 2000b:

> **Autonomy** is described as self-governance or self-regulation. It is not individualism or selfishness. Rather, the focus is on self-awareness and self-determination. It is achieved when behavior is a choice of one's own volition (p. 330-333). **Relatedness** comes when one is cared for and is able to care for others that are important to them. Not only is it fulfilled with meaningful relationships, but it grows when one feels connected to those around them (p.334-335). **Competence** can be achieved when one feels mastery over skills that are important in one's life. It is not to be confused with lack of room for growth, but rather emphasizes feelings of achievement that come with accomplishment (throughout).

Several studies support the premise of SDT, that BPN can predict or act as a proxy of well-being. For instance, satisfaction of these BPN has been linked to thriving, while frustration of these BPN has been linked to depression (Chen et al., 2015; Deci & Ryan, 2000; Deci & Vansteenkiste, 2004**).** The connection between BPN satisfaction and well-being has been seen on a macro-scale of general daily feelings (Deci &

Vansteenkiste, 2004; Ilardi, Leone, Kasser, & Ryan, 1993) and a micro-scale dependent on the activity at hand (Reis, Sheldon, Gabe, Roscoe, & Ryan, 2000). Additionally, BPN have been used a proxy for well-being across cultures (Chen et al., 2015; Deci, Ryan, Gagné, Leone, Usunov, & Kornazheva, 2001). BPN have also been illustrated as mediating factors between well-being/ill-being and personality traits; life satisfaction and depression were partially or fully explained by need satisfaction or frustration, respectively when compared to personality traits (Simsek & Koydemir, 2013).

The relevance of BPN theory has been supported in adolescents (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Demirtas, Tildiz, & Baytemir, 2017; van den Bos, Hutteman, & Reijntjes, 2017). Specifically, improving well-being, operationalized by the satisfaction of BPN, has been explored as a tool for improved diabetes management in adolescents with T1D (Austin et al., 2011; Williams et al., 2004). Research utilizing SDT as a framework (Deci & Ryan, 1985; Sheldon, Williams, & Joiner, 2003) has demonstrated increased motivations from enhanced autonomy and competence are positively correlated with improved glycemic control (Senecal, Nouwen, & White, 2000; Williams, Freedman, & Deci, 1998). The finding that autonomy and competence may act as factors for improved glycemic control suggests that socioemotional factors such as BPN may facilitate more effective diabetes self-management, reducing harmful side-effects due to uncontrolled insulin and blood-sugar levels (Senecal et al., 2000; Williams et al., 1998). If an increase in socioemotional factors, such as BPN, can reduce harmful side-effects of mismanaged blood sugar it is important to understand mechanisms and contexts in which BPN can be improved. As

indicated earlier, MSCs may act as context to improve socioemotional skills (BPNS) in adolescents with T1D.

Medical Specialty Camp as Context for Socioemotional Development in Adolescents

How adolescents spend their out of school time (OST) is one of the main predictors of youth development (Zarrett & Lerner, 2008). OST youth programs may be instrumental in enhancing the wellness of youths due to exposure to intentional learning experiences (Le Menestrel & Perkins, 2007) outside of school and family obligations (Li, Bebiroglu, Phelps, Lerner, & Lerner, 2008). Specifically, meaningful involvement in quality OST programs has predicted pro-social behavior (Morrissey & Werner-Wilson, 2005) as well as improved health, socioemotional, and educational wellness (Le Menestrel & Perkins, 2007). The positive influence of OST programs on adolescent functioning and development have been found to be meaningful after accounting for sex, race, and family household income (Zarrett & Lerner, 2008).

One potential OST context to develop socioemotional skills in youth are summer camps (Henderson, Whitaker, Bialeschki, Scanlin, & Thurber, 2007). Camps can provide both short- and long-term benefits for youth including the formation of supportive relationships, increased knowledge of social skills, and discovery of self-identity (Garst, Browne, & Bialeschki, 2011; Gillard & Allsop 2016; Henderson, Bialeschki, & James, 2007; Henderson**,** Bialeschki, & Scanlin et al., 2007; Henderson et al., 2007; Thomas, 1996). These positive changes are frequently observed by the campers themselves, camp staff, and by their parents (Henderson et al., 2007; Thurber, Scanlin, Scheuler, & Henderson, 2007). One study indicated these changes may be observed as far as six

months post-camp (Henderson et al., 2007). In a review of youth development in structured after school programs, development of positive aspects was found most often when programs focus on inclusion and diversity as well as the promotion of healthy behaviors (Johnston Nicholson, Collins, & Holmer, 2004). More specifically, Johnston et al. (2004) indicated that the best programs often take into account the specific struggles that are faced by the adolescents served, allowing the adolescents to be agents of change in their own situations. A specific type of camper that may have unique challenges are those that have chronic illness.

One camp type that may benefit youth with chronic illnesses are MSCs. Increased well-being has been observed in disease-specific camps for children with HIV/AIDS (Gillard et al., 2011), cancer (Gillard & Watts, 2013), and T1D (McAuliffe-Fogarty et al., 2007). Disease specific camps have been studied as settings in which feelings of meaning and purpose improve in campers with chronic or serious illness (Meltzer et al., 2018). A recent systematic review of MSCs by Sendak, Schilstra, Tye, Brotkin, and Maslow (2018) indicated that over 90% of MSCs in their study focused on the development socioemotional skills such as active leadership and sustained positive relationships. Active leadership is developed via opportunity to learn new skills and chances for adventure experiences to build self-reliance (Gillard, Witt, & Watts, 2011). Indeed, the emerging research exploring MSCs suggests these camps can act as powerful context for development. For example, MSCs also allow for youth with serious illness to find a sense of belonging (McAuliffe-Fogarty et al., 2007), acceptance (Meltzer et al., 2018), enjoyment, and being themselves (Gillard & Allsop, 2016). Participation in MSCs often

leads to close interpersonal relationships with others with a similar disease (McAuliffe-Fogarty et al., 2007), which have been linked to better disease management (Doe, 2018). Other outcomes such as improvements in positive attitudes have been found to be best fostered with intentional programs to build support for BPN (Gillard & Watts, 2013). Additional investigations indicate MSCs are linked to improvements in the adolescent's abilities to plan and stick to goals (Woods, Mayes, Bartley, Fedele, & Ryan, 2013) which is helpful for daily management of illnesses such as T1D.

In addition to the socioemotional development often facilitated by MSCs, there may be specific programmatic impacts related to improved disease management. In a review of MSCs for youth with diabetes, McAuliffe-Fogarty et al. (2007) suggested in addition to the benefits associated with more traditional camp experiences, these MSCs also tended to focus on disease management education including blood glucose control, regimen adherence, and social support. Similarly, Hill et al. (2015) indicated that in the context of MSCs, a child's perceived diabetes knowledge competence can increase. With an understanding of how MSCs may act as a context which enhances socioemotional well-being among children with chronic illnesses, it is also important to understand how adolescents' feelings about themselves and their bodies may also influence overall well-being.

Body Image in the Context of Adolescence

Body image is a complex construct, composed of several factors of both positive and negative ideations. Positive and negative body image are not simply opposites where the absence of one means the presence of the other; rather, they are distinct constructs

with socioemotional impacts and profiles of their own (Tylka & Wood-Barcalow, 2015b). There is a large body of literature connecting both positive and negative body image with mental health. Generally, aspects of negative body image are linked to worse mental health and aspects of positive body image are linked with better mental health (Fuller-Tyszkiewicz et al., 2015; O'Dea & Abraham, 1999; O'Dea, 2004; Prabhu, & Cunha, 2018; Rierdan, Koff, & Stubbs, 1988; Rierdan, Koff, & Stubbs, 1989; Tiggemann, 2005; van den Berg, Mond, Eisenberg, Ackard, & Neumark-Sztainer, 2010). Differences between positive and negative body image, as well as the processes to develop each are important to understand.

In 2010 Wood-Barcalow, Tylka, and Augustus-Horvath proposed positive body image could be defined as:

> overarching love and respect for the body that allows individuals to appreciate their uniqueness as well as the functions the body performs; acceptance and admiration for the body even when aspects of the body differs from societal ideals; ability to feel beautiful and comfortable in the body; emphasis on assets over imperfections; interpretation of information in a body-protective manner (p. 112).

Positive body image may influence overall psychological well-being and is multifaceted to include body acceptance and filtering information through a body-protective manner, amongst others (Tylka & Wood-Barcalow, 2015b). The uniqueness of positive body image allows it to be manifested and expressed differently across cultures and background (Tiggemann, 2015). Whereas positive body image is associated with love and respect for one's own body, negative body image includes feelings of dissatisfaction with appearance, feelings of high self-monitoring and overwhelming thoughts about the body, and pre-occupation with body size (Wood, Becker, &

Thompson, 1996). Prevalence of negative body image has been linked to depressive symptoms in adolescents (Rierdan et al., 1988; Wood, Becker, & Thompson, 1996) and greater levels negative body image has been linked as a predictor of persistent depression in adolescent girls (Rierdan et al., 1989). Those with higher levels of body dissatisfaction have been found to have lower indicators of self-esteem and this effect only worsens as adolescents mature (Prabhu, & Cunha, 2018). Aspects of negative body image may be established at ages as young as 12 (Kostanski & Gullone, 1998); this emphasizes the importance of understanding the factors that lead to body image development.

Due to the connections established between mental well-being and body image, understanding positive and negative factors of body image and how they can be cultivated is important (Wood et al., 1996). The development of body image in adolescence can be influenced by several factors including gender, BMI (Obeid et al., 2018; Trompeter et al., 2018), and onset of puberty (Williams & Currie, 2000). In addition to factors beyond an individual's level of control, there have been strong connections found between the development of body image and socioemotional factors. In 2010, Frisén and Holmqvist found positive body image was linked to enhanced feelings of belonging, satisfaction with appearance, healthy views on exercise, and positive relationships with others. The adolescents from Frisén and Holmqvist's 2010 study were also aware of these factors in their lives: they consciously understood that their thoughts and feelings were related to their body image. Research also suggests self-esteem and body image are highly related: how an individual feels about their appearance may influence self-esteem (Fuller-Tyszkiewicz et al., 2015; Tiggemann, 2005; van den

Berg et al., 2010). Specifically, improvements in self-esteem may be linked to improved body image in both male and female adolescents (O'Dea & Abraham, 1999) and protective against negative thoughts about their bodies (O'Dea, 2004) yet a causal relation has not been established between these factors.

The present study focuses on one specific aspect of positive body image: body appreciation (BA). BA, operationalized by Avalos, Tylka, and Wood-Barcalow (2005), is the intentional choice to accept one's own body despite imperfections, respect and attend to the body's needs with health-promoting and preserving behavior, and to resist or refocus beauty standards. More simply, BA reflects body acceptance, appreciation for body's functions, and caring about one's body (Andres, Tiggemann, & Clark, 2016; Halliwell, Jarman, Tylka, & Slater, 2017; Tylka & Wood-Barcalow, 2015a). These factors are also supported by the 2010 study from Frisén and Holmqvist that found adolescent positive body image included satisfaction with appearance and appreciation for the body's abilities. In the present study, BA was chosen as the sole indicator of positive body image, due to its established relation with how the body functions (Tylka & Wood-Barcalow, 2015b) and the increased awareness that adolescents that manage a chronic illness have for their bodies (Araia et al., 2017; Troncone et al., 2016; Wing et al., 1986).

As suggested earlier, when compared with their peers without chronic illness, adolescents with T1D tend to report poorer body image (Araia et al., 2017; Troncone et al., 2016) and a relatively high symptomology of disordered eating (Wing et al., 1986). Adolescents with T1D also tend to feel that they are not in control of their own bodies

and find taking care of their bodies to be emotionally taxing and inescapable (King et al., 2017). The high negative awareness adolescents with T1D have about their bodies is important to note, as it has also been found that adolescents with poorer body image tend to have worse blood sugar control (Araia et al., 2017; Kichler, Foster, & Opipari-Arrigan, 2008). Specifically, it has been observed that adolescent females tend to manage their diabetes worse than males (Austin et al., 2011), often times motivated by a desire to lose weight (Kichler et al., 2008). The contentious relationship these adolescents have with their bodies (Araia et al., 2017; Troncone et al., 2016) is predicted to influence their BA scores.

CHAPTER THREE

METHOD

Study Site and Participant Characteristics

The present study was conducted at Camp Kudzu in Georgia in the Summer of 2019. Camp Kudzu is an independent, non-profit organization that serves adolescents and children with T1D. Attendance has increased to over 840 annual participants in its 19 years and consists of Georgians that the racial, ethnic, and socioeconomic backgrounds of that state(Camp Kudzu, n.d.a; Table 1). Kudzu offers a variety of programs, but the present study focused on a resident summer camp. Summer camp staff consists of endocrinologists, health care professionals, and volunteers trained in diabetes management. Kudzu's mission is focused on the empowerment of families, children, and teens living with T1D while encouraging healthy habits and relationship building amongst those who have T1D (Camp Kudzu, n.d.b). This goal is accomplished through normalizing the T1D experience and recognizing the unique struggles each camper experiences. During Kudzu sessions campers meet daily with clinicians to predict how many carbohydrates (i.e., carb) they will consume during their meals, estimate their insulin needs, and discuss their carb intake. Blood sugar levels are taken before and after meals and before high-intensity activities to assist campers in understanding their blood sugar and insulin needs. They are encouraged to discuss their T1D management with other campers at mealtimes and whenever appropriate. In addition to the planning and awareness associated with their disease, camper successes are publicly celebrated. For

example, at mealtime, the Golden Syringes are given to campers that accomplish a new disease-management-related goal.

Prior to data collection, an a-priori power analysis was conducted to determine the minimum sample size necessary for the eight study hypotheses utilizing criteria developed from prior studies employing similar measures and populations (i.e., Gagnon et al., 2019). Specifically, a conservative approach (power of .80; $\lambda = 11.94$) was selected with multiple independent variables (IV) and dependent variables (DV) (alpha = .05; average IV to IV $r = .01$; average IV to DV: $r = .01$, $R^2 = .038$) (Cohen, Cohen, West, & Aiken, 2003). The power analysis with these criterion suggested a sample of at least 301 was necessary for hypothesis testing, thus the final study sample of 537 was sufficient for the study purposes. Campers were 44.2% ($n = 222$) male and 55.8% ($n = 280$) female. Ages ranged from 10 to 20 years old, with the mean age for this study between 13 and 14 years old ($M = 13.787$ years; SD = 1.927). The majority of campers self-identified as White (64.4%), with the next largest group identifying as Black or African American (18.1%), and others identifying as Asian Origin (0.7%), East Asian (0.4%), Hispanic or Latino Origin (3.9%), Multiple Race (4.8%), or Other (1.5%). 81.6% of campers had been to Camp Kudzu prior to this year, and 89.1% had attended summer camp of some sort prior to this year. For a deeper description of campers, see the camper demographic information found in Table 1.

Table 1

Camper Demographics

Factor/*Item*	**N (%)**
Gender	502
Female	280(55.8)
Male	222(44.2)
Age	501
10	5(1)
11	58(11.6)
11.5	2(0.4)
12	83(16.6)
13	98(19.6)
14	67(13.4)
14.5	1(0.2)
15	78(15.6)
16	56(11.2)
17	48(9.6)
18	4(0.8)
20	1(0.2)
Ethnic Group	504
Asian Origin	4(0.8)
Black, African American	97(19.2)
East Asian	2(0.4)
Hispanic or Latino Origin	21(4.2)
Multiple Race	26(5.2)
Other	8(1.6)
White	346(68.7)

Inclusion/Exclusion

Parents of campers were informed of the study prior to the commencement of camp. Specifically, parents were emailed about the study from Camp Kudzu partners and their ability to opt out of the study if they so choose. Prior to the study campers were informed of the benefits and risks of the study and that their participation is voluntary. Campers were not required to participate in the study; those that chose not to be involved in the study still filled out all questionnaires, but their answers were not included.

Sampling Procedures

The researchers concluded that the camp was an ideal location for the present study due to the age of campers, its MSC status, and the camp's dedication to adolescents with T1D. Due to its selective and subjective nature, this sampling technique is purposive, specifically a typical case sample (Yin, 2014). The present study is done in hopes of generalization to similar cases such as other MSCs but is not generalizable to all adolescents with T1D.

Camp occurred at three different sites in similar settings of Georgia throughout the summer and was done in four different week-long sessions. Data was collected via paper questionnaire and was administered by camp counselors during cabin time. Counselors were advised not to give answers to the campers, but rather to help them understand the questions. The questionnaires included the two standardized scales: the Body Appreciation Scale-2 for Children and the Basic Psychological Needs Satisfaction or Frustration Scale. The questionnaires were also where the campers indicated their gender and racial identity. The full questionnaires can be found in appendices C and D. All measures are described below.

Measures

Gender

Camper gender identity was collected through camper self-selection in the pre-camp questionnaire. Gender is defined as the socially constructed characteristics that determine if someone is 'male', 'female', or neither (WHO Regional Office for Europe, 2019). It is not, however, to be confused with sex, which relates to anatomical differences that one is born with. As opposed to biological, gender identity has more to do with the

psychological conception of the self and the roles that they, and society expect, them to fulfill (West & Zimmerman, 1987). It is an important part of the way one interacts with the world, and often influences the expectations of society.

For the purpose of this study, gender was recorded using the following options:

a. Female
b. Male
c. Non-Binary
d. Please Fill In

Body Appreciation

The Body Appreciation Scale 2 for Children (BA2-2C) is a 10-item questionnaire used to assess BA. This scale incorporates measures for body acceptance (e.g., *I feel like I am beautiful even if I am different from pictures and videos of attractive people)*, caring and respect for the body (e.g., *I pay attention to what my body needs)*, and inward positivity (e.g., *You can tell I feel good about my body by the way I behave)*. It includes 10 items and asks the participant to rank on a 1-5 Likert-style scale from never (1) to always (5). This scale was developed as a third iteration of the Body Appreciation Scale (BAS). Alterations were made in wording to ensure understanding of the question in a younger sample. Additionally, associations were considered between BA, body image, mood, and dieting. It is found that the BAS-2C has internal consistency reliability, construct validity, criterion-related validity, and test-retest reliability (Halliwell et al., 2017). In the full sample from Halliwell et al. (2017), Cronbach's alpha for internal consistency study was .89; the re-test sample had an alpha of .90 in full, .88 in girls, and

.89 in boys. In this study, Cronbach's alpha pre-and post, respectively, were 0.956 and 0.966. The Halliwell et al. (2017) study indicated construct validity with body esteem has a positive correlation of $r = .76$, $p \leq .001$. There was a negative correlation found with body surveillance, $r = -.61$, $p \leq 001$. In addition, after testing and re-testing 6 weeks apart, it was found that scores did not change considerably over time. Intra-class correlation coefficients and paired sample t-tests were done to test test-retest reliability; ICCs of 0.81 were found in both boys and girls, and the t-tests indicated no significant changes over time. The BAS-C2 is appropriate to be used in samples as young as 9 years old, which is why it is appropriate to use for this sample.

The Body Appreciation Scale 2 for Children was selected for this study instead of the Body Esteem Scale due to the wording of the questions and the adaptation to the age of the sample. The researchers felt that the questions asked in the body esteem scale may bring up negative thoughts about the body that may trigger self-consciousness in the sample. Due to the sensitivity of the sample in relation to their body image, BA was deemed the most appropriate measurement. Additionally, a large link between the scales was established by Halliwell et al. in 2017; it was also found that BA contributed to 10% variance in positive affect above the shared positive affect with body positivity.

A list of the questions for the BAS-2C utilized in the present study can be found in Appendix A.

Basic Psychological Needs Satisfaction and Frustration

The Basic Psychological Needs Satisfaction and Frustration (BPNSFS) scale is indicative of 6 factors: respective satisfaction or frustration of autonomy, relatedness, and

competence. The BPNSFS comes from a study by Chen et al. in 2015. Need satisfaction comprises 'well-being' in autonomy satisfaction (e.g., *I feel a sense of choice and freedom in the things I undertake*), relatedness satisfaction (e.g., *I feel that the people I care about also care about me*), and competence satisfaction (e.g., *I feel confident I can do things well).* Frustration of needs is indicated by 'ill-being' by autonomy frustration (e.g., *Most of the things I do feel like I have to),* relatedness frustration (e.g., *I feel excluded from the group I want to belong to)* and competence frustration (e.g., *I have serious doubts about whether I can do things well*). In the scale development study by Chen et al. in 2015, acceptable Cronbach's alphas were found for autonomy satisfaction ($\alpha = 0.81$), relatedness satisfaction ($\alpha = 0.72$), competence satisfaction ($\alpha = 0.88$), autonomy frustration ($\alpha = 0.71$), relatedness frustration ($\alpha=0.81$), and competence frustration ($\alpha = 0.86$). The present study found Cronbach's alphas to be pre-and post, respectively, autonomy satisfaction ($\alpha = 0.751, 0.847$), relatedness satisfaction ($\alpha = 0.875, 0.911$), competence satisfaction ($\alpha = 0.848, 0.893$), autonomy frustration ($\alpha = 0.812, 0.893$), relatedness frustration ($\alpha = 0.857, 0.909$), and competence frustration ($\alpha = 0.897, 0.914$). The BPNSFS uses 24 Likert-style questions ranging from completely untrue (1) to completely true (5) are asked about how the participant feels about certain aspects of themselves and their lives. A modified scale from completely untrue (1) to completely true (7) was used by Gagnon, Garst, & Townsend in 2019 with this same sample, and the extended scale will be used in this study. The increase in range is to encourage variation in response choice. The questions for the BPNSFS can be found in Appendix B.

CHAPTER FOUR

DATA PROCESSING, ANALYSIS, AND FINDINGS

Data Preparation

Prior to analysis, the data was examined for outliers and normality using Mahalanobis distance and chi-square distribution ($p < .001$; Field, 2013). This analysis suggested 14 respondents were harming normality in the data set, and were thus removed, leading to the final study sample of 537. In all analyses, a pairwise deletion approach to missing data was employed, to maximize responses (Field, 2013).

Analysis and Findings

Demographic information such as race and gender identities were collected once, in the pre-camp questionnaire. Questionnaire data for the socioemotional factors was collected twice, at the commencement of camp and at the conclusion of camp. The collection of data in two sessions, pre- and post-camp, allowed us to identify potential changes in the measured socioemotional factors related to the camp experience. For research question one, the goal was to assess change in BA score from pre- to post-camp to determine if the two averages differed significantly. For this analysis, a paired samples t-test was utilized (Field, 2013). Cohen's D was also employed for the first research question to express the difference between the means in standard deviation units, a measurement of effect size (Field, 2013). To assess potential factors influencing the relation between pre- and post-camp BA scores, a test of moderation was utilized (Field, 2013). Research questions two and three are analyzed with moderations tests, as they focus on what factors may influence of BA scores pre- to post-camp. Moderation occurs

"when the relationship between two variables changes as a function of a third variable" (Field, 2013, page 879); in this case, the moderator (the variable that changes the size and/or direction of the relationship between the other two variables) being tested in each analysis was a factor of BPN or gender. For each moderator output, a value of β is given; β is the standardized regression coefficient, which indicates the strength of relationship between the given predictor (in this case, each factor of BPN) and an outcome (in this case, post-camp BA) (Field, 2013, page 870). Each value of β indicates how much (in standard deviations) post-camp BA would change if pre-camp BPN changed one standard deviation. These values of β are also given a p-value, or a significance level; for this study an alpha level of 0.05 was used. Findings for each research question can be found below.

Research Question 1

Does body appreciation change when no deliberate programming on body image is present in a medical specialty camp?

Hypothesis 1

H1: No significant change in body appreciation scores will occur from pre-to post-camp.

Results 1

To test if there was a change in body image pre- and post- camp, a paired-samples t-test of means was conducted. This analysis indicated that scores were significantly higher post-camp (M = 5.859, SD = 1.208) than pre-camp (M = 5.671, SD = 1.200),

[$t(423) = 5.323$, $p < .001$, $d = 0.156$], as seen in Figure 4. On average, BA scores increased by 0.189, with a standard deviation of 0.731; these changes are significant for an alpha value of 0.05 and p of 0.000. We reject the null hypothesis and conclude that there were significant changes in BA scores from pre-to post-camp. Descriptive statistics, factor-level data, and item-level data is available in Table 2. Additionally, the detailed pair-wise t-test statistics can be found in Table 3.

Figure 4

Results 1: Significant Change in Body Appreciation Scores

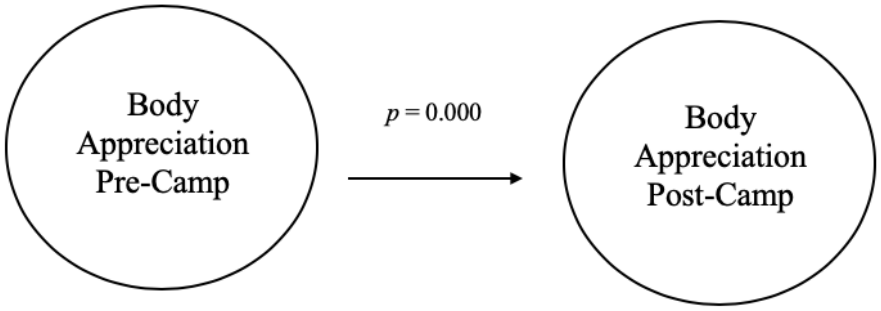


Table 2

Descriptive Statistics

Factor/*Item*	**Pre-Camp**		**Post-Camp**	
	***M*◊ (*SD*)**	**Cronbach's α**	***M*◊ (*SD*)**	**Cronbach's α**
Autonomy Satisfaction	5.776 (0.932)	.751	5.927 (0.999)	0.847
I feel a sense of choice and freedom in the things I undertake.	5.646 (1.259)		5.895 (1.193)	
I feel that my decisions reflect what I really want.	5.64 (1.279)		5.823 (1.256)	
I feel I have been doing what really interests me.	5.931 (1.172)		6.037 (1.16)	
I feel my choices express who I really am.	5.859 (1.326)		5.933 (1.234)	

Table 2 Cont.

Descriptive Statistics				
Autonomy Frustration	2.740 (1.326)	0.812	2.339 (1.374)	0.893
Most of the things I do I feel like "I have to".	3.787 (1.763)		2.786 (1.732)	
I feel forced to do many things I wouldn't choose to do.	2.421 (1.666)		2.281 (1.567)	
I feel pressured to do too many things.	2.397 (1.626)		2.140 (1.456)	
My daily activities feel like a chain of obligations.	2.383 (1.599)		2.145 (1.523)	
Relatedness Satisfaction	6.099 (0.973)	0.875	6.190 (0.966)	0.911
I feel that the people I care about also care about me.	6.123 (1.155)		6.194 (1.076)	
I feel connected with people who care for me, and for whom I care.	6.152 (1.142)		6.206 (1.026)	
I feel close and connected with other people who are important to me.	6.192 (1.068)		6.241 (1.078)	
I experience a warm feeling with people I spend time with.	5.887 (1.246)		6.081 (1.184)	
Relatedness Frustration	2.308 (1.318)	0.857	2.152 (1.358)	0.909
I feel excluded from the group I want to belong to.	2.661 (1.743)		2.346 (1.616)	
I feel that people who are important to me are cold and distant towards me.	1.998 (1.391)		2.041 (1.484)	
I have the impression that people I spend time with dislike me.	2.364 (1.594)		2.213 (1.610)	
I feel the relationships I have are just superficial.	2.294 (1.612)		2.034 (1.417)	
Competence Satisfaction	5.929 (0.942)	0.848	6.126 (0.915)	0.893
I feel confident that I can do things well.	5.88 (1.495)		6.127 (1.010)	
I feel capable at what I do.	5.987 (1.102)		6.208 (0.993)	
I feel competent to achieve my goals.	5.964 (1.144)		6.117 (1.113)	
I feel I can successfully complete difficult tasks.	5.862 (1.183)		6.066 (1.073)	
Competence Frustration	2.421 (1.436)	0.897	2.166 (1.348)	0.914
I have serious doubts about whether I can do things well.	2.571 (1.664)		2.267 (1.510)	
I feel disappointed with many of my performances.	2.457 (1.648)		2.213 (1.515)	

Table 2 Continued

I feel insecure about my disabilities.	2.397 (1.6262)		2.136 (1.475)	
I feel like a failure because of the mistakes I make.	2.308 (1.672)		2.036 (1.535)	

Table 2 Cont.

Descriptive Statistics

Body Appreciation	5.637 (1.216)	0.956	5.855 (1.206)	0.966
I feel good about my body.	5.327 (1.529)		5.703 (1.461)	
I respect my body.	5.919 (1.246)		6.032 (1.256)	
I feel that my body has at least some good qualities.	5.987 (1.197)		6.103 (1.144)	
I take a positive attitude towards my body.	5.553 (1.495)		5.778 (1.437)	
I pay attention to what my body needs.	5.963 (1.1669)		6.076 (1.1422)	
I feel love for my body.	5.511 (1.502)		5.744 (1.465)	
I appreciate the different and unique things about my body.	5.668 (1.395)		5.887 (1.302)	
You can tell I feel good about my body by the way I behave.	5.248 (1.646)		5.502 (1.585)	
I am comfortable in my body.	5.620 (1.507)		5.827 (1.395)	
I feel like I am beautiful even if I am different from pictures and videos of attractive people (e.g. models/actresses/actors).	5.533 (1.607)		5.7631 (1.516)	

Table 3

Composite Scores Paired Sample t-test

		Paired Differences						
			95% Confidence Interval of the Difference					
Pair	***M*◊ (*SD*)**	**Std. Error Mean**	**Lower**	**Upper**	**t**	**Df**	**Sig. (2-tailed)**	**Cohen's D**
Pair 1 Autonomy Satisfaction post - pre	0.142 (0.838)	0.039	0.065	0.218	3.657	468	0.000	0.149
Pair 2 Autonomy Frustration post - pre	-0.380 (1.173)	0.054	-0.486	-0.274	-7.056	473	0.000	0.286
Pair 3 Relatedness Satisfaction post - pre	0.112 (0.808)	0.037	0.039	0.185	3.022	472	0.003	0.115
Pair 4 Relatedness Frustration post - pre	-0.152 (1.159)	0.054	-0.258	-0.046	-2.829	464	0.005	0.116

Table 3 Cont.

Composite Scores Paired Sample t-test								
Pair 5 Competence Satisfaction post - pre	0.206 (0.801)	0.037	0.134	0.279	5.568	466	0.000	0.229
Pair 6 Competence Frustration post - pre	-0.237 (1.151)	0.053	-0.341	-0.134	-4.500	476	0.000	0.173
Pair 7 Body Appreciation post - pre	0.189 (0.731)	0.0355	0.119	0.259	5.323	423	0.000	0.156

Averages above are different than the differences of the averages found in Table 2, as the composite score statistics are based on pair-wise deletion. M (SD) above is based on the composite paired sample statistics, altering the N. Pair averages are used as opposed to individual factor averages.

Research Question 2

Do pre-camp basic psychological needs scores moderate any changes in body appreciation?

Hypothesis 2

H2A: Autonomy satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp.

H2B: Relatedness satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp.

H2C: Competence satisfaction pre-camp will not moderate any change in body appreciation from pre-to post-camp.

H2D: Autonomy frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp.

H2E: Relatedness frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp.

H2F: Competence frustration pre-camp will not moderate any change in body appreciation from pre-to post-camp.

Results 2

To test if change in BA score pre- to post-camp is moderated by pre-camp basic psychological needs scores, six multiple regression analyses were conducted. A multiple regression analysis is "an extension of simple regression in which an outcome is predicted by a linear combination of two or more predictor variables" (Field, 2013, page 880); in this case, body image pre-was the predictor variable and BA post- was the dependent variable (See Figure 5). Each separate hypothesis was conducted as a linear regression, with each aspect of BPN satisfaction or frustration acting as the individual moderating factor. The results of these tests are discussed below and can also be found in Figure 5 and Table 4.

Figure 5

Results 2: Moderation Effect of Pre-Camp BPNSF

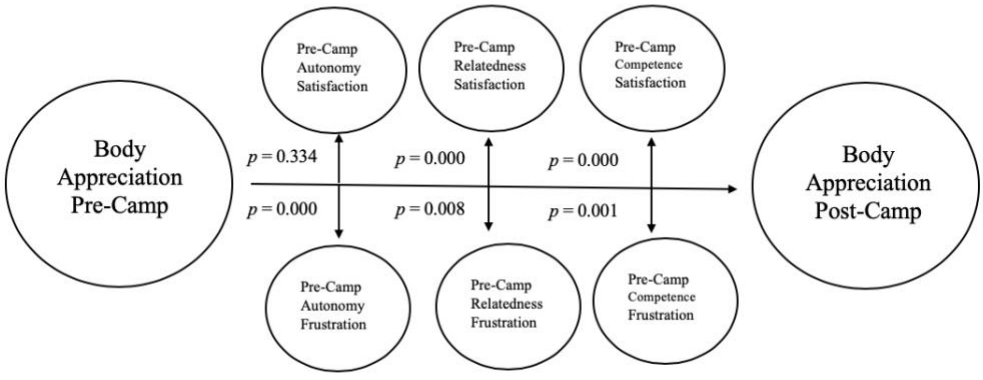


Table 4

Linear Model of Basic Psychological Needs Moderators of Body Appreciation Post

	β	*SE β*	*t*	*p*	*Lower Level Confidence Interval (95%)*	*Upper Level Confidence Interval (95%)*
Autonomy						
Constant	5.806	0.055	105.082	0.000	5.697	5.914
Autonomy Satisfaction Pre	0.084	0.051	1.656	0.099	-0.016	0.184
Body Appreciation Pre	0.829	0.045	18.478	0.000	0.741	0.918
Autonomy Satisfaction Pre-x Body Appreciation Pre	0.093	0.096	0.968	0.334	-0.096	0.281
Constant	5.915	0.035	169.045	0.000	5.846	5.983
Autonomy Frustration Pre	-0.104	0.028	-3.776	0.000	-0.158	-0.049
Body Appreciation Pre	0.744	0.030	24.468	0.000	0.684	0.804
Autonomy Frustration Pre-x Body Appreciation Pre	0.096	0.020	4.711	0.000	0.056	0.136
Relatedness						
Constant	5.806	0.035	164.664	0.000	5.737	5.875
Relatedness Satisfaction Pre	0.147	0.046	3.230	0.001	0.058	0.236
Body Appreciation Pre	0.828	0.033	24.913	0.000	0.762	0.893
Relatedness Satisfaction Pre-x Body Appreciation Pre	0.089	0.020	4.401	0.000	0.049	0.130
Constant	5.903	0.035	167.354	0.000	5.833	5.972
Relatedness Frustration Pre	-0.093	0.029	-3.189	0.002	-0.150	-0.036
Body Appreciation Pre	0.740	0.032	23.027	0.000	0.677	0.804
Relatedness Frustration Pre-x Body Appreciation Pre	0.048	0.018	2.665	0.008	0.013	0.083

Table 4 Cont.

Linear Model of Basic Psychological Needs Moderators of Body Appreciation Post

Competence						
Constant	5.797	0.037	157.708	0.000	5.725	5.869
Competence Satisfaction Pre	0.028	0.052	0.539	0.589	-0.074	0.129
Body Appreciation Pre	0.867	0.037	23.335	0.000	0.794	0.940
Competence Satisfaction Pres x Body Appreciation Pre	0.101	0.21	4.729	0.000	0.059	0.144
Constant	5.916	0.036	162.722	0.000	5.845	5.988
Competence Frustration Pre	-0.110	0.028	-3.918	0.000	-0.166	-0.055
Body Appreciation Pre	0.706	0.035	20.065	0.000	0.637	0.775
Competence Frustration Pre-x Body Appreciation Pre	0.054	0.017	3.222	0.001	0.021	0.088
Gender						
Constant	5.868	0.035	168.912	0.000	5.799	5.936
Gender	0.013	0.073	0.174	0.862	-0.130	0.155
Body Appreciation Pre	0.827	0.054	15.292	0.000	0.720	0.933
Gender x Body Appreciation Pre	-0.072	0.109	-0.666	0.506	-0.286	0.141

To test the moderation effect proposed in H2A, we examined the moderating influence of pre-camp autonomy satisfaction on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was not a significant interaction between pre-camp BA and pre-camp autonomy satisfaction [β = .0927, 95% C.I. (-.0956, .2810, p = 0.334], seen in Table 4. As such we examined the potential moderation effects of autonomy satisfaction pre-camp at low [-1 SD; β = 0.745 , SE =

0.096, p = 0.000, 95% CI (0.556 to 0.934)], average [β = 0.829, SE = 0.045, p = 0.000, 95% CI (0.74 to 0.918)], and high [+1 SD; β = .915, SE = .101, p = 0.000, (95% CI (0.716 to 1.113)] levels of pre-camp BA scores. Our analysis indicated that regardless of the level of pre-camp autonomy satisfaction, BA scores pre-camp significantly predicted BA scores post-camp in a positive direction. The high relation between these values is further explained by the coefficient of determination (R_2 = 0.681), which reveals that about 68.1% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This conclusion supports the findings of a significant change pre- to post- camp in BA, illustrated in Table 3.

Table 5

Conditional Effect of Body Appreciation Pre-on Body Appreciation Post at values of Basic Psychological Needs Pre

	Effect	*se*	*t*	*p*	*Lower Level Confidence Interval (95%)*	*Upper Level Confidence Interval (95%)*
Autonomy						
Autonomy Satisfaction Pre						
-0.917	0.745	0.096	7.743	0.000	0.556	0.934
0.000	0.829	0.045	18.478	0.000	0.741	0.918
0.917	0.915	0.101	9.049	0.000	0.716	1.113
Autonomy Frustration Pre						
-1.290	0.620	0.045	13.897	0.000	0.533	0.708
0.000	0.744	0.030	24.468	0.000	0.684	0.804
1.290	0.868	0.035	24.683	0.000	0.799	0.937

Table 5 Cont.

Conditional Effect of Body Appreciation Pre-on Body Appreciation Post at values of Basic Psychological Needs Pre

Relatedness						
Relatedness Satisfaction Pre						
-0.969	0.741	0.037	20.014	0.000	0.668	0.813
0.000	0.828	0.033	24.913	0.000	0.762	0.893
0.891	0.908	0.039	23.041	0.000	0.830	0.985
Relatedness Frustration Pre						
-1.261	0.680	0.044	15.232	0.000	0.593	0.767
0.000	0.740	0.032	23.027	0.000	0.677	0.804
1.277	0.802	0.034	23.844	0.000	0.735	0.868
Competence						
Competence Satisfaction Pre						
-0.921	0.774	0.039	19.586	0.000	0.696	0.852
0.000	0.867	0.037	23.335	0.000	0.794	0.940
0.921	0.961	0.045	21.579	0.000	0.873	1.048
Competence Frustration Pre						
-1.358	0.632	0.049	13.040	0.000	0.537	0.727
0.000	0.706	0.035	20.065	0.000	0.637	0.775
1.399	0.782	0.035	22.624	0.000	0.714	0.850

To test the moderation effect proposed in H2B, we examined the moderating influence of pre-camp relatedness satisfaction on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was a significant interaction between pre-camp BA and pre-camp relatedness satisfaction [β = 0.096, 95%

C.I. (0.049 to 0.056), p = 0.000], seen in Table 4. As such we examined the potential moderation effects of relatedness satisfaction pre-camp at low [-1 SD; β = 0.741, SE = 0.037, p = 0.000, 95% CI (0.668 to 0.813)], average [β = 0.824, SE = 0.033, p = 0.000 , 95% CI (0.762 to 0.893)], and high [+1 SD; β = 0.908, SE = 0.039, p = 0.000, 95% CI (0.830 to 0.985)] levels of pre-camp BA scores. Our analysis indicated that regardless of the level of pre-camp relatedness satisfaction, pre-camp BA scores significantly predicted BA scores post-camp in a positive direction. The high relation between these values is further explained by the coefficient of determination (R_2 = 0.691), which reveals that about 69.1% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This supports the findings of a significant change pre- to post- camp in BA, illustrated in Table 3.

To test the moderation effect proposed in H2C, we examined the moderating influence of pre-camp competence satisfaction on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was a significant interaction between pre-camp BA and pre-camp competence satisfaction [β = .101, 95% C.I. (0.059 to 0.114), p = 0.000], seen in Table 4. As such we examined the potential moderation effects of competence satisfaction pre-camp at low [-1 SD; β = 0.774, SE = 0.039, p = 0.000, 95% CI (0.696 to 0.852)], average [β = 0.867, SE = 0.037, p = 0.000, 95% CI (0.794 to 0.940)], and high [+1 SD; β = 0.961, SE = 0.045, p = 0.000, 95% CI (0.873 to 1.048)] levels of pre-camp BA scores. Our analysis indicated regardless of the level of pre-camp competence satisfaction, BA scores pre-camp significantly predicted BA scores post-camp, in a positive direction. The high relation between these values is

further explained by the coefficient of determination (R_2 = 0.685), which reveals that about 68.5% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This supports the findings of a significant change pre- to post- camp in BA, illustrated in Table 3.

To test the moderation effect proposed in H2D, we examined the moderating influence of pre-camp autonomy frustration on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was a significant interaction between pre-camp BA and pre-camp autonomy frustration [β = 0.096, 95% C.I. (0.056 to 0.136), p = 0.000], seen in Table 4. As such we examined the potential moderation effects of pre-camp autonomy frustration at low [-1 SD; β = 0.620, SE = 0.045, p = 0.000, 95% CI (0.533 to 0.708)], average [β = 0.744, SE = 0.030, p = 0.000 , 95% CI (0.684 to 0.804)], and high [+1 SD; β = 0.868, SE = 0.035, p = 0.000, 95% CI (0.799 to 0.937)] levels of pre-camp BA scores. Our analysis indicated regardless of the level of autonomy frustration, BA scores pre-camp significantly predicted BA scores post-camp in a positive direction. The high relation between these values is further explained by the coefficient of determination (R_2 = 0.693), which reveals that about 69.3% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This supports the findings of a significant change pre- to post- camp in BA, illustrated in Table 3.

To test the moderation effect proposed in H2E, we examined the moderating influence of pre-camp relatedness frustration on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was a significant

interaction between pre-camp BA and pre-camp relatedness frustration [β = 0.048, 95% C.I. (0.013 to 0.083), p = 0.008], seen in Table 4. As such we examined the potential moderation effects of relatedness frustration pre-camp at low [-1 SD; β = 0.680, SE = 0.044, p = 0.000 , 95% CI (0.593 to 0.767)], average [β = 0.740, SE = 0.032, p = 0.000 95% CI (0.677 to 0.804)], and high [+1 SD; β = 0.802, SE = 0.034, p = 0.000, 95% CI (0.735 to 0.868)] levels of pre-camp BA scores. Our analysis indicated regardless of the level of relatedness frustration, BA scores pre-camp significantly predicted BA scores post-camp in a positive direction. The high relation between these values is further explained by the coefficient of determination (R_2 = 0.685), which reveals that about 68.5% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This supports the findings of a significant change pre-to post-camp in BA, illustrated in Table 3.

To test the moderation effect proposed in H2F, we examined the moderating influence of pre-camp competence frustration on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was a significant interaction between pre-camp BA and pre-camp competence frustration [β = 0.054, 95% C.I. (0.021 to 0.088), p = 0.001], seen in Table 4. As such we examined the potential moderation effects of pre-camp competence frustration at low [-1 SD; β = 0.632, SE = 0.049, p = 0.000, 95% CI (0.537 to 0.727)], average [β = 0.706, SE = 0.035, p = 0.000, 95% CI (0.637 to 0.775)], and high [+1 SD; β = 0.782, SE = 0.035, p = 0.000, 95% CI (0.714 to 0.850)] levels of pre-camp BA scores. Our analysis indicated regardless of the level of pre-camp competence frustration, BA scores pre-camp significantly predicted

BA scores post-camp in a positive direction. The high relation between these values is further explained by the coefficient of determination (R^2 = 0.687), which reveals that about 68.7% of variance in BA post-camp can be explained by the value of BA pre-camp. Details of this analysis can be found in Table 5. This supports the findings of a significant change pre-to post-camp in BA, illustrated in Table 3.

Research Question 3

Does gender play a meaningful role in the change of body appreciation pre-to post-camp?

Hypothesis 3

H3: There is no gendered effect on change of score pre-to post-camp.

Results 3

To test the moderation effect proposed in H3, we examined the moderating influence of gender identity on the relation between pre-camp BA and post-camp BA. The results of this analysis indicated that there was not a significant interaction between pre-camp BA and gender identity [β = 0.0506, 95% C.I. (-0.286 to 0.2141), p = 0.506], as seen in Figure 6. This moderation analysis, however, is at the 'average' gender after the data had been centered; in this context, that meant no gender. When looking deeper into high (female) and low (male) gender scores, the following was found: at high [+1 SD, gender = female; β = 0.795, SE = 0.073, p = 0.000, 95% CI (0.652 to 0.939)] and low [-1 SD, gender = male; β = 0.868, SE = 0.080, p = 0.000, 95% CI (0.709 to 0.939)] levels of BA pre-camp significant effects on BA post-camp were found. Both gender scores were

statistically significant moderators of the change in BA pre- to post. Our analysis indicated that regardless of gender identity, BA scores pre-camp significantly predicted BA scores post-camp in a positive direction. Details of this analysis can be found in Table 6 and Table 7.

Figure 6

Results 3: Gender Did Not Play a Meaningful Role in Change

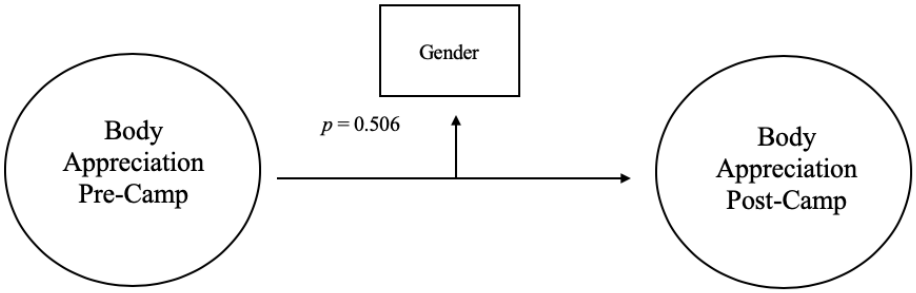


Table 6

Linear Model of Gender as a Predictor of Body Appreciation Post

	b	***SE B***	***t***	***p***	***Lower Level Confidence Interval (95%)***	***Upper Level Confidence Interval (95%)***
Constant	5.868	0.035	168.912	0.000	5.799	5.936
Gender	0.013	0.073	0.174	0.862	-0.130	0.155
Body Appreciation Pre	0.827	0.054	15.292	0.000	0.720	0.933
Gender x Body Appreciation Pre	-0.072	0.109	-0.666	0.506	-0.286	0.141

Table 7

Conditional Effect of Body Appreciation Pre-on Body Appreciation Post at values of Gender

Gender	*Effect*	*se*	*t*	*p*	*Lower Level Confidence Interval (95%)*	*Upper Level Confidence Interval (95%)*
-0.566 (male)	0.868	0.080	10.822	0.000	0.709	1.025
0.434 (female)	0.795	0.073	10.879	0.000	0.652	0.939

Post-Hoc Analyses

While there are many competing explanations for the significant moderating effects identified in the present study, another explanation could be due in part to the high correlations between the factors of interest (i.e., BPN & BA). As such, we conducted a post-hoc analysis exploring a correlation matrix of the measured study factors. Correlation is a "standardized measure of the strength of relationship between two variables" (Field, 2013, page 880); its values range from -1 to 1, with -1 being the strongest possible negative and +1 being the strongest possible positive relationship between the two variables .As illustrated in Table 8 there are significant correlations between the factors of basic psychological needs and body appreciation. Specifically, the pre-camp satisfaction of autonomy [$r(451) = 0.530$, $p = 0.000$], competence [$r(450) = 0.651$, $p = 0.000$], and relatedness [$r(461) = 0.517$, $p = 0.000$] had high and significant positive correlations with pre-camp body appreciation. Additionally, the pre-camp frustration of autonomy [$r(460) = -0.380$, $p = 0.000$], competence [$r(460) = -0.540$, $p = 0.000$], and relatedness [$r(458) = -0.442$, $p = 0.000$] had high and significant negative

correlations with pre-camp body appreciation. The moderating effects of these factors on the relation between pre- and post-camp body appreciation may be partially explained by these high correlations.

Table 8

Post-Hoc Analysis: Correlations

Factor/*Item*	**F1.**	**F2.**	**F3.**	**F4.**	**F5.**	**F6.**	**F7.**	**F8.**	**F9.**	**F10.**	**F11.**	**F12.**	**F13.**	**F14.**	**F15.**
Body Appreciation															
F1. Body Appreciation (pre-composite)	1														
F2. Body Appreciation (post-composite)	0.816*	1													
Basic Psychological Needs Satisfaction															
F3. Autonomy Satisfaction (pre composite)	0.530*	0.453	1												
F4. Autonomy Satisfaction (post composite)	0.433*	0.623*	0.614*	1											
F5. Relatedness Satisfaction (pre composite)	0.517*	0.472*	0.658*	0.559*	1										
F6. Relatedness Satisfaction (post composite)	0.409*	0.630*	0.531*	0.806*	0.649*	1									
F7. Competence Satisfaction (pre composite)	0.651*	0.505*	0.725*	0.484*	0.668*	0.458*	1								
F8. Competence Satisfaction (post composite)	0.537*	0.717*	0.534*	0.782*	0.557*	0.793*	0.65*	1							

Table 8 Continued

Post-Hoc Analysis: Correlations															
Basic Psychological Needs Frustration															
F9. Autonomy Frustration (pre composite)	- 0.380*	- 0.389*	- 0.388*	- 0.419*	- 0.368*	- 0.370*	- 0.372*	- 0.385*	1						
F10. Autonomy Frustration (post composite)	- 0.366*	- 0.449*	- 0.404*	- 0.516*	- 0.449*	- 0.517*	- 0.392*	- 0.487*	- 0.612*	1					
F11. Relatedness Frustration (pre composite)	- 0.442*	- 0.440*	- 0.382*	- 0.447*	- 0.432*	- 0.441*	- 0.390*	- 0.431*	0.778*	0.529*	1				
F12. Relatedness Frustration (post composite)	- 0.398*	- 0.493*	- 0.398*	- 0.546*	- 0.456*	- 0.605*	- 0.403*	- 0.519*	0.540*	0.808*	0.607*	1			
F13. Competence Frustration (pre composite)	- 0.540*	- 0.523*	- 0.401*	- 0.420*	- 0.375*	- 0.398*	- 0.504*	- 0.491*	0.789*	0.519*	0.821*	0.571*	1		
F14. Competence Frustration (post composite)	- 0.506*	- 0.562*	- 0.399*	- 0.500*	- 0.425*	- 0.515*	- 0.472*	- 0.575*	- 0.513*	0.787*	0.558*	0.836*	0.647*	1	
Gender															
F15. Gender (0 = Male; 1 = Female)	-0.140	-0.120	0.007	0.003	0.092	0.094	-0.043	-0.019	-0.051	-0.043	-0.028	-0.050	-0.015	- 0.018	1

*$p = 0.000$
**$p < 0.01$
***$p < 0.05$

CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

This study aimed to quantify the socioemotional impact that a Medical Specialty Camp had on adolescents with T1D. Specifically, the researchers studied the satisfaction and frustration of basic psychological needs as well as body appreciation. The three research questions each focused on the impact of the camp, using scores from both pre- and post-camp. Research question one focused on changes in BA scores from pre- to post-camp, while questions two and three analyzed potential moderations that may explain changes seen.

In the analysis from research question one, it was found that BA scores significantly improved from pre- to post- camp. There are many factors that may influence the change; two of these factors were examined in this study, socioemotional well-being and gender. Research question two analyzed the moderating effects of BPN on the relation between pre- and post-camp BA scores. Five of the six factors had significant moderating effects on the relation, except for autonomy satisfaction. Research question three looked into a potential gendered effect on this change and found that there were statistically significant differences in the changes from pre- to post-camp between genders. Following is a discussion on these results, their interaction, and implications of these findings.

Discussion

The main focus of this study was to examine body image perceptions of adolescents with T1D. The findings from research question 1 that there was a significant

increase in BA scores from pre- to post-camp (Table 3) provide support that even without deliberate programming, MSCs may act as a context in which positive body image can increase in adolescents with T1D. There are several other factors, at hand, however, including socioemotional well-being and gender.

Research question 2 analyzed the moderating effect of each item in BPN satisfaction and frustration on the change in BA scores from pre- to post-camp. The moderating affect was analyzed for each item: autonomy satisfaction and frustration, relatedness satisfaction and frustration, and competence satisfaction and frustration. For each item, it was found that regardless of the pre-camp score of that item, BA pre-camp score had a significant effect on BA post-camp score. This indicates that the pre-camp score of BPNSF was not a significant predictor of post-camp BA. However, for each item of BPNSF, aside from autonomy satisfaction, there was a significant moderation effect. The details of this analysis can be found in Table 4 and Table 5.

It is not surprising that BA and BPN pre-camp scores are both found as significant when predicting post-camp BA. The connection between body image and mental state has been well-documented (Fuller-Tyszkiewicz et al., 2015; O'Dea & Abraham, 1999; O'Dea, 2004; Prabhu, & Cunha, 2018; Rierdan et al., 1988; Rierdan et al., 1989; Tiggemann, 2005; van den Berg et al., 2010), specifically with self-esteem (Fuller Tyszkiewicz, 2015; Kostanski, 1998; Mendelson & White, 1982; ODea, 2000; ODea, 2010) and BPN (Demirtas et al., 2017). The connections uncovered between BPN, body image, and self-esteem in the present study may explain the significant moderations seen in the present study. Specifically, it was observed that despite the level of pre-camp BPN

satisfaction or frustration a significant relation between pre- and post-camp BA scores remained (Table 5). While it may seem backwards that the frustration of BPN would be a significant positive moderator in this study, a potential explanation is the floor effect (McCabe, n.d.). A floor effect occurs when a measure receives consistently low scores; this occurred with the frustration scores (Table 2) and may explain how a seemingly negative factor may be a positive moderator. In addition to the floor effect, another potential explanation for the moderations seen in the present study are the high correlations between factors seen in the post-hoc analysis.

The high correlations observed (Table 8) between the values of BPN and BA indicate that BPN and BA may be so highly correlated that the moderation observed may not have practical application. As such, it could be assumed that an increase in either BPN or BA may be related to an increase in the other. Finding directionality (i.e., causality) based on the analysis of this present study is not possible. The lack of directionality is supported in the literature connecting body image and self-esteem; it is difficult to predict which is influencing the other (e.g., are SE scores causing BA to change or is BA causing SE to change; see also Fuller Tyszkiewicz, 2015). More specifically, a positive body image incorporates the idea that one is strong and capable (Frisén & Holmqvist, 2010, Wood-Barcalow et al., 2010), an idea reflected in autonomy and competence (Ryan & Deci 2000b). The socioemotional measures selected for this study may be so connected that observed differences are enmeshed. As explained in the future directions section, looking at the moderation effect of the change in BPN scores

(seen in Table 3) on the relation between pre- and post-camp BA may provide more insight into the relation(s) between these variables.

The third research question examined the moderating effect of gender on pre- to post-camp BA scores. BA scores were not significantly moderated by gender. This moderation output is based off of the 'average' gender score after being centered, which would indicate no gender. However, the average moderation output alone does not tell the whole story; when observing each gender separately, there was a gendered difference in the moderating relationship. At high levels of gender score (female) and low levels of gender score (male) gender effects were found to be significant (Table 7). Additionally, when looking at each effect separately it was seen that males had a higher effect; males not only had a moderation effect, but a strong effect when compared to females. While this gendered difference in moderation strength is statistically significant, it is not significant in practice. It is not surprising that gender modified change in BA, as gender is a commonly known factor in the development of body image (Rierdan et al., 1988). Specifically, in adolescents with T1D research suggests females tend to have worse body image and high eating disorder behaviors (Araia, 2017) and tend to manage their diabetes worse (Austin et al., 2011; Kichler et al., 2008). As previously indicated, uncontrolled management of blood sugar may lead to adverse health effects such as nerve damage and blindness (Martinez et al., 2018; Wood & Peters, 2018), so understanding the influence of an uncontrollable factor such as gender may assist management programs to better understand their patients.

Understanding the socioemotional experience of an adolescent with T1D is important on its own but has implications for tools that can be used to assist with management of their illness. Following is a discussion on what implications the findings of this study may have on practice of management of the disease as well as in the context of MSCs.

Implications for Practice

This study further supported research suggesting increasing socioemotional well-being in adolescents with T1D may be related to an increase in body image, specifically BA. It also indicated that a MSC may be a context in which these socioemotional factors can increase, despite no intentional programmatic frameworks toward doing so.

Previous studies have found that neither programmatic intent (Gagnon & Garst, 2016) nor repeated attendance to camp (Gagnon et al., 2019) have significant impacts on camper outcomes. This supports that what was found in the present study – a significant change with no intentional programming towards the outcomes – may not be abnormal. Changes observed in the present study in both BPN and BA may be due to several unintentional factors, one of which may be the highly researched impact of a camp experience on socioemotional outcomes (Garst et al., 2011; Gillard & Allsop 2016; Henderson, Bialeschki, & James, 2007; Henderson, Bialeschki, & Scanlin et al., 2007; Henderson et al., 2007; Thomas, 1996) or the more specific MSC experience that allows adolescents to feel as if they belong (Meltzer et al., 2018). Regardless of the mechanism of change in BA, it is impactful to understand that this positive change came without explicit programming to increase BA at the study site.

The natural question arises then, is there a point to programming intentionally to increase body image if there is no concrete need to do so, as suggested by the results of the present study? An answer to that question looking solely at the study at hand would state that there may not be a need to; the factors used (BPN and BA) were so closely related that they were inseparable. However, several studies have shown that overt programming towards increasing body image scores are highly effective, and also often tied to the promotion of self-esteem and wellbeing (Richardson, Paxton, & Thomson, 2009; Stanford & McCabe, 2005; Steese, Dollette, Phillips, Hossfeld, Matthews, & Taormina, 2006; Yager, Diedrichs, Ricciardelli, & Halliwell, 2013). The evidence highlighting that adolescents with T1D have much worse body image than their peers (Araia et al., 2017; Troncone et al., 2016; Wing et al., 1986) shows a dire need for this population to have a greater appreciation for their bodies, but also perhaps a higher risk in triggering higher body concerns. The relation observed between BPN and BA, as well as research-backed associations between those constructs and self-esteem suggests that understanding the socioemotional aspects related to well-being is complex. A reason to dive into this complexity is that the mental well-being of adolescents with T1D has high implications for improved disease management.

As noted earlier, evidence suggests enhancing socioemotional development in adolescents with T1D generally also enhances their disease management (Johnston-Brooks, Lewis, & Garg, 2002; Luyckx et al., 2016; Martinez et al., 2018). The present study found that there were significant increases in body appreciation from pre- to post-camp, and that those changes were highly correlated to basic psychological needs

(negative for frustration, positive for satisfaction, see Table 8). Previous research on SDT (Deci & Ryan, 1985; Sheldon et al., 2003) has demonstrated that improvement basic psychological needs, specifically autonomy and competence, have implications for improved motivation for glycemic control (Williams et al., 1998). This relation between BPN and motivation for glucose control suggests that the socioemotional changes seen from pre- to post-camp (BA in present study, highly correlated to BPN) may have implications for better blood glucose control. In the present study, relatedness, as well, may have played a factor in some participants wishing to better control their blood sugar levels. When given the opportunity to speak about their camp experience freely in the post-camp survey, many campers spoke to the relationships they created in camp. Numerous campers wrote about their newfound friendships with others like them, and how these relationships made them feel as if they belong. A recent study indicated that there is a significant relation between general belongingness, BPN, and self-esteem; this relation suggested that belongingness and BPN are predictors of self-esteem (Demirtas et al., 2017).

Limitations and Future Directions

The study at hand had several limitations. Due to the complexity of the socioemotional constructs used (BA and BPN) it is near impossible to cover all factors that may influence these measures. For example, there are several moderating factors that could have been used when looking into BA and BPN scores. These moderating factors include, but are not limited to, age and racial identity.

Future analysis on this data may consider using age, and specifically years since diagnosis, as moderating factors. Age and time since diagnosis may have considerable impact on the outcomes of this study for two reasons. First, the age at which an adolescent is diagnosed with T1D, as well as years since diagnosis, has an impact on how they manage their disease (Austin et al., 2011); the longer an adolescent has had their diagnosis, the longer they have been able to become accustomed to living with their disease in management as well as socio-emotionally. Additionally, age likely had an impact on body image scores. As adolescents reach the age of puberty, their self-perceptions change (Alsaker, 1995; Petersen & Taylor, 1980; Williams & Curie, 2000). Pubertal timing has been seen to influence socioemotional development in adolescents, with those who reach puberty early, on time, or late all having variety in self-esteem (Tobin-Richards, Boxer, & Peterson, 1983) and body image (Williams & Curie, 2000).

Race is an important factor in how one identifies, and also has implications for lived experience. For example, there it has been found that there are differences in cultural expectations of appearance and therefore body image perceptions across race (van den Berg et al., 2010; Tiggemann, 2015). It also cannot be ignored that there is a disparity in healthcare availability and quality across races in the United States (Abramson, Hashemi, & Sánchez-Jankowski, 2015). Future studies may find racial identity an influential factor on BA and BPN to have a more robust understanding of the value of medical camp experiences for historically underserved youth.

The present study explored aspects of BPN, but more specifically just quantitative data. Campers were given the chance to free-write post-camp about their experience,

following the prompt ‘Because of Camp Kudzu…’. The researchers were able to read this information, but it was not included in this study. A future direction with this study may take a mixed-methods approach to further understand how the subjective camp experience, outside of the quantitative data, may influence the camp experience and subsequent socioemotional outcomes.

One final limitation of this study is in the analysis of the moderations. While a linear regression moderation, as done here, gives an understanding of how the pre-camp scores of BPN scores moderated the change in BA from pre- to post-camp, a richer understanding of the camper experience may come from looking into the way that the change in BPNSF from pre- to post-camp moderated the change in BA scores. Pre-camp understanding of BPNSF does not give the full understanding of the camper experience, and it can even be seen that BPNSF scores did change from pre- to post-camp for the subjects. In future studies, it would be helpful to look into how the change in BPNSF scores from pre- to post-camp (seen in Table 3) moderate the change in BA from pre- to post-camp. In this study, the pre-camp scores of BPNSF were studied as moderators. However, the pre-camp scores only indicate the level at which the camper came in. Each factor of BPN – autonomy, relatedness, and competence – may have a unique change within the camper.

Autonomy, or the feeling that one is good at things and can handle them on their own, was the only non-significant moderator in the analyses for the present study. For this population, such a conclusion makes sense due to the amount of control that adolescents with T1D are under to manage their illness (ADA, 2018; Davidson et al.,

2004; King et al., 2017; Wood & Peters, 2018). Typically, many adolescents with T1D do not take care of their own medical care, as intense and specific care is needed to ensure their physical well-being (Davidson et al., 2004; King et al., 2017). It is, therefore, not surprising that autonomy satisfaction was not a significant moderator of the relation between pre- and post-camp body appreciation; scores of autonomy support may be skewed. It can be assumed that the reason autonomy satisfaction scores did not moderate the relation is because the low autonomy scores were 'normal' for those campers. Autonomy frustration scores, however, were significant moderators for the relation between pre- and post-camp BA. Following the same logic, it makes sense that frustration of autonomy would be normal for these campers. Changes in autonomy satisfaction and frustration, therefore, would likely be strong moderators of change of pre- to post camp BA.

Relatedness, or the feeling of belongingness and being cared for, has a powerful impact on campers. In the present study, both relatedness satisfaction and frustration were significant moderators of the relation between pre- and post-camp BA. It has been seen that forming meaningful relationships is an outcome of camp (McAuliffe-Fogarty et al., 2007; Sendak et al., 2018), and in adolescents with T1D social support has been seen to assist in well-being and adherence to disease-specific care (Doe, 2018). Through the final question in the post-camp survey, researchers were able to uncover that many campers formed meaningful relationships; increases in relatedness satisfaction were also seen concretely in Table 3It can be assumed that the increase in relationships found through camp influenced a feeling of belongingness. BA, specifically, has an aspect of feeling

beautiful despite what others have deemed beautiful (Andres, Tiggemann, & Clark, 2016; Halliwell et al., 2017; Tylka & Wood-Barcalow, 2015a). Feeling as if one belongs and is a part of the normal may have decreased the feelings of being 'strange' or an 'outsider' that many adolescents with T1D experience (King et al., 2017). Change in relatedness, then, may moderate the increase in BA from pre- to post-camp due to its connection with increased self-esteem.

Competence, or the feeling of being good at things, is something that campers learn through disease-specific skills (Camp Kudzu, n.d.a). The intention of camp is not only to give the attendees a fun and memorable experience, but to give knowledge on managing and normalize the experience of living with T1D. Competence's relation to an increase in body image likely comes from two different ideas. The first is that campers may have come in with some anxiety or uneasiness about their body due to their diagnosis (King et al., 2017). As they learn more about their bodies and how to manage their disease, they may feel more comfortable with their bodies. The second idea that comes from positive body image is the idea that one is more than their body. Learning about their disease and becoming better at the skills associated with managing the daily aspects of living with T1D may have given campers something else to focus on and feel confident in that allowed them to not need to worry about their body as much as they may have coming into camp. The increase from pre- to post-camp seen in Table 3 would likely act as a moderator in the observed change in BA.

APPENDICES

Appendix A

Body Appreciation Scale-2 Children

1. I feel good about my body.
2. I respect my body.
3. I feel that my body has at least some good qualities.
4. I take a positive attitude towards my body.
5. I pay attention to what my body needs.
6. I feel love for my body.
7. *I appreciate the different and unique things about my body.*
8. You can tell I feel good about my body by the way I behave.
9. I am comfortable in my body.
10. I feel like I am beautiful even if I am different from pictures and videos of attractive people (e.g. models/actresses/actors)

(Halliwell et al., 2017)

Appendix B

Basic Psychological Needs Satisfaction Frustration Scale

Autonomy Satisfaction

1. I feel a sense of choice and freedom in the things I undertake

2. I feel that my decisions reflect what I really want

3. I feel my choices express who I really am

4. I feel I have been doing what really interests me

Relatedness Satisfaction

5. I feel that the people I care about also care about me

6. I feel connected with people who care for me, and for whom I care

7. I feel close and connected with other people who are important to me

8. I experience a warm feeling with the people I spend time with

Competence Satisfaction

9. I feel confident that I can do things well

10. I feel capable at what I do

11. I feel competent to achieve my goals

12. I feel I can successfully complete difficult tasks

Autonomy Frustration

13. Most of the things I do feel like ‘‘I have to’’

14. I feel forced to do many things I wouldn’t choose to do

15. I feel pressured to do too many things

16. My daily activities feel like a chain of obligations

Relatedness Frustration

17. I feel excluded from the group I want to belong to

18. I feel that people who are important to me are cold and distant towards me

19. I have the impression that people I spend time with dislike me

20. I feel the relationships I have are just superficial

Competence Frustration

21. I have serious doubts about whether I can do things well

22. I feel disappointed with many of my performances

23. I feel insecure about my abilities

24. I feel like a failure because of the mistakes I make

(Chen et al., 2015)

Appendix C

Full Pre-Camp Questionnaire

What is your gender? **(Circle One)**

Male Female Non-Binary Other **(Fill-In)** _____

What is your age in years? **(Fill-In)** _____

What is your ethnic group? **(Circle One)**

White Asian Origin Pacific Islander Black, African American

Other **(Fill-In)** _____ East Asian (Indian) Multiple Race Hispanic or Latino Origin

What is your First and Last Name? **(Fill-In)**

_____

How many years have you been diagnosed with diabetes? (leave blank if you don't know)

(Fill-in) _____

During the school year, on average, how many days per week do you participate in structured physical activities like sports (e.g., gymnastics, soccer, baseball)	
During the school year, on average, how many days per week do you participate in structured Math, Science, Engineering, or Technology Activities (e.g., robotics league, coding workshops)	
During the school year, on average, how many days per week do you participate in structured creative activities (e.g., music lessons, art classes, etc.)	

Including this year, how many years have you attended Camp Kudzu total?

(Fill-in) _____

Including this year at Camp Kudzu and other camps, how many years have you attended camp in total?

(Fill-in) _____

Here we'd like to know more about you. Please rate each statement from Strongly Disagree to Strongly Agree by circling the best choice for each item.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel a sense of choice and freedom in the things I undertake	**1**	**2**	**3**	**4**	**5**	**6**	**7**

I feel that the people I care about also care about me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel confident that I can do things well	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that my decisions reflect what I really want	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel connected with people who care for me, and for whom I care	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel capable at what I do	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel close and connected with other people who are important to me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel competent to achieve my goals	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel I have been doing what really interests me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I experience a warm feeling with the people I spend time with	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Here we'd like to know more about you. Please rate each statement from Strongly Disagree to Strongly Agree by circling the best choice for each item.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel good about my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I respect my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that my body has at least some good qualities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I take a positive attitude towards my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I pay attention to what my body needs.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel love for my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I appreciate the different and unique things about my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
You can tell I feel good about my body by the way I behave.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I am comfortable in my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel like I am beautiful even if I am different from pictures and videos of attractive people (e.g., models/actresses/actors)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel I can successfully complete difficult tasks	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel my choices express who I really am	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
Most of the things I do feel like "I have to"	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel excluded from the group I want to belong to	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I have serious doubts about whether I can do things well	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel forced to do many things I wouldn't choose to do	**1**	**2**	**3**	**4**	**5**	**6**	**7**

I feel that people who are important to me are cold and distant towards me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel disappointed with many of my performance	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel pressured to do too many things	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I have the impression that people I spend time with dislike me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel insecure about my abilities	**1**	**2**	**3**	**4**	**5**	**6**	**7**
My daily activities feel like a chain of obligations	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel the relationships I have are just superficial	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel like a failure because of the mistakes I make	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Appendix D

Full Post-Camp Questionnaire

What grade will you be going into next year? **(Fill-In)**

_____

What is your desired college major? **(Fill-In)** _____

What is your First and Last Name? **(Fill-In)**

_____

Here we'd like to know more about how you may have grown as a result of Camp Kudzu. Please rate each statement from Strongly Disagree to Strongly Agree by circling the best choice for each item.

"As a result of Camp…"	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel a sense of choice and freedom in the things I undertake	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that the people I care about also care about me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel confident that I can do things well	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that my decisions reflect what I really want	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel connected with people who care for me, and for whom I care	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel capable at what I do	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel close and connected with other people who are important to me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel competent to achieve my goals	**1**	**2**	**3**	**4**	**5**	**6**	**7**

I feel I have been doing what really interests me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I experience a warm feeling with the people I spend time with	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel I can successfully complete difficult tasks	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel my choices express who I really am	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel good about my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I respect my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that my body has at least some good qualities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I take a positive attitude towards my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I pay attention to what my body needs.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel love for my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I appreciate the different and unique things about my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
You can tell I feel good about my body by the way I behave.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I am comfortable in my body.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel like I am beautiful even if I am different from pictures and videos of attractive people (e.g., models/actresses/actors)	**1**	**2**	**3**	**4**	**5**	**6**	**7**

"As a result of Camp…"	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
Most of the things I do feel like "I have to"	**1**	**2**	**3**	**4**	**5**	**6**	**7**

I feel excluded from the group I want to belong to	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I have serious doubts about whether I can do things well	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel forced to do many things I wouldn't choose to do	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel that people who are important to me are cold and distant towards me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel disappointed with many of my performance	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel pressured to do too many things	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I have the impression that people I spend time with dislike me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel insecure about my abilities	**1**	**2**	**3**	**4**	**5**	**6**	**7**
My daily activities feel like a chain of obligations	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel the relationships I have are just superficial	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel like a failure because of the mistakes I make	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Here we'd like to know more about your experience at Camp Kudzu. Please rate each statement from Strongly Disagree to Strongly Agree by circling the best choice for each item to complete the sentence

"As a result of Camp…"	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I have a lot of voice/power to influence decisions about Camp Kudzu	**1**	**2**	**3**	**4**	**5**	**6**	**7**
It was easy for me to get involved in Camp Kudzu	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I am very involved in Camp Kudzu activities	**1**	**2**	**3**	**4**	**5**	**6**	**7**

I have friends who also take part in Camp Kudzu	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I usually feel safe when I am involved in Camp Kudzu activities	**1**	**2**	**3**	**4**	**5**	**6**	**7**
There's at least one staff member that I can go to for support or help with a problem.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel close to at least one staff member at Camp Kudzu	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Camp Kudzu activities are challenging and interesting	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I think that participating in Camp Kudzu will help me to continue my education	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I learn a lot from participating in Camp Kudzu	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Staff at Camp Kudzu pay attention to what's going on in my life	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Adults at Camp Kudzu respect me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Adults at Camp Kudzu listen to what I have to say	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Here we're like to know how Camp Kudzu influenced how you think, feel, or behave when it comes to yourself or others. **Finish this sentence:**

Because of Camp Kudzu…

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