

Harnessing the “Like”:  
Understanding Peer Support’s Effects on Exercise

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### **Abstract**

This pilot study examined the relationship between receiving peer support on social media (SM) through “likes” and attitude towards, motivations behind, and frequency of exercise behaviors in college-aged students. Following recent research on brain activation in adolescents and emerging adults who viewed images they posted on SM with a high number of “likes”, this pilot study sought to answer the questions of how the number of “likes” on an exercise selfie would affect frequency of, attitudes toward, and motivations behind physical activity (PA). It was hypothesized that higher number of “likes” would increase frequency of PA while creating more positive attitudes towards PA and motivations to be more socially oriented. Undergraduate students (N = 8) underwent a 1 week-long participation period in which they posted photos of exercise behaviors onto the study website which mimics one of the most popular SM sites, Instagram. Participants were randomly assigned into low and high “like” groups and their pictures were assigned “likes” based on their group. Deception was used to convince participants that their peers volunteered to “like” their photos on the site. It was predicted that high number of “likes” on SM posts related to exercise would increase exercise frequency and positive attitudes toward exercise while shifting motivations behind exercise to socially geared reasons. As the sample size of the pilot study was too small, no significant differences between the two time points were expected or revealed. However, the results, as well as the design, of this pilot study seek to inform future studies using social support of SM to change exercise behaviors. This pilot study has highlighted the importance of the timing of the study as well as the sample size and make up. It has also revealed the need to focus in on the concept of motivation over attitudes towards physical activity. Lastly, this pilot will yield a more efficient and effective website, one that can track exercise minutes and more accurately represent the target social media platform.

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**Harnessing the “Like”: Understanding Peer Support’s Effects on Exercise**

Internet/media-based interventions have found some success in today’s media-dominated world. Social media, particularly, has found much success in health promotion by influencing health-related knowledge and behaviors (Korda & Itani, 2013). In a time when a majority of young people between the ages 13- 29 years are using the most popular social media platforms (Lenhart, 2015; Greenwood, Perrin, & Duggan, 2016), understanding how this ubiquitous medium affects human behavior is crucial for harnessing the positive potential of media. Multiple studies have highlighted how social media encourages social comparison, which has been found to be effective at promoting behavior change in people (Miller & Mynatt, 2014; Zhang, Brackbill, Yang, Beckler, Herbert, & Centola, 2016). Few, however, have addressed how social support, specifically from peers, can impact behavior. It is clear that adolescents can find social support from engaging with or being engaged by their peers through social media (de Leeuw & Buijzen, 2016). A recent study found that adolescents, ages 13-18 years who looked at photos with a high number of “likes” on social media have increased activation in areas of their brain related to reward processing and attention as measured by fMRI technology (Sherman, Payton, Hernandez, Greenfield, & Dapretto, 2016). Because the “like” is such a concrete and tangible measure of approval on social media, it has the potential to be an indicator of how the person viewing the content with a certain number of “likes” can interpret that number as the amount of social support they are receiving from their peers. Further, as researchers argue for the extension of adolescence to beyond the age of 18 (Sawyer, Azzopardi, Wickremarathne, Patton, 2016), it is important consider the implications of these findings for those who fall into the categories of late adolescence and emerging adults. Understanding the implications of these findings on emerging adulthood, being a developmental period that is intimately linked with

adolescence (Schwartz, 2016), is critical. Therefore, we ask: what are the implications of a young person posting a picture of themselves engaging in a positive health behavior, such as exercising, and receiving many “likes” on this picture from their peers? The goal of the proposed study was to explore the relationship between perceived peer support, in the form of “likes”, on a social media platform and exercise behavior, and attitudes towards exercise in emerging adults.

### **Review of Literature**

**Young People’s Media Use.** For today’s young people, media is an inescapable aspect of everyday life. The power to influence and even to change young people’s behavior on a large scale through media needs to be explored further. Social media platforms, such as Facebook and Instagram, are examples of ubiquitous media that dominate and shape young people’s lives today. In her review of adolescents and social media, Lenhart (2015) interviewed over 1000 adolescents between the ages 13-17 years and found that 52% and 71% of all adolescents interviewed use Instagram and Facebook, respectively, with 58% and 80% of adolescents aged 15-17 years saying they used these platforms respectively (Common Sense Media, 2015). A more recent study conducted by Common Sense Media (2016) of over 1,700 parents found that 80% of the parents said that their adolescents between the ages of 13 and 18 years, had their own social media accounts. These figures highlight the extent that adolescents are engaging with social media on a daily basis. Adolescents spend approximately ten percent of their awake time-consuming media via social media. As for American adult populations, Greenwood, Perrin, and Duggan (2016) found in a survey of 1,520 adults in the United States almost 70% were Facebook users while 28% were Instagram users. When looking at just young adults ages 18-29 years, 88% were Facebook users while 55% were Instagram users. Young adult populations, then, are the

most voracious consumers of social media content. Similar to this study, researchers from the Pew Research Center conducted interviews of a nationally representative sample of over 2,000 adults in the United States and found that approximately 68% of adults use Facebook and 35% use Instagram. The study also revealed that approximately three fourths of those adults who use Facebook visit the site daily. Researchers also noted that Americans ages 18-24 years stood out as approximately 78% used the app Snapchat and 71% used Twitter. Lastly, of the 18-24 year olds, approximately 51% revealed that it would be hard to give up social media (Smith & Anderson, 2018). Their analyses also revealed that this age group is also significantly more likely to use these social media platforms than any other age group within the study. Considering the amount and breadth of information available to both adolescents and young adults on social media, it is logical to say that young people’s views of the world as well as their own identity is shaped, in part, by what they observe and attend to on this medium. As such, research on how social media affects behavior, or rather, changes and molds behavior seems crucial to understanding the power that this relationship can have.

**Adolescent and Emerging Adult Development.** Adolescence is a developmental period that is marked by identity formation, increased independence, and risk-taking (Arnett, 2001; Casey, Getz, & Galvan, 2008; Strasburger, Wilson, & Jordan, 2014). It is important, then, to consider these three key aspects when looking at how adolescents are affected by social media. This period in the lifespan is also marked by an increase in time away from parents and more time spent with peers. This transition is seen as the evolutionary precursor to the increased risk-taking and identity formation that is necessary in adolescence for people to form a sense of themselves outside of their parents’ influence (Casey et al., 2008). In identity formation, adolescents refer heavily to the external environment for cues on what defines them. As such, the

sense of identity that adolescents form is often malleable and fluid (Strasburger, et al. 2014). Friends, in particular, play a critical role in adolescents’ identity development. Shapiro and Margolin (2014), in their review of the literature on social media and adolescent development, found that adolescents use their relationships with others to foster a sense of self. Strasburger (2014) cites a similar example in his chapter where adolescent girls use a blogging website to “self-theorize”. Furthermore, a longitudinal study of 92 youths found that youth who were better adjusted at ages 13-14 were more likely to use social media in their early 20’s while those in their 20’s who reported more positive friendships were more likely to use social networking sites (Mikami, Swedo, Allen, Evans, Hare, 2010). This study highlights the long-standing nature of peer influences during adolescence into young adulthood. Emerging adulthood, similarly to adolescence, is an important time for identity development. However, it is different from adolescence due to a few distinct characteristics of this age group.. Arnett (2000) cites three subjective differences between emerging adulthood (18-25) and adolescence: demographics, subjective perceptions, and identity explorations. The first aspect of emerging adulthood explains the subjective difference between the two periods of life is the instability of young people’s residential status during this time. Many young people are often away from home and spend time in different types of residential settings during these years. In addition to this difference from adolescents, research has highlighted that emerging adults do not consider themselves “adolescents” or “adults”. Arnett (2000) cites research that revealed several conditions that emerging adults put forth that need to meet before they considered themselves adults. These two aspects of emerging adulthood make it truly distinct from adolescence. However, the point that Arnett emphasizes is the connection between adolescence and emerging adulthood is in the domain of identity development. He highlights research that has found that identity formation is



rarely finished by the end of adolescence, but rather continues and concludes beyond the age of 18 years. As such, he proposes that emerging adults focus their identity development in three domains: love work, and worldviews (Arnett, 2000). All of these developments depend on the emerging adult to explore different contexts, especially people, in life. Coyne, Padilla-Walker, and Howard (2013), in their review of current literature on emerging adulthood and media, explain that there is new research that suggests that social media sites can be used by this population to both explore and express their identities. These examples attest to the intensely social nature of identity development and how crucial peers are for both emerging adults and adolescents.

It is no surprise, then, that peers also heavily influence young people’s risk-taking behaviors. Casey et al. (2008) attributes adolescent risk-taking behavior to an increase in novelty-seeking that is paired with minimum life experience and an underdeveloped self-regulatory system. Much of the research in adolescent risky behavior have focused on the domains of sexual activities, drugs and alcohol, and smoking (Strasburger, et al., 2014; Arnett, 2001; Casey, et al., 2008). Peers often are attributed to these behaviors in that peers play an important role in the initiation and propagation of said risky behaviors (Strasburger, et al., 2014). Along these lines, researchers in the UK attempted to look at risky behavior in a sample of participants ages 19-24. This 2016 study (Reniers, et. al., 2016) found that these young adults participated in more risk-taking behavior in the presence of their peers compared to when they were alone. Reniers et al. (2016) also found that just the potential for positive peer approval had an impact on whether the participant would make the risky choice or not. Fleary (2017), in her study of data from the Youth Risk Behavior Surveillance System (YRBSS), identified behavior clusters among adolescent that included both traditional risk behaviors (e.g., substance use) and

health promoting behaviors (e.g., physical activity, healthy eating). Fleary (2017) highlighted that the overlap in traditional risk behaviors and healthful behaviors among adolescents are reflective of the co-existing relationship that health risk behaviors have with health promoting behaviors. As such, it is important to study peer influences on adolescent health behavior in the same way researchers have been looking at its influences on risk behavior. Emerging adulthood is a time when young people are the most free to explore the many types of experiences, both positive and negative, that are available to them (Arnett, 2000). Arnett asserts that emerging adult's participation is a part of their identity development in that emerging adults need to have this exploration before settling into adult roles. Schwartz (2016) cites a study that found emerging adults often cite a need to fit in as a reason for binge drinking (Borsari, Murphy, & Barnett, 2007). On the other hand, peers and significant others in emerging adulthood have also been found to be important attachment figures (Markiewicz, Lawford, Doyle, & Haggart, 2006). A 2017 study of over 600 men ages 18 years and up in the United States found that peer social control, the influence of peers on “regulation, influence, and constraint”, was found to be positively associated with health promoting behaviors ranging from health responsibility to spiritual growth (Houle, et. al., 2017). The research highlights the relationship between risky health and health promoting behaviors in young people and the influence of peers for both types of health behaviors. Therefore, it is important to understand the interaction of peers and peer influences with young people in all modes of communication. With the influence of peer approval, and peers in general, on young people's behavior, it is important to look at the role social media plays in this relationship between young people and health behaviors. Research on the impact of college-aged students' social networks have already begun to find relationships between friends and health behaviors, such as physical activity (Barnett, et. al. 2014), so the

logical next step in this process is to understand what role social media plays in bringing to the forefront those peer influences. Specifically, what influence do peers on social media have on young people’s actual behaviors.

Moreno and Kota (2014), in their chapter on social media and adolescents, highlight that according to social learning theory, people have the ability to develop behaviors based on what they observe. They emphasize that this effect is made even more poignant when adolescents view their peers engaged in certain behaviors. A 2013 study (Cook, Bauermeister, Gordon-Messer, Zimmerman) used cross-sectional data of over 2000 participants, average age 20 years, found that the density of online social networks was associated with alcohol use. The researchers found that posting pictures of alcohol consumption and having discussions about this behavior creates norms about alcohol use among young adults. It is clear, then, that the influence of peers extends much beyond the traditional age limit of adolescence into young adulthood. Social media creates an environment where young people can view the types of behaviors that their peers are engaging in. This environment also facilitates a means of expressing one’s opinion, positive or negative, of certain behaviors through comments and “likes”. Considering the developmental implications of adolescence and emerging adulthood, utilizing social media to instill behavior change in youth holds immense potential.

**Friendships on Social Media.** When considering the ubiquity of social media in the lives of young people, it seems prudent to consider the nature of friendships in this medium. In a particularly telling case study, Turkle (2011) writes about a sixteen year old girl who develops her online persona, or her “twin”, depending on the responses of her peers. She describes the process of presenting an identity on a popular social media platform, Facebook, and, depending on the response this iteration receives, deciding whether or not to keep that specific identity. This

anecdote is one that probably resonates with young people all over the world. It is without a doubt that social media has also given people access to expanded social circles of peers. Similarly, Schwartz (2016), in his review of literature on emerging adulthood, highlights that emerging adults who are insecure may turn to social media in order to seek out social support through the presentation of an online persona that is different from their offline personas (Michikyan, Subrahmanyam, & Dennis, 2014). In her book, *Social Media and Personal Relationships* (2013), author Deborah Chambers highlights a study of almost 300 undergraduate students whom reported that they have significantly more friends on social media than people they interacted with offline (Ellison, Stienfield, Lampe, 2007). This behavior is not restricted to just these few undergraduate students. The same book highlights studies on social media that say that users can have anywhere from over 100 friends to thousands of friends on social media (Golder, S.A., Wilkinson, D., & Huberman, B. A., 2007). This “friend-collecting” on social media platforms has yet to be found beneficial in any specific way but Chambers puts forth some potential benefits that mass friendships may provide young people. The weak ties provided by social media friend’s lists have the potential to provide people with various belief systems as well as resources that immediate family and offline friendships may not (Chambers, 2013). The author also cites the work of Pahl and Spencer (2004) in which they argue about the importance of choice in the development of personal communities and how the freedom to create these personal communities plays a key role in the development of social support networks. Pahl and Spencer (2004) then go on to discuss “friendship-like relationships” which are the range of relationships that make up the social circles of people and how these connections are important sources of well-being and social support. Turkle (2011) asserts that the period of adolescence is not only a time for adolescents to experience more freedom from parents, but also a period of

establishing strong boundaries both from parents and peers. She states that online platforms provide adolescents the mix of connectedness to peers as well as separation from them that allows for exploration of new identities. She states that through this “tethered self” young people become accustomed to the support provided by this personal community. Social media, through the use of “friend’s lists”, where users can see all the connections which they have agreed to be a part of, allows users to create these personal communities. It seems, then, that social media is the perfect platform in which young people can create, manage, and develop their personal communities as well as get a concrete sense of the extent of their friend-like relationships.

**Engagement with Social Media.** Recently, there have been many attempts to understand the underlying reasons for adolescents’ engagement with social media. Studies have found reasons ranging from socializing with peers (Baker & White, 2010) to narcissism (Buffardi & Campbell, 2008). Baker and White (2010) conducted a study using the Theory of Planned Behavior framework with Australian youth in an attempt to explore the underlying motivations for adolescents’ engagement with social networking sites or SNS. They found that the amount of control (i.e. more confidence in their mastery of social media sites) that an adolescent has over their behavior and group norms (i.e. perceptions that using SNS were normal among peers), were significant predictors of adolescent engagement with SNS by creating more favorable attitudes towards the medium. Buffardi & Campbell (2008), on the other hand, assumed that use of social networking sites was associated with users’ narcissistic traits. By analyzing habits of Facebook use among 100 female undergraduate students, these researchers found that narcissism was indeed related to web activity, which was derived from publicly available information such as number of friends and number of posts. A more recent study done with 446 college students using an online survey found that a strong need to belong was correlated with an increased use of

social media platforms. The same study also found that social media use mediated the relationship between the students’ need to belong and their social engagement (Kim, Wang, & Oh, 2016). This finding, however, only focuses on one aspect of the many reasons young people may engage with social media on such a high level. A survey-based study conducted with college students expanded on this exploration of motivations behind social media use and identified four different motivations for Instagram, a photo sharing social media platform, use. Using factor analysis on the results of their motives for Instagram use, four different motivations were discovered: *Surveillance/Knowledge about others*, *Documentation*, *Coolness*, and *Creativity*. It found that the first motivation, Surveillance/Knowledge accounted for the most variation in students’ motivations, which reflected the participants’ desire to keep up to date with the lives of their peers (Sheldon & Bryant, 2016). Similarly, a study of Facebook use among college students found that approximately 85% of the 90 students use Facebook to communicate with both college and high school friends (Pempek, Yermolayeva, & Calvert, 2009). These finding highlights one very important reason for young people’s fixation on others in social media platforms. It seems that young people have an intense curiosity about their peers; what they are doing, what they are eating, and other mundane daily activities. Young people’s engagement with social media may be explained, in part, by an increased importance of peer relationships in adolescence (Sherman, et al., 2016). It seems, then, young people’s motives for participating in social media is mostly outward looking, such as peers, rather than inward-looking.

**Impact of Social Media and Adolescents.** The research on the effects of media on young people has been characterized by a deficit-oriented approach, labeling media as the cause of many of youths’ ailments. These studies have mainly focused on the negative health effects

such as risky sexual behavior (Brown, L’Engle, Pardun, Guo, Kenneavy, & Jackson, 2006), alcohol use (Austin, 2000), and obesity (Strasburger, Jordan & Donnerstein 2010). A 2013 review of literature on the effects of media use on college students identified similar negative impacts of media use for this population ranging from increased aggression to greater numbers of nonrelational sexual encounter to decreased body satisfaction (Coyne et. al., 2013). This review also points out that for many of the effects mentioned within it, the research is often times lacking for emerging adults. Nevertheless, while it is important to acknowledge the negative potential of media, it is important to consider the potential for positive outcomes that media can yield for young people that engage with it.

More recent studies have looked at the positive effects that social media can have for young people. A 2011 review of work done using internet-based platforms that promote health behavior change found that social media platforms, especially communication platforms, can help support behavior change by providing advice, clarification on potentially misleading information, and encourage individuals to take action to change the current situation. Social media facilitates traditional public health practices by providing relevant information for targeted populations through its ubiquity (Korda & Itani, 2011). While this health-related perspective of social media’s potential for health promotion is important, it lacks the perspective of those interacting with social media on a day-to-day basis outside of a health setting. Vaterlaus, Patten, Roche, and Young (2015) address this issue in a qualitative study of college students that asked about what they believed to be the effect of social media on their health behaviors. Vaterlaus et al. (2015) identified three themes that encompassed the responses from their focus groups and interviews: *social media as a motivator and barrier to exercise, the perceived connection between food and social media, and the perceptions of exercise picture and posts online* (p. 153).

The students revealed how social media allows for access to new and interesting information about exercise while at the same time acting as a distraction during exercise. They also mentioned how social media was used to post pictures of food as well as expose others to different foods. Lastly, and most relevant to the current study, the students spoke in detail about the perceptions of people who post “exercise selfies” on their social media. Fifty-nine percent of the sample of students believed that social media facilitated the sharing of these pictures. The participants revealed that this practice of sharing selfies is relevant to sharing significant achievements such as drastic weight loss and found these photos to be inspiring and motivational. However, they noted that individuals who post these types of photos may also be perceived as seeking attention or affirmation and are generally seen in a negative light (Vaterlaus, et al., 2015). Even with a smaller sample size of 34, the findings of this study hold many implications for how social media can be incorporated into health promoting behaviors especially when it comes to physical activity. With this information on young people’s views on the “exercise selfie”, what are the implications of incorporating the “exercise selfie” in interventions that promote physical activity?

**Young People and Physical Activity.** Physical activity (PA), or the lack thereof, has been the focus of much research in the recent decade. Studies have found that amount of physical activity is inversely related to being overweight and the associated risks of higher body weight such as risk of developing type 2 diabetes or cardiovascular diseases (Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015). However, research have also found that as children get older, amount of physical activity decreases approximately 50% from age 6 years to age 16 years and this trend continues into adulthood (Thompson, et al., 2014). A recent study that used data from ten countries has also found that across all ages girls were more sedentary and less active than



boys (Cooper et al., 2015). Adolescent obesity rates in America further substantiate this finding. Approximately 30% of adolescents between the ages 12-19 years in the United States fall under the categories of obese or extremely obese as of 2014. This number is staggering for this age group when compared to the data from twenty years ago when only 10.5% and 26% of adolescents aged 12-years to 19-years fell into the categories of obese or extremely obese, respectively (Ogden, Carroll, Lawman, 2016). Researchers have also identified that inactivity in adolescence is likely to track into adulthood (Gordon-Larsen, McMurray, Popkins, 2000). Interestingly, this decrease in physical activity seems to be most evident in the 15-18 year old age group, continuing to 21 years of age. These trends seem to stop once the individual reaches their thirties (Caspersen, Pereria, Curran, 2000). Along these lines, obesity is a problem that is found in college campuses as well. As approximately half of young people ages 17-24 years are enrolled in college and 30% of these people are considered obese (Nelson, Story, Larson, Neumark-Sztainer, Lytle, 2012), targeting college campuses for intervention is crucial to foster behavior change in this critical turning point for physical activity rates.

Fostering regular and appropriate physical activity in young people, especially girls, seems to be of utmost importance given evidence that has shown that adolescent obesity is a strong predictor of adult obesity (Jensen, Duraccio, Hunsaker, Rancourt, Kuhl, Jelalian, Wing, 2014). The detrimental effects of obesity, including, but not limited to, higher risk of cardiovascular disease, type 2 diabetes, and strokes, (Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015) indicate a necessity for increased attention to fostering physical activity in young people. Strasburger et al. (2014) reiterates that the evidence for media's relationship to childhood obesity is still tenuous at best. In their chapter on obesity and media, the authors cite the displacement effect as an explanation for the belief that media use is replacing physical activity.

The displacement effect states that the time that children are engaging with media is time that is not spent engaging in a physical activity rather there being a cause and effect relationship. But they are also careful to address that just as many studies have found no association between media use and childhood obesity (Strasburger, et al. 2014). As media, especially social media, is a medium that appeals equally to the sexes, it is necessary to think about how it can be used to help the problem of decreasing physical activity. The question then becomes, what can media do and how can young people’s relationships with media be leveraged to address the rising rates of obesity among young people?

**Physical Activity Motivations and Intervention.** Interventions that attempt to promote physical activity among young people have focused on walking as the gateway into creating consistent, self-motivated routines for exercise (Miller & Mynatt, 2014; Thompson et al., 2014). While creating easy to access interventions is important to address the issue at hand, it seems prudent to first understand the motivations behind young people’s engagement in physical activity. One study of 40 young people between the ages 18-20 years found that many who engaged in physical activity for the purpose of losing weight cite internal motivations for their continued dedication to the act (Jensen, et al., 2014). For adolescents still in school, another study found that internal motivation is most often the reason why adolescents participate in organized activities such as sports teams (Mahoney, Vandell, Simpkins, Zarrett, 2009). Despite the significance of internal motivation, research has also shown that there are many external factors that can have an effect on rates of physical activity. External factors such as availability of school and community programs, socioeconomic status, maternal education level, and neighborhood crime rates were found to be related to adolescent physical activity (Gordon-Larsen, et al. 2000). Familial and peer factors also played a role in young people’s motivations to

participate in physical activity. A qualitative study used semi-structured interviews about weight loss and weight control of 40 young people found that 70% of the sample cited their peers and the support that peers provided as a motivating factor in continued engagement with physical activity (Jensen et al., 2014). In the same vein, encouragement and support from peers and family members have been found to be effective external motivators for participation in physical activities (Mahoney, Vandell, Simpkins, Zarrett, 2009). A review of over 60 physical activity related interventions that targeted adult populations was particularly insightful in understanding the motivations behind exercise for adult populations. This review took on a self-determination theory (Deci & Ryan, 2008) lens to analyze the findings of the interventions it reviewed. The two findings of interest in this review were that identified regulation and intrinsic motivation were the two most significant correlates to exercise behavior in adults (Teixeira, Carraca, Markland, Silva, Ryan, 2012). Identified regulation in the self-determination theory context is the process of consciously choosing to value a goal so the actions that lead to that goal are seen as important (Deci & Ryan, 2008). Internal motivation it seems is again found as critical for adult's continuous engagement with physical activity (Teixeira et. al., 2012). Most importantly, research has highlighted how these external motivators can evolve into internal motivators after a certain amount of time (Mahoney et al., 2009). Social media can provide those external motivations for young people by providing this population with a platform where they can both receive peer support and observe norms established by their peers. It is in this regard where social media's role in the potential development of internal motivations for physical activity shines. Therefore, peer support should be incorporated into interventions that aim to promote physical activity in young people.

Mead, Hilton, and Curtis (2001) describe peer support as a type of connection that develops when two parties empathize with one another's situation. It appeals to a person's need to belong and sense of identity within a community or peer group. As such, the authors note that peer support fosters a sense of healing and capability rather than one of sickness and inability. This concept has the potential to be incorporated into a variety of settings in order to promote positive change, such as social media. Within the health professions, there has been an acknowledgement that when individuals are faced with certain obstacles, they tend to turn toward their personal relationships for support. Dennis (2003), in her analysis of peer support, examined the extent of a peer's impact in various health care scenarios. Her analysis of literature on peer support in the health field in the past 10-15 years used a linguistic approach in defining peer support and deduced that peer support was the “giving of assistance and encouragement by an individual considered to be equal” (p. 323). She found that peer support had a positive effect for those going through transitional periods in life, experiencing acute or chronic stressors, as well as increasing the effectiveness of health promotion efforts (Dennis, 2003). These findings support the need for interventions based on peer support.

Recent efforts to study and quantify the concept of peer support and the role it can play in young people's lives have yielded interesting results. The following study has begun to grasp at the beginnings of incorporating social media as a source of social support for young people. This recent and robust study used both social comparison and social support in order to look at how undergraduates at a university enrolled in an 11-week exercise class would perform under each condition. This study utilized a website for both conditions where the social comparison group received performance reports of five of their peers while the social support group received five peers with whom they could encourage via the website. Researchers found that performance

increased significantly for the social comparison group compared to both the control and social support group (Zhang, et al., 2016). However, of the 192 participants in the social support group, only 81 online messages were generated over the course of the eleven-week program. There was no discussion on how the presence of social support was actually measured. Methods to quantify an abstract topic such as peer support currently rely heavily on methods of self-report questionnaires to get at the concept, leaving much room for biases and errors to occur.

Nonetheless, these studies open the door for future studies that utilize these online mediums to address the inconsistencies in the measurement of the concept of social support. Social media, then, seems to be the perfect medium in order to explore the effects of peer support. Developmentally, adolescents depend heavily on the opinions of their peers to shape their perceptions on the world and themselves (Strasburger, et al. 2014). Similarly, friendships in emerging adulthood have been found to predict well-being in this age group (O'Connor, Sanson, Hawkins, Letcher, Toumbourou, Smart, Vassallo, Olsson, 2011). Elmore, Scull, and Kupersmidt (2017) found that what adolescents saw on media explained a significant amount of variance for what these adolescents then perceived to be socially acceptable norms. While this study used advertisements for alcohol and tobacco as their medium, it is important to note that even with commercials with people who were assumed to have no physical connection to the adolescents, the advertisements were able to affect adolescents' perceptions. Media in this case acted as the “super peer”. A super peer refers to the idea that media now has the ability to shape adolescents' view about what social norms are (Elmore, Scull, & Kupersmidt, 2016). Coyne et. al. (2013) found similar results of media both establishing norms as well as increasing exposure to certain behaviors among emerging adults. Nevertheless, social media has the potential to take this super peer status to the next level by putting young people up against the approval of their actual peers.

Messages that would have been endorsed by celebrities and characters in the past can now be endorsed by young people’s peers through pictures, “likes”, and comments. The addition of the peer influences makes social media the perfect medium in which to understand how peer influences, specifically, peer support can influence behaviors and motivations. As such, it seems necessary to develop a method of measuring the social support a young person receives on the various social media platforms of today.

Advancements in technology have given researchers a novel way to measure peer support. The “like” on social media platforms such as Facebook and Instagram has potential as a means of gauging a sense of peer support among adolescents. A 2016 study used functional magnetic resonance imaging (fMRI) to look at how the brains of 34 typically developing youth between the ages of 13-18 years responded to images with different numbers of “likes” (Sherman, Payton, Hernandez, Greenfield, Dapretto, 2016). The participants saw two sets of images, the first being a collection of 40 images submitted by the participants themselves. These images were separated into two categories of low like (0-22) and high like (23-45). The second set of images consisted of 148 images of everyday objects along with photos depicting risky behavior, such as smoking, divided into a bimodal distribution of low likes (0-15) and high likes (30-45) with 16 images in the intermediate ranges of 16-22 or 23-29. Participants were then asked to click the “like” or “next” button based on how they felt about the images. These “likes” were displayed as numbers with a red heart next to them and no indication of who had “liked” the photos were given to the participants. Researchers found that there were differences in brain activation when adolescents looked at their own images posted online with a high number of “likes” compared to neutral images. Adolescents were more likely to “like” an image, even those depicting risky behavior, with high peer endorsement (i.e., more “likes”). Another finding of this

study showed that the centers of the brain associated with social cognition and reward learning and motivation had greater activation when observing images with higher number of “likes”, leading to higher feelings of satisfaction (Sherman, Payton, Hernandez, Greenfield, Dapretto, 2016). This study sets the groundwork for further research in both quantifying peer support through social media as well as using the “like” to affect behavior change in adolescents and young adults. Specifically, the potential of the “like” in giving real time, meaningful measures of perceived peer support for young people is one that needs to be explored further. It is crucial to differentiate between peer support and perceived peer support in the case of the “like” as “likes” can be given by anyone that a person has given permission to see the content that they submit to a social media platform. The Sherman et al. study (2016) showed that adolescents do not need to know the source of the “likes” in order to show increased neurological activity in their reward learning and motivation centers. While there is no research currently that replicates these result in emerging adults, neuroscience research has suggested that receiving a “like” is akin to receiving a social reward which in turn activates the reward centers of the brain (Meshi, Tamir, & Heerkeren, 2015). As such, the ability to quantify the abstract concept of perceived peer support in the ubiquitous medium of social media will allow researchers to access the enormous amount of information available on these platforms for further study. The proposed study aims to utilize this potentially novel measure of peer support to change exercise behavior among young people.

### **Current Study**

It used a quantitative, experimental approach to explore how perceived peer support on social media platforms may affect physical activity in college-aged students. The literature review revealed that developmental characteristics of adolescence and emerging adulthood including

increased autonomy, identity formation, and desire for peer approval may impact both engagement with social media as well as rates of physical activity. It is important to consider the potential positive effect of media interventions in increasing frequency of physical activity.

Social media has the combined attributes of being a community of the young people’s peers and a ubiquitous platform on which young people spend much of their time, making it an ideal environment for this study. An artificial social media environment was created in order to see how the number of “likes” on pictures posted by the participants can alter attitudes towards, frequency, and motivations behind physical activity. This study was guided by three questions regarding this matter:

1. What is the relationship between the number of “likes” on an exercise selfie and the frequency of physical activity?

H<sub>1</sub>: The more “likes” a young person receives on an “exercise selfie”, the more frequently that person is likely to participate in physical activity.

2. What is the relationship between the number of “likes” on an exercise selfie and attitudes toward physical activity?

H<sub>2</sub>: The more “likes” a young person receives on an “exercise selfie”, the more likely that person will have more positive attitudes about exercise.

3. What is the relationship between the number of “likes” on an exercise selfie and motivations to participate in physical activity?

H<sub>3</sub>: The more “likes” a young person receives on an “exercise selfie”, the more likely that person will have more socially oriented motivations about exercise.



## Methods

The current pilot study underwent full review at the Tufts University Institutional Review Board due to the use of deception in the description of how the “likes” were assigned. The study received approval in the spring semester of the 2017-2018 academic year.

### Participants

Eight undergraduates between the ages of 18-22 at Tufts University were included in the study. Participants were recruited through flyers posted throughout the university grounds, posts on social media, and announcements in large social science lectures. These recruitment materials described the study and provide the necessary information to get in contact with researchers. Because the study involved voluntary participation in exercise, it was important that the participants did not have an obligation to participate in exercise or activities that could be considered physical activity (e.g., varsity and club sports/dance teams and physical education classes) in order to participate in the study. Compensation of \$50 total was distributed at two points during the study: \$10 after the initial intake session and \$40 at the conclusion of the study. Those participants who did not complete the full week as part of the study or posted frequencies lower than once in the week received only the initial \$10. Participants who did not meet the age and extracurricular participation criteria were excluded from the study following screening.

### Measures.

**Screening questionnaire.** Potential participants were provided with one initial screening question that asked about any obligations to participate in physical activity.

**Study Website.** A password-blocked website (heejae.herokuapp.com) created for this study and accessible only to participants with login information and the principle investigator.

This website was accessible through both mobile devices and desktop computers and was designed to mimic the popular social media site, *Instagram*. Upon log in, participants were able to scroll through the website and see the different photos that were posted by other participants as well as the “likes” that each photo received. Participants also had the ability to upload their own de-identified exercise photos onto the site. The website was created through the collaboration of the principle investigator and a professional software engineer, whose primary work is website design. Before using the study website, the principal investigator and the website creator tested the usability of the site. Photos and test accounts were created and each account was put into a “like” condition by the website creator. Approximately four test photos were uploaded and “likes” were assigned by the website’s algorithms. These steps were the extent of the testing of the function of the website. There were no problems with either the uploading of photos, viewing of the photo feed, or the assigning of like groups. Participants did not report any problems with usability or confusion with the website after using the platform.

**Demographics.** Participants were asked to provide information on their age, year in college, sex (M/F/Other), as well as their ethnicity. This measure was adapted from the media health demographic questionnaire used as a component of the media health literacy study conducted in the Child Health Equity Research Lab at Tufts University.

**Social Media Use.** A five-point Likert Scale (1 = never use, 2 = once a day, 3 = between 2 and 4 times a day, 4 = between 4 – 5 times a day, and 5 = more than 5 times a day) accompanied the question “How often are you on social media (Facebook, Twitter, Instagram, Snapchat) in one day?”

**Physical Activity.** For measuring physical activity, the Short Last 7 Days Telephone (S7T) format of the International Physical Activity Questionnaire (IPAQ) (Booth, 2000) was

administered verbally by the researchers. The IPAQ S7T form consists of seven questions that prompt the participant to recall physical activity done in the past seven days to report frequencies and duration in days, hours, and minutes. This item was tested in 12 different countries for validity and reliability and was found to be an acceptable measure of physical activity in adults aged 18-65 year with an acceptable criterion validity ( $\rho = 0.30$  for the short form) when compared to a data from a digital monitor of physical activity and sitting behavior. The measure also had a test-retest reliability for a period of no more than ten days which when pooled was around  $\rho = 0.76$ . Because this measure was created with the intent of being administered over the phone, alterations were made to in order for an online survey platform. Refer to appendix B for example alterations.

**Motivation.** The revised Exercise Motivation Inventory (EMI-2) (Markland & Ingledew, 1997) was used to obtain data on participant motivation to exercise. This self-report measure consists of 51 items using a 6-point Likert Scale (0 = Not at all true for me to 5 = Very true for me). The measure consisted of 12 subscales of motivations to exercise: stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness ( $\alpha = 0.63 - 0.90$ ). Scores for each of the subscales were calculated by summing the scores for each of the responses belonging to each subscale with a maximum score of 20 for a majority of subscales with the exception of revitalization, health pressures, ill-health avoidance, positive health, and nimbleness which have a maximum score of 15. The test-retest reliability within a period of 4-5 weeks of this measure was found to be  $\rho = 0.63 - 0.90$ .

**Attitude.** Attitude Towards Physical Activity (ATPA) (Kenyon, 1968) was used to assess participants' attitudes towards physical activity. The ATPA consists of 54 items using a 7-point

Likert Scale, where participants indicate how closely their attitudes align with a certain adjective describing an aspect of physical activity. This inventory consists of six subscales which identify the following attitudes towards physical activity: social experience, health and fitness, pursuit of vertigo, aesthetic experience, cathartic, and ascetic. Hoyt’s  $r$  reliability measures for the six subtests ranged from .72 for both men and women to .89 and .86 men and women respectively.

**Procedures.** The proposed study was conducted during the spring semester of 2018 with participant recruitment occurring earlier in the semester. The study lasted approximately two weeks from the moment the participant met with the researcher for an initial briefing session to the final debriefing session. Recruitment took place for one week and those who showed interested were directed toward the screening survey. The screening questions were delivered via Tufts Qualtrics, an online survey platform that could be accessed by potential participants through a link on recruitment materials. A second question about interest in participation as well as contact information was asked if the participant was eligible. Fifty five people filled out the screening survey of which 27 were found to be eligible. The first eight people who were eligible were chosen to be a part of the study. After recruitment and screening, participants were given a consent form and a description of the study in a one-on-one briefing session. This initial briefing session also included a guided exploration of the web platform being used for the study, detailing login information and pseudo-social media platform. Participants were told that there are approximately 100 volunteers who were looking at the photographs they posted on the study website and assigning “likes” based on the content of the picture and the volunteers’ personal preferences. This portion of the study used deception as there were no volunteers and instead, an algorithm on the website was used to assign “likes” to picture based on randomized placement into two condition groups: low likes (0-15) and high likes (85-100). The participants were

assured that as long as they made sure to hide identifying information in the photos they took, the “volunteers” and other participants would not be made aware of their identities. Examples of non-identifying photos were provided to participants in order to better facilitate this process. This methodological step also limited confounding variables such as study participants grouping up to go to exercise and creating peer support outside of the study context. Participants were then asked to complete the IPAQ, EMI-2, and ATPA along with the demographic and social media use forms. Participants were assigned login information to the study website that they can use for reporting. Once this initial briefing was completed, the participants began the process of posting pictures to the study site (*heejae.herokuapp.com*) during their one week as participants. During this week, participants were reminded that “likes” will be assigned to pictures gradually throughout the day and all “likes” would have been assigned by the end of every day at 10 pm. Following the week-long experimental photo-posting period, participants were called back a week after completing the study period to complete the same questionnaires (IPAQ, EMI-2, and ATPA) on physical activity. This final session also included a debriefing session where participants will be made aware of the deception that took place within the study. Participants were given a chance to ask questions and then compensated for their time.

**Data Analysis.** IBM SPSS Statistics software was used to analyze the data collected for this study. Descriptives and frequencies analyses were conducted on the preliminary survey data. To gauge differences over two timepoints for the three PA measures, paired sample t-tests were conducted with data from time 1 and time 2 for each measure. Following these tests, repeated measures ANOVA were conducted with time as the dependent variable and “like” group as the between-subjects variable in order to see if “like” groups had significant effects on any changes

identified through the paired samples t-tests. These tests were also used to determine the interaction effects between the independent variable, number of likes, and the three measures.

## Results

### Preliminary Survey Responses.

Table 1. Example Table of Data Collected from One Participant

Participant ID	SME000			
Age	20			
School Year	<i>Freshman</i>			
Sex	<i>Female</i>			
Ethnicity	<i>African American</i>			
Self-Report Daily Exercise	7+ hrs			
Daily Media Use*	<i>Comp for HW</i> few time a day	<i>Comp for Other</i> multiple times a day	<i>Comp Games</i> once a day	<i>Social Media</i> I do not do this
IPAQ	<i>Vigorous Ex</i>	<i>Moderate Ex</i>	<i>Walking</i>	<i>Sitting</i>
Time 1 (mins)	300	200	800	750
Time 2 (mins)	450	100	1000	900
ATPA (Subscale Totals)*	<i>Social Experience</i>	<i>Health and Fitness</i>	<i>Pusuit of Vertigo</i>	<i>Aesthetic</i>
Time 1	15	23	23	14
Time 2	22	14	21	12
EMI-2 (Subscale Totals)*	<i>Stress Manage</i>	<i>Revitalization</i>	<i>Enjoyment</i>	<i>Challenge</i>
Time 1	5	8	10	18
Time 2	14	9	12	15

Note: \* indicates that not all subscales used were included in this table

Table 1 shows an example of all the information gathered from one participant. The data reflected in the table are not from a real participant. Table 2 shows the demographics of the

sample at two timepoints (prior to study period and following study period). One study participant did not complete the posting of photographs following the initial intake session so no data could be collected from this participant at time two. At time two, there were 7 participants of which 3 belonged to the low “like” group (0-15) and 4 in the high “like” group (85-100). In terms of exercise selfie posting frequencies, all seven participants posted the minimum three (3) photos required to be included in time 2 data collection.

Table 2. Demographic Information

Demographics	Time 1	Time 2
<i>Age (Years)</i>	n = 8	n = 7
Mean	20.25	20.72
Range	19 - 22	19 - 22
<i>School Year</i>	<i>Frequency</i>	
College Freshman	2	1
College Sophomore	1	1
College Junior	1	1
College Senior	4	4
<i>Sex</i>		
Males	3	3
Females	5	4
<i>Ethnicity</i>		
Caucasian	4	4
Asian	2	2
African American	1	1
Two or more races	1	0

Note: Data from one (1) participant had to be removed due to not meeting inclusion criteria at Time 2.

Table 3 shows participant responses from the measure of media use include in the preliminary survey. All eight participants stated that they used social media multiple times (n=4) or a few times (n=4) a day. It was also found that all participants used apps on smart devices multiple times per day.

Table 3. Frequency of Daily Media Use

<u>Daily Media Use</u>				
<u>Media</u>	<u>Multiple Times a Day</u>	<u>A few time a day</u>	<u>Once a day</u>	<u>I do not do this</u>
Computer for Homework	6	2	0	0
Computer for Other	5	2	1	0
Computer Games	0	0	2	6
Social Media	4	4	0	0
Tablet	0	1	0	7
Smartphone	8	0	0	0
Portable Game Player	0	0	0	8
Video Games	0	0	2	6
Mobile Games	2	3	2	1
Television	1	1	3	3
Videos Online	4	1	2	1
Music	3	4	1	0
Read for Enjoyment	0	0	3	5
Apps on Smart Devices	8	0	0	0

*Note: 8 participants completed this survey, however only 7 finished the study*

Table 4 shows participants' responses from the measure of exercise frequency included in the preliminary survey. All participants stated that they exercise between 1 – 7 hours a week.

Table 4. Frequency of Participant Responses to Self-Reported Weekly Exercise

<u>Self-Reported Weekly Exercise Frequencies</u>
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<u>Weekly Exercise</u>	<u>More than</u> <u>7 hours</u>	<u>Between</u> <u>5-7 hours</u>	<u>Between</u> <u>3-5 hours</u>	<u>Between</u> <u>1-3 hours</u>	<u>Less than</u> <u>1 hour</u>
Frequencies	0	3	3	2	0

*Note: 8 participants completed this survey, however only 7 finished the study*

**Paired samples t-tests.** In order to determine if there were significant differences in minutes exercised prior to the study and after study completion, paired samples t-test were conducted for the results from the IPAQ S7T measures using four variables: daily vigorous exercise, weekly vigorous exercise, daily moderate exercise, and weekly moderate exercise. The IPAQ S7T asked participants to answer in both hours and minutes to report daily and weekly exercise habits. In order to have these numbers be in the same units, participant responses were converted to total minutes and summed for each time point. Each variable was assessed at two time points: T1 and T2. Tables 5 and 6 show the results of the tests based on “like” group.

Table 5.

Paired Samples T-Test for IPAQ Results for Low Like Group (n=3)

Time 1 – Time 2	<u>Paired Differences</u>			<u>95% C.I. of the Difference</u>		t	df	<u>Sig. (2-tailed)</u>
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Std. Error Mean</u>	<u>Lower</u>	<u>Upper</u>			
Daily Vigorous Exercise	-10.00	17.32	10.00	-53.03	33.03	-1.00	2.00	0.423
Weekly Vigorous Exercise	-150.00	266.65	153.95	-812.38	512.38	-0.97	2.00	0.433
Daily Moderate Exercise	-58.33	105.63	60.99	-320.74	204.07	-0.96	2.00	0.440
Weekly Moderate Exercise	-233.33	318.17	183.70	-1023.72	557.05	-1.27	2.00	0.332

Note: All units reported in minutes

Table 6.

## Paired Samples T-Test for IPAQ Results for High Like Group (n=4)

Time 1 – Time 2	<u>Paired Differences</u>			<u>95% C.I. of the Difference</u>		<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
	<u>Mean</u>	<u>Std. Deviation</u>	<u>Std. Error Mean</u>	<u>Lower</u>	<u>Upper</u>			
Daily Vigorous Exercise	-63.75	99.11	49.56	-221.46	93.96	-1.29	3.00	0.289
Weekly Vigorous Exercise	-453.75	860.67	430.34	-1823.27	915.77	-1.05	3.00	0.369
Daily Moderate Exercise	11.25	61.69	30.85	-86.92	109.42	0.36	3.00	0.740
Weekly Moderate Exercise	150.00	124.90	62.45	-48.74	348.74	2.40	3.00	0.096

Note: All units reported in minutes

Table 4 shows that for those in the low “like” group, minutes exercise decreased across all categories with mean differences between the two time points being negative. The same holds true for daily and weekly vigorous exercise minutes in the high “like” group on Table 5. None of the comparisons proved to have significant differences between time one and time two. Paired samples t-tests were used for results from the ATPA and EMI-2 in order to see if there were any differences in scores of the subscales. While all subscales of the ATPA were included in the analyses, only three (social recognition, affiliation, and appearance) subscales were used in the analysis of the EMI-2 results as these were the only that were socially oriented. Tables 7 and 8 show the results of the paired samples t-tests of the ATPA subscales at time 1 and time 2 based on “like” group.

Table 7.

Paired Samples T-Test for ATPA Subscale Totals for Low Like Group (n=3)

Time 1 – Time 2	<u>Paired Differences</u>			<u>95% C.I. of the Difference</u>		<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
	<u>Mean</u>	<u>Std. Deviation</u>	<u>Std. Error Mean</u>	<u>Lower</u>	<u>Upper</u>			
Social Subscale	1.00	11.31	8.00	-100.65	102.65	0.125	1	0.921
Health and Fitness Subscale	0.67	7.57	4.37	-18.14	19.48	0.152	2	0.893
Pursuit of Vertigo Subscale	-0.67	3.21	1.86	-8.65	7.32	-0.359	2	0.754
Aesthetic Subscale	1.33	9.02	5.21	-21.07	23.74	0.256	2	0.822
Catharsis Subscale	2.33	8.74	5.04	-19.37	24.04	0.463	2	0.689
Ascetic Subscale	-5.67	3.06	1.76	-13.26	1.92	-3.213	2	0.085
Chance Subscale	-5.67	6.35	3.67	-21.44	10.11	-1.545	2	0.262

Table 8.

Paired Samples T-Test for ATPA Subscale Totals for High Like Group (n=4)

Time 1 – Time 2	<u>Paired Differences</u>			<u>95% C.I. of the Difference</u>		<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
	<u>Mean</u>	<u>Std. Deviation</u>	<u>Std. Error Mean</u>	<u>Lower</u>	<u>Upper</u>			
Social Subscale	-5.25	4.11	2.06	-11.79	1.29	-2.553	3	0.084
Health and Fitness Subscale	4.50	3.79	1.89	-1.52	10.52	2.377	3	0.098
Pursuit of Vertigo Subscale	2.75	3.30	1.65	-2.51	8.01	1.665	3	0.195

Aesthetic Subscale	1.00	6.38	3.19	-9.15	11.15	0.314	3	0.774
Catharsis Subscale	-0.75	7.23	3.61	-12.25	10.75	-0.208	3	0.849
Ascetic Subscale	-1.00	6.06	3.03	-10.64	8.64	-0.330	3	0.763
Chance Subscale	0.50	3.87	1.94	-5.66	6.66	0.258	3	0.813

The results of the paired samples t-tests revealed no significant differences between the subscale scores of the ATPA at two time points. Table 7 shows that there was a negative mean difference for the low “like group” in three subscales: Pursuit of Vertigo (physical activity as a thrill), Ascetic (physical activity as beauty in human movement), and Chance (physical activity to test luck). Table 8 shows that there was a negative mean difference in total subscale scores between time one and time two in the high “like” group in three subscales: Social (physical activity as a social experience), Catharsis (physical activity as a release in tension), Ascetic (physical activity as training). Table 7 also shows that for the Ascetic subscale, the observed mean difference between two time points approached significance,  $t(2) = -3.123$ ,  $p = 0.085$ , for the low “like” group ( $M = -5.67$ ,  $SD = 3.06$ ). For the high “like” group, the social ( $M = -5.25$ ,  $SD = 4.11$ ) and health and fitness ( $M = 4.50$ ,  $SD = 3.79$ ) subscales the mean differences also approached significance;  $t(3) = -2.553$ ,  $p = 0.084$  and  $t(3) = 2.377$ ,  $p = 0.098$ , respectively. Tables 9 and 10 show the results of the paired samples t-tests on three subscales of the EMI-2.

Table 9.

#### Paired Samples T-Test for 3 Subscales of the EMI-2 Results for Low Like Group (n = 3)

<u>Paired Differences</u>				
Time 1 – Time 2	<u>Mean</u>	<u>Std.</u> <u>Deviation</u>	<u>Std.</u> <u>Error</u>	<u>95% C.I. of the</u> <u>Difference</u>

			<u>Mean</u>	<u>Lower</u>	<u>Upper</u>	<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
Social Recognition Subscale	-1.67	2.08	1.20	-6.84	3.50	-1.387	2	0.300
Affiliation Subscale	6.00	6.08	3.51	-9.11	21.11	1.708	2	0.230
Appearance Subscale	0.67	1.15	0.67	-2.20	3.54	1.000	2	0.423

Table 10.

## Paired Samples T-Test for 3 Subscales of the EMI-2 Results for High Like Group (n = 4)

Time 1 – Time 2	<u>Paired Differences</u>			<u>95% C.I. of the Difference</u>		<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
	<u>Mean</u>	<u>Std. Deviation</u>	<u>Std. Error Mean</u>	<u>Lower</u>	<u>Upper</u>			
Social Recognition Subscale	6.75	5.62	2.81	-2.19	15.69	2.402	3	0.096
Affiliation Subscale	-1.00	1.41	0.71	-3.25	1.25	-1.414	3	0.252
Appearance Subscale	-0.50	3.11	1.55	-5.45	4.45	-0.322	3	0.769

While the paired samples t-tests revealed no significant differences between the two time points among the three subscales, the mean difference in the social recognition subscale for the high “like” group (M =6.75, SD = 5.62) approached significance;  $t(3) = 2.402$ ,  $p = 0.096$ . There was also positive differences in scores in the social recognition subscale for the high “likes” group whereas the low “like” group experienced a negative mean change in the same subscale. The opposite was true for the affiliation and appearance subscales for each “like” group.

**Repeated Measures ANOVAs.** Even though there were no significant differences found between the two time conditions for any of the subscales, repeated measures ANOVAs were conducted in order to see if the “like” groups had a significant effect on the changes noticed in the paired sample t-tests. A total of nine repeated measures ANOVAs were conducted for the IPAQ S7T, two subscales of the ATPA, and three subscales of the EMI-2 with time as the dependent variable and “like” group as the between-subjects variable. The specific subscales for the ATPA, social and health and fitness, were chosen based on the results of the paired sample t-tests for the high “like” group. As for the three subscales for the EMI-2, social recognition, affiliation, and appearance, these subscales were chosen because they measure socially oriented motivations behind exercise. The first four repeated measures ANOVAs were conducted using the time 1 and time 2 measures of the IPAQ S7T for daily and weekly self-reported vigorous and moderate physical activity times. The two repeated measures ANOVAs conducted for the two subscales on the ATPA looked at effects of “like” group on the mean differences between time 1 and time 2 scores for the social subscale and health and fitness subscale. Lastly, the final three repeated measures ANOVAs were conducted for the social recognition, affiliation, and appearance subscales on the EMI-2. There were no significant effects of “like” group on any of the measures.

## **Discussion**

The pilot study found no statistically significant changes from time 1 and time 2 in scores of the subscales of the IPAQ, ATPA, and EMI-2. These results were expected given the sample size. However, this type of pilot study was important in that it helped elucidate where failures may occur in future studies, unexpected behaviors may be observed on the study site, and which

measures were inadequate or did not answer the questions asked. The process of researching for, designing, and conducting this pilot study yielded both the discovery of potential measures that can be used in future iterations and the creation of a website that can be added to and altered to more effectively and efficiently collect data. The lessons learned through this study have established a skeleton on which to build upon future iterations of this study.

Methodologically, this study has helped identify what needs to be done in order to refine future iterations of this study. Expanding the sample is the primary adjustment necessary to truly get at the questions that were asked. Including a larger number of participants as well as including true adolescents would make the data more meaningful and generalizable. The power of a statistical tests depends on three things: “the significance criterion, the sample size, and the population effect size” p. 98 (Cohen, 1997). Because the population effect size is not known in this case and the significance criterion for each of the test was set at the standard 0.05, the sample size was the only one of these three factors that could have been controlled. As the likelihood of rejecting a false null hypothesis increases as the sample size becomes larger (Cohen, 1997), this methodological step seems important to consider for future studies. Cohen (1997) asserts that a 0.8 power level, or an 80% chance of an effect if one exists, should be the standard. According to Field (2013), the sample necessary to achieve a power level of 0.8 with a significance criterion of 0.05 is around 1000 participants. . However, limitations on funds and time prevented all eligible participants from being included in the study.

Inclusion of college-aged adults who are not attending formal institutions would also create richer data. Coyne et. al. (2013) hypothesizes that this population may use social media very differently than their college attending counterparts for this reason, as identity development may have been pushed forward by participation in full time work. The dearth of research that is

present on this population makes it critical to promote health promotion interventions for these emerging adults who are not attending post-secondary institutions as they represent a vulnerable population (Nelson et. al., 2008). The design of the current pilot study is perfect for this population as the ubiquity of social media is harnessed in order to reach this typically unreachable population by providing them with procedures that are understood by a majority of people in this age group as well as the convenience of the website format of data collection. However, since this pilot study was designed specifically for undergraduates at a medium-sized, research institution in the northeast United States, certain alterations would have to be made in order to accommodate this population. As approximately 60% of young people have not completed a post-secondary education by the age of 27 (Symonds, Schwartz, Ferguson, 2011), it is important to tailor future interventions to the needs of this distinct population. As college completion rates hover around 56% in the United States (Symonds, et. al., 2011), almost half of young adults in the United States do not have or will not have access to collegiate athletic facilities. Attitudes towards exercise going into the study may be different in this population compared to a college-attending emerging adult population so this aspect of this population will have to be considered when designing interventions. Lastly, incentives (amount, type, and distribution methods) will have to altered as this population may not be as conveniently located as the sample used in the current pilot study.

The entirety of this data collection process from the preliminary survey all the way to the debriefing form could be digitized so that they can be completed remotely from any location with an internet connection. The original need to digitize the study came about in order to ensure that time 2 data collection happened immediately following the completion of the active participation period rather than over a week after. It was thought that this would allow the data to



show more meaningful trends as the effects of the study would have been more accurately represented in the data. A 2010 study conducted with 135 adults in the United States found that electronic survey methods yielded larger standard deviations in results but also higher response rates (Norman, et. al., 2013). While this finding seems promising, a review of literature on online survey administration identified a large variety of factors that affect response rates (Fan & Yan, 2010). Two key methods of improving response rates, which was found to lower than their offline counterparts in this review, the authors suggest two time points to focus on during the development of the survey: formatting of the survey and delivering the survey. Future iterations of the study will have to address this issue of how digitizing existing measures could affect both the quality and quantity of responses.

A more fully developed website with all existing data collection tools as well as an addition of a self-report exercise tracker could streamline and bolster the data collected in future iterations. With a fully automated website, extension of the active participation period for the participants should be possible. The necessity of the extending the posting period became evident after looking at the posting behavior of the 7 participants in the study. There was great variability in the rate at which participants posted photos. However, all posted only three photos, the minimum to receive compensation. This observation brought up the question of what would happen if the study period was extended out to a month or even longer, similar to the 11 weeks of the Zhang et. al. (2016) study. Extending the posting period would allow for a more meaningful look at if the “like” group people were assigned to affected posting behavior and in turn, engagement with social media platforms. As studies have shown that emerging adults who do not feel sure of themselves sometimes turn to social media to seek out social support on social media (Michikyan, Subrahmanyam, & Dennis, 2014), it would be interesting to see if this

concept applied in this study condition with the exercise selfie. These lessons learned will immensely improve the study design and the efficiency of future iterations of this study.

The measures used also reveal much to think about for future attempts at answering the study questions. The IPAQ was unique in that it asked participants separately about vigorous and moderate exercise as well as walking and sitting. While walking and sitting were not of interest in this particular study, future iterations could look at if sedentary behavior, i.e. sitting, is affected by the “like” group participants are placed in. This separation of exercise into moderate and vigorous exercise was not characteristic of the literature reviewed for this study. As there was a difference in mean difference in minutes of moderate exercise between the two “like” groups in the study, this finding could be something that could potentially be replicated in studies with larger samples. However, this measure was very vague in distinguishing between moderate and vigorous activity. The primary method of distinguishing between the two types of physical activity provided to participants between the two types of activity was how hard they were breathing. For example, “fast bicycling” was used as an example of vigorous exercise while “bicycling at a regular pace” was used as an example of moderate exercise (Craig, et. al. 2003). The definitions provided by this measure could be interpreted very subjectively by each individual participant as there could be much variation in different types of exercise and what one could consider vigorous or moderate effort. Secondly, for those that do not participate in exercise a lot, any type of exercise could be considered vigorous over moderate. There needs to be a greater focus on one type of exercise that the participant is involved in order to obtain accurate characterizations of the intensity of exercise. The 2015 version of the Behavioral Risk Factor Surveillance System (BRFSS), a survey distributed by the CDC, separates physical activity by intensity by asking participants about intensity of specific activities they reported as

contributing to their exercise in the past month (CDC, 2015). Similarly, the 2017 BRFSS provides participants with a list of specific activities to choose from in their answer (CDC, 2017). The way these measures ask about the intensity of physical activity will be important to consider in future iterations, especially for adolescent populations who are attending school. The ATPA will not be utilized in future iterations of the study. Other than being outdated and having a lot of overlap, this measure does not get at the information necessary to answer the second questions about attitudes towards physical activity. The measure required much guidance on the part of the principal investigator in the domain of how to go about answering the questions as well as puzzled looks from participants while reading the measure. It also grouped responses by attitude so participants could consciously choose more positive adjectives in attitudes they deemed more agreeable at the time rather than choosing answers that reflect their true attitudes toward exercise. The EMI-2 will be utilized in future iteration of this study due to its ease of administration and scoring. The traditional Likert scale answering procedures allow it to be administered with little confusion on the part of the participant. The questions were also sorted randomly to prevent participants from identifying which questions aligned with which motivations.

Beyond the quantitative measures that were planned to be incorporated in this study, additional qualitative measure that gets at participants reactions toward the “likes” they received on the photos they posted on the study site are needed. This lesson came about from a reaction by one of the participants in the study during the debriefing session where he found out that the “likes” were assigned by random assignment into “like” groups. With a frown on his face, this participant remarked, “I knew something was up, I only got four ‘likes’ on one of my photos. How could you do that to me?”. The principal investigator assured this participant that the likes

were assigned based on the algorithm built into the website but the participant, whom principle investigator knows personally, was slightly disturbed by the small number of “likes” his photos received. However, this issue was not something that needed to be addressed any further than the debriefing approved by the institutional review board due to the nature of the relationship between the participant and the principal investigator. While this was a unique case, all participants reacted in one way or another to the news that the “likes” were not assigned by human volunteers. In future iterations of the study, participants will be provided with resources for the mental health as well as a walkthrough of how to schedule an appointment with a mental health counselor at the university’s mental services in those cases when the reassurance of the “likes” not being a reflection of how people viewed the participant was not enough. Through the reactions of the participants, it became evident that there needed to be some measure that got at what the participants’ reactions to this news was and how they felt if the number of “likes” they received during the study were vastly different from “likes” they receive in their own social media posts. A qualitative measure could bring researchers closer to understand what the “like” means to emerging adults as well as the effect that it can have on behavior. This qualitative measure could also act as an extension of the debriefing process where participants are asked to seriously consider how they felt about the “likes” they received rather than being given a verbal prompt for questions regarding the deception that was involved.

Ultimately, this study attempted to understand if “likes” on social media could act as an agent of change for health behavior, specifically physical activity, as a proxy for perceived social support. Future iterations of this study should utilize the principles of the Transtheoretical Model (TTM) to social media and physical activity. The TTM, which breaks down health behavior change into six stages (Prochaska, Redding, & Evers, 2015), provides the ideal theoretical

framework for a study on exercise behavior and perceived peer support. The six stages of the model are as follows: *precontemplation*, *contemplation*, *preparation*, *action*, *maintenance*, and *termination*. The TTM posits *dramatic relief*, “increasing negative or positive emotions to motivate taking appropriate actions” (p. 126) as a construct that allows people to move between the six stages. In the context of this study, “likes” acted as the construct of *dramatic relief* by providing people with the activation in the reward centers of the brain highlighted by Sherman et. al. (2016). The goal of the study, then, was to push people who were in either the *contemplation* or *preparation* stage into the next stage in the model. Future iterations of this study should incorporate this model from the beginning by determining at which point a participant is in the TTM regarding physical activity. Applying this model, future iteration of this study can ask the question of if “likes” can be act as the *dramatic relief* construct in exercise behavior change in young people.

The lessons learned in this pilot study, as well as the potential information that could be obtained through studies like this one, have some implications for policy and future research. Interventions that provide peer support to young people who are at risk for reduced rates of physical activity are critical. Particularly, these types of interventions could help those emerging adults who are of college-age but not attending a post-secondary educational institution be successful in developing healthful behaviors. The accessibility and self-evident nature of a social media intervention could help improve rates of physical activity among, as Arnett (2000) calls them, the “forgotten half”. The need for more research on understanding the health implications of the “like” and the extent of its effects is necessary to address the growing concern of reduced physical activity rates among young people (Caspersen, Pereria, Curran, 2000).

**Limitations.** There were many methodological limitations in this pilot study that need to be addressed. The small sample size paired with the homogeneity of the sample did not allow for any meaningful conclusions to be drawn from the data. The analyses that were done, at best, are proof that these measures can be used in the way they were in this study. Outside of this conclusion, there is not much that can be inferred from the data. In terms of the measures that were used, the ATPA was an outdated measure of attitudes that did not yield data that answered the question that was asked. The ATPA was created in by Gerald S. Kenyon in 1968 and has not been updated since. The subscales also had much overlap with the EMI-2, a measure that was updated in 1997 (Markland & Ingledew, 1997). Rather than identifying if there were shifts in valence of attitudes towards physical activity, it instead asked how strongly participants identified with certain statements that get at a reason for participation in exercise. The timing of the study also was limitation that seriously affected the outcome of the study. Due to the timing of the initiation of the study, recruitment could not begin until the week before the students’ spring break. Following the completion of the active participation period, students left campus for a week for break before being able to schedule time 2 data collection. As such, participants were removed from the conditions in which the study initially took place in. The IPAQ, since it asks participants to recall physical activity in the last seven days, was then asking questions about physical activity levels over spring break rather than immediately following the study period. Lastly, participants’ posting behavior on the study website left doubts about their engagement with the study. Posting behavior was erratic, this was expected, but all seven participants only posted the minimum three pictures during the week. Some participants posted all three within two days of starting the study but did not post more while others posted all three on the last day of the study period. Seven out of the eight initial participants met the minimum

requirement for inclusion in the time 2 measures (picture count = 3). As this was the number of photos that was necessary to receive the second half of the compensation, it could be that participants posted this many due to that reason and that reason alone. The self-motivated posting activity aspect of this study was a limitation because validity of the data depends entirely on the participants' posting behavior. As there was no way of controlling posting behavior without straying further from creating a true social media environment, this behavior acted as a confounding variable in understanding the proposed questions. However, frequent posting of exercise selfies may be, in fact, an activity that participants are less than eager to engage in as they may view the high frequency of posting as annoying or showing off (Vaterlaus et al., 2015). This study included the study website, which mimicked a closed social media environment while giving the experimenters control of the number of “likes” each participant receives. This aspect of the study also presented a limitation in that the behaviors exhibited in this pseudo social media environment may not translate to real social media environments. Yet, without a proper procedure set in place for using social media environments in research studies, this pseudo social media environment will inform future practice on how researchers can create proper social media environments for research purposes. All of these limitations, while quite serious, were expected and informative.

**Future Directions.** Even with the severe methodological limitations there are some merits for conducting such a pilot study. First, this pilot study helped highlight the importance of finding a larger sample as well as ways that the study website could be enhanced. The next step, then, would be to refine the methodology and conduct the study in a larger sample within the university setting with motivations being the focus alongside frequency of exercise. As such, it is important that the study website hosts a feature to track exercise frequency to better understand

changes over time in total minutes of exercise per participant. These steps are necessary before being taken to populations outside of the university setting, such as adolescents and emerging adults not enrolled in post-secondary educational facilities, because this pilot was designed for college students. Future studies in this domain could help inform policy regarding the promotion of health behavior among young people in the United States as well as the delivery of health behavior interventions to young people. Schools and youth serving organizations will hopefully be provided the resources to utilize the network of young people at their disposal to guide those young people who demonstrate the most need. As the research on social media’s influences on health behaviors grows, the “like” will hopefully be able to be harnessed as a tool for promoting healthful behavior among young people.

### **Conclusion**

In order to harness the wealth of information that social media platforms possess, it is necessary to conduct studies that incorporate various components of these platforms in their design. The “like” is one of these components that is universally understood and could have meaningful implications for those who receive and give them. The current pilot study attempted to use the “like” to see if the number of “likes” a young person receives could impact the frequency of, attitudes toward, and motivations behind exercise behaviors. Due to small sample size, the results of the study could not be used to draw any meaningful conclusions. However, as more and more children are born into a world dominated by social media, it seems important to examine the impact that social media can have on various health behaviors, psychological and physical. This study came short in many regards: understanding how experimental social media platforms are perceived, how participants were affected when their photos receive less likes



when compared to their true social media posts, and revealing the relationship between perceived social support and “likes” on social media. However, the potential for social media to affect positive health behaviors was exhibited in the positive trends found for mean differences in daily and weekly moderate exercise minutes. The lessons learned through this study are just a few small steps in understanding this relationship between social media and health behaviors.

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## Appendix A

Q: Do you have any commitments or obligations to participate in any form of rigorous physical activity, such as clubs, teams, or classes?

A: Yes / No / Maybe

If maybe is chosen:

Q: Please explain your answer choice.

A: Open ended response

## Appendix B

Example of ORIGINAL IPAQ S7T form

## Short Last 7 Days Telephone IPAQ

**READ:** I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

**READ:** Now, think about all the *vigorous* activities which take *hard physical effort* that you did in the last 7 days. Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities?  
 Days per week [VDAY; Range: 0-7, 8, 9]  
 8.  Don't Know/Not Sure  
 9.  Refused

[**Interviewer clarification:** Think only about those physical activities that you do for at least 10 minutes at a time.]

[**Interviewer note:** If respondent answers zero, refuses or does not know, skip to Question 3]

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?  
 Hours per day [VDHRS; Range: 0-16]  
 Minutes per day [VDMIN; Range: 0-960, 998, 999]  
 998. Don't Know/Not Sure  
 999. Refused

[**Interviewer clarification:** Think only about those physical activities you do for at least 10 minutes at a time.]

Example of alteration to READ: sections

Please read the following prompt carefully: Think about all the *vigorous* activities which take *hard physical effort* that you did in the last 7 days. Vigorous activities make you breath much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

Example of alteration to line of questioning

1. During the **last 7 days**, on many days did you do **vigorous** physical activities? Think only about those physical activities that you do for at least 10 minutes at a time.

A: \_\_\_\_\_ days per week / don't know / refused to answer

If respondent answers zero days or don't know, website will skip to question 3.