LEAD ME TO LOSE: HOW LEADERS, UNCERTAINTY, AND COMPETITION INFLUENCE WEIGHT LOSS INTENTIONS IN GROUPS

By

Jeffrey Beaulieu

A Thesis Presented to

The Faculty of Humboldt State University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Psychology: Academic Research

Committee Membership

Dr. Amber Gaffney, Committee Chair

Dr. Benjamin Graham, Committee Member

Dr. Taylor Bloedon, Committee Member

Dr. Christopher Aberson, Graduate Coordinator

July 2020

Abstract

LEAD ME TO LOSE: HOW LEADERS, UNCERTAINTY, AND COMPETITION INFLUENCE WEIGHT LOSS INTENTIONS IN GROUPS

Jeffrey Beaulieu

The rates of obesity in the US was 42.4% in 2017-2018. Engaging people's social identities through leadership may be an effective method to encourage weight loss. The social identity approach to leadership often examines representative and prototypical leadership as of the *average* group traits or as leaders who are *similar* to followers. However, exceptional leaders may also be prototypical. The preference for exceptional (ideal) over similar (representative) leaders may lie in the identity function the leader serves. Here, I hypothesized that ideal leaders (e.g., someone who has already successfully lost weight), who embody extreme positive group attributes are most influential when followers experience uncertainty and/or the ingroup is engaged in competition, while similar leaders (e.g., someone who is losing weight with the group) are more effective under low uncertainty when the group is not engaged in competition. Ideal leaders have the ability to separate the ingroup from relative outgroups and clarify group prototypes, which should be particularly attractive in times of competition and uncertainty. Participants were placed in a hypothetical weight loss group (lead by an ideal

or representative leader) that is either in competition with another or not. Results found that participants led by an ideal leader had greater weight loss intentions than those led by a representative leader. However, in the opposite direction of what was expected, participants who were uncertain and those in competition had lower weight loss intentions than those who were certain and those who were not engaged in competition.

Table of Contents

List of Tables

Introduction

In 2017-2018, the rates of obesity in the United States reached 42.4%, and I continually increasing (Hales et al., 2020). Obesity is a serious problem as it can lead to diabetes, cardiovascular disease, and several cancers. Therefore, the health concern of obesity in America needs attention, and more effort needs to be directed towards addressing this problem (Ng, et al., 2014). Obesity stems from a variety of causes, including added sugars, low physical activity, aggressive marketing of unhealthy foods, misinformation, and cheap, processed, and addictive food (Gunnars, 2018). However, research suggests another underlying influencer of obesity: people's group memberships, specifically, how membership to a social group with unhealthy norms can influence obesity (Hunger et al., 2015). Hunger et al. (2015), stated that being overweight is stigmatized in society, and when people self-categorize as such, 'overweight' becomes a shared social identity with other overweight people. Once that stigmatized identity is salient, people may perceive a threat to their weight-based social identity, which is associated with undermined self-regulation and avoiding stigmatizing environments, such as the gym.

Self-Categorization

A part of a person's self-concept is derived from their membership in social groups, thus forming a social identity (Hogg 2006; Hogg & Reid, 2006; Tajfel & Turner, 1979). Social identity is "the evaluative part of the self-concept through which people define themselves in terms of what their group is (the ingroup) and what their group is not (the outgroup)" (Gaffney & Hogg, 2017, p. 3).When people attempt to evaluate their

beliefs, values, and behaviors in terms of social norms, a safe and easy way to determine what is socially acceptable is to compare themselves to relevant ingroups and outgroups, and their respective group norms. The ingroup provides information about who a person should be and the outgroup provides information about who a person should not be, and group norms provide crucial information about how people should and should not act and feel (Hogg & Turner, 1987). These norms are defined by ingroup prototypes, which are a fuzzy set of cognitive attributes, such as attitudes, beliefs, and behaviors, that define a group both by ingroup norms and outgroup distinctions (Hogg, 2006). The dichotomy of ingroup similarities versus outgroup differences is the metacontrast principle, which states that the attributes of the group become prototypical to the extent that they minimize ingroup deviation and maximize outgroup distinction. These prototypes describe what it means to be a member of the group, as well as how a group member should act, think, and feel. It is important to emphasize that prototypes do not describe the average ingroup member, rather they describe the ideal ingroup member (Hogg, 2006). When a person's membership to a specific group becomes salient, they "conform to, and thus are influenced by, the prototype," (Hogg, 2001, p. 189). Therefore, through conformity to the prototype, members who are more representative of the prototype are able to exert more influence over group members than less prototypical members.

The mechanism through which social identity influences human thought, feelings, and behaviors is self-categorization. When membership to a specific group becomes salient, self-categorization is the process of group members depersonalizing their

identities and categorizing themselves and other group members along the lines of the group prototype, and then acting in accordance to the prototype (Hogg & Reid, 2006). Members of a group can even go so far as to internalize the prototypes of the ingroup as a part of the self, a process known as *depersonalization* (Smith & Henry, 1996). Self-categorization is underpinned by social comparison, in which people compare themselves to those similar to them, to ascertain the correctness of their opinions and behaviors (Festinger 1954; Hogg & Gaffney, 2014). Thus, when categorizing themselves in relation to the group prototype, people compare themselves to prototypical others to learn what is prototypical of the group, then align their behavior with the group prototype. Therefore, if healthy eating behaviors and exercising is a part of the group's prototype, group members will act in alignment with that prototype. Hunger et al. (2015) posit that when people categorize themselves or believe others categorize them as fat or overweight, it becomes a social identity shared with other people who are perceived to be overweight. Take, for example, a social group in which the prototype and norms revolve around being overweight and engaging in unhealthy behaviors such as eating junk food or sedentary activities. Overweight identities are often stigmatized, and negative evaluations of the overweight identity can often lead to aversive mental and health effects, such as stress and reduced self-control of unhealthy behaviors (Hunger et al., 2015). Given that a person is a member of the group, and that group membership is salient, it can then be inferred that the person will act accordingly with, and potentially internalize, these negative health behaviors (Haslam et al., 2009; Jetten et al., 2017). On the other hand,

being a member of a group whose prototype consists of positive health behaviors, such as exercise and eating healthy foods, could cause depersonalization and an internalization of these positive prototypes, potentially leading to positive health behavior change (Hermans et al., 2008; Higgs, 2015; Prinsen et al., 2013).

Uncertainty-identity Theory

If a person's overweight identity is salient, the adverse health effects of an unhealthy lifestyle becomes salient. Stress over stigmatization and adverse health effects could cause self-uncertainty, another motivator of social identity (Hogg, 2006). Uncertainty about the self, one's abilities, and the accuracy of one's opinions create a negative drive state. To reduce this negative drive state, people can look to others that share their identity, as other ingroup members are an important source of how one should act and feel (Gaffney & Hogg, 2017). Uncertainty-identity theory posits that when people experience self-uncertainty, they can turn to groups that they identify with to reduce their uncertainty through self-categorization and depersonalization to the group's prototypes (Gaffney & Hogg 2017). When depersonalization occurs, an individual no longer sees themselves as an individual, instead, they view themselves along the lines of the relevant ingroup prototype. Thus, self-categorization provides one with a sense of how to act and feel in a group through that group's prototypes, helping to reduce feelings of self-uncertainty (Mullin & Hogg, 1998). Prototypical members are perceived to have more influence than less prototypical members, and leaders who are high in prototypicality usually lead groups that are highly cohesive, providing an opportunity to reduce

uncertainty, since highly cohesive groups provide clear guidelines on how to act and feel (Hogg, 2001; Spencer-Rogers et al., 2007). However, if a group believes it has no incumbent leader but instead one or more prospective leaders, feelings of self-uncertainty can also cause group members to support a prospective non-prototypical leader (Rast et al., 2012). In these situations, the group feels a need for some sort of leadership, regardless of prototypicality and might be willing to accept the change of a less prototypical leader.

Leadership

Prototypes are important in determining a person's beliefs and behaviors, and according to the social identity theory of leadership, one major influence on group prototypes is the leader of the group (Hogg, 2001; Hogg & van Knippenberg, 2003; van Knippenberg & Hogg, 2003). Specifically, more prototypical members have more influence than less prototypical members, (Hogg, 2001; Turner, 1991) and leaders tend to be group members who best represent the ingroup prototype and are thus prototypical (Gaffney & Hogg, 2017; Hogg et al., 2012). These prototypical members, generally leaders, are the targets of social comparison, and thus conformity. Group members pay attention to and are influenced by highly prototypical members because prototypical group members provide information about the group prototype, essentially paving the model of group attitudes and behavior (Hogg & Gaffney, 2014). In addition, when group membership becomes salient, the prototypicality of leaders becomes more influential than other bases of leadership (Hains et al., 1997; Hogg et al., 1998).

The perceived effectiveness of leadership is influenced by the leader's perceived prototypicality, and according to the metacontrast principle, their prototypicality can be split into two facets that could influence leader effectiveness. This duality of the metacontrast ratio is exemplified by two aspects of group prototypes: the central tendency, or typical attributes that group members hold that increase intragroup similarity, and more extreme attributes, which increase intergroup differentiation (Kim & Wiesenfeld, 2017). In some situations, such as in an intragroup context when comparison is with other group members, prototypicality should be defined by a 'central tendency'. However, in an intergroup context, when the ingroup desires differentiation from the outgroup, prototypicality is defined by extreme attributes, which polarizes the group prototype away from the outgroup (Gaffney et al., 2014). As a result, extreme attributes should be favored as part of the prototype when the group is engaged in direct competition with a relevant outgroup, effectively increasing the desire for intergroup distinction. The current work proposes two types of prototypical leaders: Ideal leaders, who embody the more extreme attributes that group members aspire to, and representative leaders, who embody the central tendency prototypes that group members currently hold. Ideal leaders could be seen as "entrepreneurs of identity" (Platow et al., 2015, p. 343) by actively construing the group prototypes to match the leader's aspirations and qualities that shift prototypicality and group norms. In an intragroup context, such leaders would not be perceived as prototypical; however, in a competitive intergroup context, ideal leaders will have shaped the group's prototype in juxtaposition

to a relevant outgroup, positioning themselves as prototypical of an extremitized and ideal ingroup prototype. The idea of representative and ideal leaders have been hinted at in previous studies by Halevy et al. (2011). It was documented that visionary leaders (whose definition is similar to ideal leaders) promote ingroup identification, intrinsic motivation, and collective action more than representative leaders. This suggests that an ideal leader could be more effective at increasing weight loss intentions. However, neither ideal nor representative leadership has been directly addressed or studied in previous research, thus the current study will examine these types of leadership, and how they influence weight loss in a group setting.

Both representative and ideal leaders could be seen as prototypical, with a representative leader embodying the central tendency of a prototype, being "prototypical" in an intragroup context, and the ideal leader embodying the extreme part of a prototype, and only being "prototypical" in an intergroup context (Kim & Wiesenfeld, 2017). Previous literature suggests that implementing change in a group is a central aspect of leadership, which begs the question of whether ideal or representative leaders are more effective at influencing change, specifically weight loss in the current context (Avolio & Yammarino, 2002; Conger & Kanungo, 1987). Transformational leadership could be equated to an ideal leader, as such leaders are widely regarded as the most effective form of leadership (Judge & Piccolo, 2004). Halevy et al., (2011) demonstrated that a visionary candidate was endorsed more strongly than a representative candidate, and Rast et al. (2016) found that when people feel uncertain, they prefer leaders who are change-

focused, suggesting that an ideal leader could gain support and be able to increase weight loss intentions under some circumstances. Furthermore, an intergroup context can increase the influence of an ideal leader over a representative leader (Kim & Wiesenfeld, 2017). When the social context makes intergroup boundaries salient, ingroup members strive for distinction from the outgroup, such as in a weight loss competition. When in competition with an outgroup, ingroup members try to distinguish themselves from the outgroup and see other group members as more similar to increase feelings of interdependence necessary to win the competition. Even extreme ingroup prototypes are seen as useful and less deviant in achieving the group goal in these competitive contexts (Greer et al., 2018; Oakes et al., 1998). These ingroup similarities and outgroup differences are characterized by the group's prototype, which the leader represents and exemplifies. Therefore, when in competition, the leader will use their prototypicality to either bolster the ingroup similarities and emphasize the central tendency of the prototype, or bolster the outgroup differences and emphasize the extreme attributes. The ideal leader embodies the extreme attributes that maximize intergroup differences, and therefore could be seen as more prototypical in this context, increasing their influence. Hogg and colleague's work (e.g., Gaffney et al., 2014; Hogg et al., 2010) demonstrates that as self-uncertainty increases, people are more willing to identify with groups that are more extreme and adopt more extremist attitudes. Followers who strongly identified with the group had strong relational identification with their leader, meaning they define themselves by their subordinate role-relationship with the leader (Sluss & Ashford, 2007;

Steffens et al., 2014). This relationship is further strengthened by the degree to which the leader is perceived as representative of the group's central tendency prototype, as well as group members' shared social identity with the leader. This suggests that under low uncertainty, a representative leader would foster strong relational identification among followers, potentially increasing weight loss intentions. Rast et al. (2012) found that under high uncertainty, support for a leader whose prototypicality is closer to the central tendency weakened, suggesting that under conditions of uncertainty, a support for a representative leader would weaken and support for a leader who deviates from the central tendency prototype may increase.

Overview of the Research

Being overweight is stigmatized in American society, and people who are overweight experience discrimination and devaluation (Crandall & Reser, 2005). Hunger et al. (2015) demonstrate that concern about weight-based discrimination and devaluation can trigger weight-based social identity threat, and further propose that this threat can have serious negative effects on psychological and physiological health in ways such as increased stress, increased motivation to avoid and escape stigma, and reduced self-control resources important for the regulation of healthy behaviors. One way for overweight individuals to reduce this threat to their identity, and potential self-uncertainties related to it, would be to identify with a cohesive group (see related work in the educational domain by Cruwys et al. (2014), potentially even one in which attempting to lose weight is prototypical. Because leadership is integral to group cohesion and

group-based influence, leader prototypicality of the group should be crucial to identification with such groups (Gaffney & Hogg, 2017; Hogg, 2001; Hogg & van Knippenberg, 2003; van Knippenberg & Hogg, 2003). Previous research points to two different types of leaders, ideal and representative (Kim & Wiesenfeld, 2017). For the current study, an ideal leader is defined as a person who has already lost weight and is leading the group to lose weight, and a representative leader is defined as a person who is losing weight with the group. Group context also plays an important role in leader effectiveness. Under conditions of intergroup competition which magnify the intergroup context, such as a weight loss competition, ideal leaders can be seen as more prototypical (Hogg, 2001; Kim & Wiesenfeld, 2017) and should be increasingly effective to the extent that people experience self-uncertainty (e.g., Gaffney et al., 2014). The type of intergroup context being used in this study is an intergroup competition, specifically a weight loss competition. On the other hand, previous research suggests that under low uncertainty, group members would identify strongly with a representative leader, but as self-uncertainty increases, support for a representative leader weakens (Rast et al., 2012). The current study investigated whether an ideal or a representative leader would influence greater weight loss intentions in a group in situations of high or low self-uncertainty and intragroup or intergroup context. Specifically, this study focuses on how a weight loss group led by a leader who is either losing weight alongside the weight loss group (representative), or a leader who has already lost weight (ideal) will influence weight loss

intentions. In addition, how feeling uncertain about one's identity and being in competition with another weight loss group influences this relationship is examined.

I hypothesized that under high uncertainty, participants who have an ideal leader would demonstrate greater weight loss intentions than those who have a representative leader (H1a), while under low uncertainty, participants who have a representative leader would demonstrate greater weight loss intentions than those who have an ideal leader (H1b). In general, participants engaged in intergroup competition should demonstrate greater weight loss intentions than those not engaged in intergroup competition (H2a). H2a should be qualified such that, participants who are high in uncertainty and engaged in intergroup competition, would demonstrate greater weight loss intentions if their group is led by an ideal vs. a representative leader (H2b). These effects should be mediated by perceived leader prototypicality, such that under the condition of intergroup competition, those high in uncertainty should perceive the ideal leader as more prototypical than the representative leader, which will then impact weight loss intentions (H3).

Method

Design

This study is a 2x2x2 experimental design, examining the effects of leadership type (ideal vs. representative), self-uncertainty (high vs. low), and social context (intergroup vs. intragroup) on weight loss intentions (the primary dependent variable) and perceived leader prototypicality (the proposed mediator). At the beginning of the survey, participants were told that the purpose of the study was to examine the effectiveness of

online weight loss programs, and were given the option to proceed with the online weight loss group to which they are assigned if they wish.

Participants

A power analysis was conducted to detect the probability of rejecting the false null hypotheses. The analysis indicated that a sample size of 205 was necessary to reach adequate power (.80). Four hundred and twenty nine participants were recruited from Amazon's Mechanical Turk. Each participant was paid $0.50. Of the 429 participants surveyed, 95 did not complete the survey, and 2 did not consent to the use of their data, leaving 332 participants. Participants were removed if they gave impossible answers on certain measures, such as working out 8 days a week or reporting a BMI well out of physical possibility. In addition, participants were given several attention checks. For the competition manipulation, participants were asked either the name of their weight loss group (no competition condition) or the name of the group they are competing against (competition condition). For the leadership manipulation, participants were asked the reason why the leader was chosen for their weight loss group. After removing participants for impossible answers and failing the attention checks, the final sample was 133 participants, less than the 205 necessary to reach adequate power.

Demographics

The sample was comprised of 67 (50.4%) female, 64 (48.1%) male, 1 (0.7%) transgender male, and 1 (0.7%) preferred not to answer. In addition, the sample was

67.7% Caucasian, and 53.4% received a 4-year degree. The average age of participants was 36.6 with a range of 20-66.

Covariates

Pretest of Weight Loss Intentions

After the study was introduced to the participants and they were aware the study examined weight loss intentions, they were asked to rate their intentions to exercise, measured through frequency and intensity. Participants were first asked how many days per week and minutes per day they intended to be physically active. They were then asked to rate the intensity of the physical activity on a 6-point semantic differential scale, ranging from 1 (*very mild*) to 6 (*very intense*). The purpose of measuring weight loss intentions as a pretest was to use them as covariates in the analyses. Participants who already have high intentions to lose weight at the beginning of the study will likely have relatively higher intentions at the end of the survey than those who had lower intentions at the pretest, regardless of the manipulations.

Experimental Variables

Uncertainty Prime

Participants were primed with high (low) uncertainty by reading the prompt "Please take a few moments to think about yourself, your future, and where you are going. Then, think about the things that make you feel deeply uncertain (confident) and then list and describe 3 things that make you feel uncertain (confident) and or confused

(clear) about who you are," (Gaffney & Hogg, 2017; Grant & Hogg, 2012; Hogg et al., 2007).

Competition

Participants were given a personality test ostensibly with the purpose of assigning them to a weight loss group with like-minded individuals. This test was adapted from Hohman et al. (2017) purpose of this test was to give the participants the impression that they are engaged in competition with another group or not. Upon completion, participants waited 30 seconds while the results of the test were "calculated". In reality, the results of the personality test were not calculated, and the participant were randomly assigned to either be in competition with another weight loss group or not. In the competition condition, participants were told, "According to the results of the personality test, you have been placed in The Gut Busters. Your group consists of like-minded individuals who we believe would work best together towards the goal of weight loss. You will be competing with The Waist Watchers, which consists of people who scored differently than the members of your group. The two groups will compete to lose the most total weight." The participants in the non-competition condition were told, "According to the results of the personality test, you have been placed in The Gut Busters. Your group consists of like-minded individuals who we believe would work best together towards the goal of weight loss."

Leadership Type

Participants were randomly assigned to either the ideal leader or representative leader condition. Participants in the ideal leader condition read the prompt, “Jamie is the selected leader of your weight loss group. They have previously lost a significant amount of weight, and will be helping to guide the group to their goal weight. Jamie was selected because of their fitness and ability to stick to a healthy diet and exercise.” Participants in the representative leader condition read the prompt “Jamie is the selected leader of your weight loss group. They are attempting to lose weight alongside members of the group, and will be helping to guide the group to their goal weight.”

Dependent Variables

BMI

Participants were asked about their height and weight, so their BMI can be calculated in the analysis.

Identity Leadership

The 12-item Identity Leadership Inventory (ILI) developed by Steffens et al. (2014) was used to assess the extent to which the participants view the leader’s prototypicality, identity advancement, and identity entrepreneurship. The participants used a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) to measure the extent to which they agree with statements such as “Jamie embodies what the group stands for,” and “Jamie makes people feel as if they are part of the same group”. The total scale was reliable ($\alpha = .95$), as were the subscales of prototypicality ($\alpha = .87$), identity advancement ($\alpha = .88$), and identity entrepreneurship ($\alpha = .85$).

Leader Support

Leader support was measured using a 10-item scale developed by Rast et al. (2012). Participants used a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) to indicate the extent to which they disagree or agree with each of the statements about their opinions of the weight loss group leader, such as, "I am a strong supporter of Jamie," and "I trust Jamie to advocate for my weight loss group." It was a reliable scale ($\alpha = .94$).

Weight Loss Intentions

Intentions to exercise were measured in terms of intensity, frequency, and duration, as well as their interest in joining the weight loss group (Grant & Hogg, 2012). Participants were told "Based on the information about Jamie and The Gut Busters, please answer the following statements about your exercise intentions." They first used a 7-point Likert scale ranging from 1 (*not interested at all*) to 7 (*very interested*) to rate their interest in competing in this program with the Gut Busters. They were then given two open ended questions asking "how many day/week" and "how many minutes each time" would he/she intend to be physically active. Participants were then asked to rate the intensity of the physical activity on a 6-point semantic differential scale from 1 (*very mild*) to (*very intense*).

Group Identification

Group identification was measured using the 8-item group identification scale (Hogg & Hardie, 1991; Hogg et al., 1993; Hogg & Hains, 1996; Hogg et al., 1998).

Participants used a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) to measure the extent to which they agree with statements regarding how they feel about being in the weight loss group, such as, "I identify strongly with being in this weight loss group." It was a reliable scale ($\alpha = .94$).

Uncertainty Manipulation Check

Participants' uncertainty was measured using a 5-item scale (Gaffney & Hogg, 2017; Grant & Hogg, 2012; Hogg & Adelman, 2013; Hogg et al., 2007). They filled out a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) to indicate the extent to which they agree with statements such as "I am uncertain about myself and the future" and "I feel uncertain about the future of The Gut Busters." It was a reliable scale ($\alpha = .89$).

Demographics

Participants were asked about their age, gender identification, ethnicity, and education.

Data Analytic Plan

The data were analyzed in R utilizing a 2 (leadership type: ideal, representative) x 2 (competition: competition, no competition) x 2 (uncertainty: high, low) between groups ANCOVA.

Results

Assumptions for Primary Hypotheses

All assumptions of normality were examined using histograms, QQ-plots, and 99% confidence intervals around the skew and kurtosis statistics. The assumption of homogeneity of variance was tested by examining sample size ratios and variance ratios.

Weight Loss Intentions Pretest

The weight loss intentions pretest consisted of days per week of intended exercise, minutes per day of intended exercise, and intensity of intended exercise.

Days per Week of Exercise. I examined normality visually using a histogram and QQ-plot and statistically using a 99% confidence interval around the skew and kurtosis statistics. The confidence interval around the skew statistic is *99% CI* [-0.72, 0.12] and around the kurtosis statistic is *99% CI* [-0.93, 0.94]. All indicated that the target evaluation variable is normally distributed. I tested homogeneity of variance by examining the sample size ratio and variance ratio. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio (3.36:0.69) has a 4.84:1 ratio which exceeds the maximum for variance. To correct for this, I used the square root transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.64, 0.17] and around the kurtosis statistic is *99% CI* [-0.90, 1.10]. The variance of the transformed variable is better than the original variable, the reflected log

transformation, or the reflected inverse transformation. I used the square root transformed variable for Hypotheses 1 and 2.

Minutes per Day of Exercise. The confidence interval around the skew statistic is *99% CI* [1.27, 3.68] and the confidence interval around the kurtosis statistic is *99% CI* [1.64, 22.90]. To visually examine the normality, I used a histogram and a QQ-plot. The visual and statistical assessments indicated an issue with normality. To correct for this, I used the log transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.36, 0.84] and around the kurtosis statistic is *99% CI* [-0.42, 1.82]. The normality of the transformed variable is better than the original variable, the reflected square root transformation, or the reflected inverse transformation. I assessed the homogeneity of variance using the transformed variable. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio 1.91:1 (0.062:0.032) is under the maximum 4:1. I used the log transformed variable for Hypotheses 1 and 2.

Intensity of Exercise. I examined normality visually using a histogram and QQ-plot and statistically using a 99% confidence interval around the skew and kurtosis statistics. The confidence interval around the skew statistic is *99% CI* [-0.46, 0.35] and around the kurtosis statistic is *99% CI* [-0.58, 0.78]. All indicated that the target evaluation variable is normally distributed. I tested homogeneity of variance by examining the sample size ratio and variance ratio. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The

largest to smallest variance ratio (1.17:0.36) has a 3.24:1 ratio which is under the maximum for variance. This shows that the pretest for intensity of exercise meets all the assumptions to test Hypothesis 1 and 2 with no transformations on this variable.

Weight Loss Intentions Posttest

The weight loss intentions posttest consisted of days per week of intended exercise, minutes per day of intended exercise, and intensity of intended exercise.

Interest in Joining Weight Loss Group. The confidence interval around the skew statistic is *99% CI* [-1.25, -0.48] and the confidence interval around the kurtosis statistic is *99% CI* [-1.10, 0.72]. To visually examine the normality, I used a histogram and a QQ-plot. The visual and statistical assessments indicated an issue with normality. To correct for this, I used the reflected log transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.30, 0.29] and around the kurtosis statistic is *99% CI* [-1.45, -0.84]. While the kurtosis of the transformed variable is still problematic, the normality of the transformed variable is better than the original variable, the reflected square root transformation, or the reflected inverse transformation. I assessed the homogeneity of variance using the transformed variable. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio 1.90:1 (0.10:0.05) is under the maximum 4:1. I used the reflected log transformed variable for Hypothesis 1 and 2.

Days per Week of Exercise. I examined normality visually using a histogram and QQ-plot and statistically using a 99% confidence interval around the skew and kurtosis statistics. The confidence interval around the skew statistic is *99% CI* [-0.69, 0.04] and around the kurtosis statistic is *99% CI* [-0.80, 1.07]. All indicated that the target evaluation variable is normally distributed. I tested homogeneity of variance by examining the sample size ratio and variance ratio. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio (3.36:0.69) has a 4.84:1 ratio which exceeds the maximum for variance. To correct for this, I used the square root transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.05, 0.58] and around the kurtosis statistic is *99% CI* [-0.84, 0.48]. The variance of the transformed variable is better than the original variable, the reflected log transformation, or the reflected inverse transformation. I used the square root transformed variable for Hypothesis 1 and 2.

Minutes per Day of Exercise. The confidence interval around the skew statistic is *99% CI* [1.10, 3.38] and the confidence interval around the kurtosis statistic is *99% CI* [1.52, 19.57]. To visually examine the normality, I used a histogram and a QQ-plot. The visual and statistical assessments indicated an issue with normality. To correct for this, I used the log transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.52, 0.80] and around the kurtosis statistic is *99% CI* [-0.33, 2.36]. The normality of the transformed variable is better than

the original variable, the reflected square root transformation, or the reflected inverse transformation. I assessed the homogeneity of variance using the transformed variable. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio 2.11:1 (0.065:0.031) is under the maximum 4:1. I used the log transformed variable for Hypotheses 1 and 2.

Intensity of Exercise. I examined normality visually using a histogram and QQ-plot and statistically using a 99% confidence interval around the skew and kurtosis statistics. The confidence interval around the skew statistic is *99% CI* [-0.62, 0.11] and around the kurtosis statistic is *99% CI* [-0.92, 0.10]. All indicated that the target evaluation variable is normally distributed. I tested homogeneity of variance by examining the sample size ratio and variance ratio. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest to smallest variance ratio (1.18:0.87) has a 1.35:1 ratio which is under the maximum for variance. This shows that the intensity of exercise dependent variable meets all the assumptions to test Hypothesis 1 and 2 with no transformations on this variable.

Leader Prototypicality

The confidence interval around the skew statistic is *99% CI* [-1.43, -0.48] and the confidence interval around the kurtosis statistic is *99% CI* [-0.30, 4.26]. To visually examine the normality, I used a histogram and a QQ-plot. The visual and statistical assessments indicated an issue with normality. To correct for this, I used the reflected log

transformation on the variable. The confidence interval around the skew statistic for the transformed variable is *99% CI* [-0.23, 0.32] and around the kurtosis statistic is *99% CI* [-1.03, -0.31]. While the kurtosis of the transformed variable is still problematic, the normality of the transformed variable is better than the original variable, the reflected square root transformation, or the reflected inverse transformation. I assessed the homogeneity of variance using the transformed variable. The largest to smallest sample size ratio (21:9) has a 2.3:1 ratio which barely exceeds the maximum 2:1 for sample size. The largest variance ratio 2.8:1 (0.06:0.02) is under the maximum 4:1. I used the reflected log transformed variable for Hypothesis 3.

Covariate Analysis

Pretest of Intensity of Exercise

For Hypothesis 1, homogeneity of covariance was assessed for the pretest of intensity of exercise compared with leader type and uncertainty on interest in joining the weight loss group using a factorial ANOVA. Results indicated no significant interaction between the covariate, leader type, and uncertainty; $F(1,125) = 0.157$, $p = .693$, partial $\eta^2 = .001$. Homogeneity of covariance for the pretest of intensity of exercise was also assessed using a factorial ANOVA comparing leader type, uncertainty, and the covariate on the intensity of exercise posttest. Results indicated no significant interaction between the covariate, uncertainty, and leader type; $F(1,125) = 0.102$, $p = .750$, partial $\eta^2 = 0$.

For Hypothesis 2, homogeneity of covariance assessed for the pretest of intensity of exercise compared with leader type, competition context, and uncertainty on interest in

joining the weight loss group using a factorial ANOVA. Results indicated no significant interaction between the covariate, leader type, competition context and uncertainty; $F(1,117) = 2.032$, $p = 0.157$, partial $\eta^2 = .017$. Homogeneity of covariance for the pretest of intensity of exercise was also assessed using a factorial ANOVA comparing leader type, competition context, uncertainty, and the covariate on the intensity of exercise posttest. Results indicated no significant interaction between the covariate, uncertainty, competition context and leader type; $F(1,117) = 0.270$, $p = .604$, partial $\eta^2 = .002$. These results justify the use of the pretest of intensity of exercise as a covariate for Hypothesis 1 and 2 on the dependent variables of interest in joining the weight loss group and the posttest for intensity of exercise.

Pretest of Days per Week of Exercise

For Hypothesis 1, homogeneity of covariance was assessed for the pretest of days per week of exercise compared with leader type, and uncertainty on the days per week of exercise posttest using a factorial ANOVA. Results indicated no significant interaction between the covariate, leader type, and uncertainty; $F(1,125) = 0.010$, $p = .920$, partial $\eta^2 = 0$.

For Hypothesis 2, homogeneity of covariance for the pretest of days per week of exercise was also assessed using a factorial ANOVA comparing leader type, competition context, uncertainty, and the covariate on the days per week of exercise posttest. Results indicated no significant interaction between the covariate, uncertainty, competition context and leader type; $F(1,117) = 0.808$, $p = .370$, partial $\eta^2 = .007$. These results

justify the use of the pretest of days per week of exercise as a covariate for Hypothesis 1 and 2 on the dependent variable of the days per week of exercise posttest.

Pretest of Minutes per Day of Exercise

For Hypothesis 1, homogeneity of covariance was assessed for the pretest of minutes per day of exercise compared with leader type, and uncertainty on the minutes per day of exercise posttest using a factorial ANOVA. Results indicated no significant interaction between the covariate, leader type, and uncertainty; $F(1,125) = 0.149$, $p = .700$, partial $\eta^2 = .001$.

For Hypothesis 2, homogeneity of covariance for the pretest of minutes per day of exercise was also assessed using a factorial ANOVA comparing leader type, competition context, uncertainty, and the covariate on the minutes per day of exercise posttest. Results indicated no significant interaction between the covariate, uncertainty, competition context and leader type; $F(1,117) = 0.005$, $p = .947$, partial $\eta^2 = 0$. These results justify the use of the pretest of minutes per day of exercise as a covariate for Hypothesis 1 and 2 on the dependent variable of the minutes per day of exercise posttest.

Manipulation Check

An ANOVA testing the effectiveness of the uncertainty manipulation found marginally significant results comparing the scores on the self-uncertainty scale between the high uncertainty and low uncertainty groups; $F(1, 131) = 3.134$, $p = .079$, partial $\eta^2 = .023$. Participants in the high uncertainty condition ($M = 4.22$, $SD = 1.41$) felt more uncertainty then those in the low uncertainty condition ($M = 3.75$, $SD = 1.62$)

Table 1

Means, standard deviations, and correlations with confidence intervals

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	
1. Minutes per day pretest	1.61	0.22									
2. Days per minute pretest	4.72	1.35	.07 [-.10, .24]								
3. Intensity of exercise pretest	4.02	0.95	.22* [.05, .37]	.33** [.17, .47]							
4. Interest in joining group	7.62	0.28	.07 [-.10, .24]	.13 [-.05, .29]	.41** [.26, .54]						
5. Days per week	4.80	1.34	.06 [-.11, .23]	.90** [.86, .93]	.30** [.14, .45]	.18* [.01, .34]					
6. Minutes per day	1.61	0.22	.93** [.90, .95]	.05 [-.12, .22]	.23** [.07, .39]	.16 [-.01, .32]	.08 [-.09, .25]				
7. Intensity of exercise	4.20	1.02	.22* [.05, .38]	.31** [.14, .45]	.85** [.79, .89]	.43** [.28, .56]	.32** [.16, .47]	.29** [.12, .44]			
8. Leader prototypicality	0.33	0.18	.18* [.01, .34]	-.13 [-.29, .05]	-.07 [-.24, .10]	-.39** [-.52, -.23]	-.13 [-.30, .04]	.09 [-.08, .26]	-.14 [-.30, .03]		
9. Uncertainty	3.97	1.54	-.12 [-.28, .05]	-.05 [-.22, .12]	-.02 [-.19, .15]	-.15 [-.32, .02]	-.06 [-.23, .11]	-.14 [-.30, .03]	-.01 [-.18, .16]	.20* [.04, .36]	

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Hypothesis 1

Hypothesis 1 posited that participants under high uncertainty would have greater weight loss intentions (measured by interest in joining the weight loss group, days per week, minutes per day, and intensity of intended exercise) when led by an ideal leader, and those under low uncertainty will have greater weight loss intentions when led by a representative leader.

Interest in Joining Group

A factorial ANCOVA was conducted between uncertainty and leader type on the transformed variable for participants' interest in joining the weight loss group, controlling for intensity of exercise. Results indicated a main effect for uncertainty; $F(1, 128) = 5.412$, $p = .022$, partial $\eta^2 = .018$, wherein participants in the low uncertainty condition ($M = 7.67$, $SD = 0.26$) were more interested in joining the weight loss group than participants in the high uncertainty condition ($M = 7.57$, $SD = 0.26$). See Figure 1 for a graph of this main effect. No main effect was present for leader type; $F(1, 128) = 0.482$, $p = .489$, partial $\eta^2 = .002$. Both the ideal leader ($M = 7.63$, $SD = .026$) and the representative leader ($M = 7.61$, $SD = 0.26$) had similar levels of interest in joining the weight loss group. Results found no interaction between uncertainty and leader type; $F(1, 128) = 0.04$, $p = .848$, partial $\eta^2 = 0$. See Table 2 for the ANCOVA results.

Table 2

Two-Way ANCOVA results using interest as the criterion

Predictor	Sum of Squares	*df*	Mean Square	*F*	*p*	$_{\text{partial}}\,\eta^2$
(Intercept)	313.849	1	33.489	4866.644	<.001	
Pre-Intensity	1.733	1	1.733	26.874	<.001	.156
Leader	0.031	1	0.031	0.482	.489	.002
Uncertainty	0.349	1	0.349	5.412	.022	.018
Leader x Uncertainty	0.002	1	0.002	0.037	.848	.000
Error	8.255	128	0.065			

Days per Week of Exercise

A factorial ANCOVA was conducted between uncertainty and leader type on the amount of days per week of intended exercise, controlling for intended days of exercise per week. Results indicated no significant main effect for uncertainty*;* $F(1, 128) = 0.187$, $p = .666$, partial $\eta^2 = .001$. Participants in the low uncertainty condition ($M = 6.25$, $SD = 0.18$) intended to spend similar days per week exercising as participants in the high uncertainty condition ($M = 6.26$, $SD = 0.18$). No significant main effect was present for leader type; $F(1, 128) = 0.536$, $p = .465$, partial $\eta^2 = .003$. Both the ideal leader ($M = 6.26$, $SD = 0.18$) and the representative leader ($M = 6.24$, $SD = 0.18$) intended to spend similar days per week exercising. Results found no interaction between level of uncertainty and leader type*;* $F(1, 128) = 0.007$, $p = .933$, partial $\eta^2 = 0$.

Minutes per Day of Exercise

A factorial ANCOVA was conducted between uncertainty levels and leader type on the transformed variable for the number of minutes per day of exercise, controlling for the transformed variable of intended days of exercise per week at pretest. Results indicated no significant main effect for uncertainty*;* $F(1, 128) = 0.665$, $p = .416$, partial $\eta^2 = 0$. Participants in the low uncertainty condition ($M = 1.61$, $SD = 0.08$) intended to spend similar minutes per day exercising as participants in the high uncertainty condition ($M = 1.62$, $SD = 0.08$). No significant main effect was present for leader type; $F(1, 128) = 0.672$, $p = .414$, partial $\eta^2 = 0$. Both the ideal leader ($M = 1.62$, $SD = 0.08$) and the representative leader ($M = 1.61$, $SD = 0.08$) intended to spend similar minutes per day

exercising. Results found no interaction between level of uncertainty and leader type*;* $F(1, 128) = 0.411$, $p = .522$, partial $\eta^2 = .003$.

Intensity of Exercise

A factorial ANCOVA was conducted between uncertainty levels and leader type on the intensity of intended exercise, controlling for a pretest of intensity of intended exercise. Results indicated no significant main effect for uncertainty*;* $F(1, 128) = 1.129$, $p = .290$, partial $\eta^2 = .013$. Participants in the low uncertainty condition ($M = 4.16$, $SD = 0.55$) intended to exercise at a similar level of intensity as participants in the high uncertainty condition ($M = 4.25$, $SD = 0.54$). No significant main effect was present for leader type*;* $F(1, 128) = 2.167$, $p = .143$, partial $\eta^2 = .021$. Both the ideal leader ($M = 4.28$, $SD = 0.55$) and the representative leader ($M = 4.13$, $SD = 0.54$) intended to exercise at similar levels of intensity. Results found no interaction between level of uncertainty and leader type*;* $F(1, 128) = 0.636$, $p = .427$, partial $\eta^2 = .005$.

These results did not support hypotheses 1a and 1b. However, it was found that participants who were low in uncertainty were more interested in joining the weight loss group. It is worth noting that this is the opposite direction of the expected results.

Hypothesis 2

Hypothesis 2 posited that participants engaged in intergroup competition will have greater weight loss intentions, specifically that those high in uncertainty, engaged in intergroup competition, and led by an ideal leader will demonstrate greater weight loss intentions.

Interest in Joining Group

A three-way factorial ANCOVA was conducted between uncertainty levels, competition context, and leader type on the transformed variable for interest in joining the weight loss group, controlling for a pretest of intensity of intended exercise. Results indicated a main effect for uncertainty*; F*(1, 124) = 5.700, *p* = .018, partial η^2 = .016, wherein participants in the low uncertainty condition (*M* = 7.66, *SD* = 0.27) were more interested in joining the weight loss group than participants in the high uncertainty condition (*M* = 7.56, *SD* = 0.26). See Figure 2 for a graph of this main effect. A main effect for competition context was found as well*; F*(1, 124) = 4.388, *p* = .038, partial η^2 = .014, wherein participants in the no competition condition (*M* = 7.66, *SD* = 0.25) were more interested in joining the weight loss group than those in the competition condition (*M* = 7.56, *SD* = .026). See Figure 3 for a graph of this main effect. No main effect was present for leader type; *F*(1, 124) = 0.480, *p* = .490, partial η^2 = 0. Participants led by the ideal leader (*M* = 7.63, *SD* = 0.26) and those led by the representative leader (*M* = 7.59, *SD* = 0.27) had similar levels of interest in joining the weight loss group. Results found no interactions between level of uncertainty, leader type, and group context*; F*(1, 124) = 0.378, *p* = .540, partial η^2 = .003. See Table 3 for the ANCOVA results.

Table 3

Three-Way ANCOVA results using interest as the criterion

Predictor	Sum of Squares	*df*	Mean Square	*F*	*p*	partial η^2
(Intercept)	238.575	1	238.575	3729.520	<.001	
Pre-Intensity	1.733	1	1.733	27.093	<.001	.144
Competition	0.281	1	0.281	4.388	.038	.014
Uncertainty	0.365	1	0.365	5.700	.018	.016
Leader	0.031	1	0.031	0.480	.490	.000
Competition x Uncertainty	0.001	1	0.001	0.013	.911	.002
Competition x Leader	0.003	1	0.003	0.053	.818	.000
Uncertainty x Leader	0.001	1	0.001	0.010	.922	.001
Competition x Uncertainty x Leader	0.024	1	0.024	0.378	.540	.003
Error	7.932	124	0.064			

Days per Week of Exercise

A three-way factorial ANCOVA was conducted between uncertainty levels, competition context, and leader type on the amount of days per week of intended exercise, controlling for an intended days of exercise per week pretest. Results found no main effect for uncertainty*; F*(1, 124) = 0.138, *p* = .711, partial η^2 = .006, no main effect for competition context*; F*(1, 124) = 1.798, *p* = .182, partial η^2 = .001, and no main effect for leader type, *F*(1, 124) = 0.818, *p* = .368, partial η^2 = 0. Results found no interactions between level of uncertainty, leader type, and group context*; F*(1, 124) = 0.006, *p* = .939, partial η^2 = 0.

Minutes per Day of Exercise

A three-way factorial ANCOVA was conducted between uncertainty levels, competition context, and leader type on the transformed variable for the number of minutes per day of intended exercise, controlling for an intended minutes of exercise per day pretest. Results found no main effect for uncertainty*; F*(1, 124) = 0.557, *p* = .457, partial η^2 = 0, no main effect for competition context*; F*(1, 124) = 1.252, *p* = .265, partial η^2 = .007, and no main effect for leader type, *F*(1, 124) = 0.985, *p* = .323, partial η^2 = .001. Results found no interactions between level of uncertainty, leader type, and group context*; F*(1, 124) = 0.012, *p* = .913, partial η^2 = 0.

Intensity of Exercise

A three-way factorial ANCOVA was conducted between uncertainty levels, competition context, and leader type on the intensity of intended exercise, controlling for a pretest of intensity of intended exercise. Results indicated no main effect for

uncertainty*; F*(1, 124) = 0.869, *p* = .353, partial η^2 = .006, wherein participants in the high uncertainty condition (*M* = 4.24, *SD* = 0.56) intended to exercise at similar levels of intensity than participants in the low uncertainty condition (*M* = 4.12, *SD* = 0.58). A main effect for competition context approached significance*; F*(1, 124) = 3.906, *p* = .050, partial η^2 = .010, wherein participants in the no competition condition (*M* = 4.28, *SD* = 0.54) intended to exercise at a higher level of intensity than those in the competition condition (*M* = 4.07, *SD* = 0.56). Figure 4 graphs this relationship. A main effect also approached significance for leader type; *F*(1, 124) = 3.124, *p* = .080, partial η^2 = .004. Participants led by the ideal leader (*M* = 4.26, *SD* = 0.55) intended to exercise at a higher level of intensity than those led by the representative leader (*M* = 4.09, *SD* = 0.57) intended to exercise at similar levels of intensity. Results found no interactions between level of uncertainty, leader type, and group context*; F*(1, 124) = 0.349, *p* = .556, partial η^2 = .003. See Table 4 for ANCOVA results.

Table 4

Three-Way ANCOVA results using intensity as the criterion

Predictor	Sum of Squares	*df*	Mean Square	*F*	*p*	partial η^2
(Intercept)	1.783	1	1.783	6.125	.015	
Pre-intensity	98.784	1	98.784	339.389	<.001	.715
Competition	1.137	1	1.137	3.906	.050	.010
Uncertainty	0.253	1	0.253	0.869	.353	.006
Leader	0.909	1	0.909	3.124	.080	.004
Competition x Uncertainty	0.117	1	0.117	0.403	.527	.000
Competition x leader	0.002	1	0.002	0.008	.929	.002
Uncertainty x leader	0.123	1	0.123	0.421	.518	.000
Competition x Uncertainty x leader	0.102	1	0.102	0.349	.556	.003
Error	36.092	124	0.291			

Marginal support for Hypothesis 2a was found in the opposite of the predicted direction, such that participants who were not engaged in competition were more interested in joining the weight loss group and intended to exercise more intensely than those engaged in competition, but this relationship was not found for any other weight loss intentions. These results found partial, marginal support for Hypothesis 2b, such that participants led by an ideal leader intended to exercise more intensely than those led by a representative leader, and opposite of what was hypothesized, participants low in uncertainty were more interested in joining the weight loss group. While there were no significant interactions, it was found that participants with low uncertainty had more interest in joining the weight loss group than those with high uncertainty.

Hypothesis 3

Hypothesis 3 posited that Hypothesis 2 will be mediated by leader prototypicality, such that participants high in uncertainty and engaged in intergroup competition will perceive the ideal leader as more prototypical than the representative leader, resulting in greater weight loss intentions. A three-way factorial ANCOVA was conducted between uncertainty levels, competition context, and leader type on leader prototypicality to assess whether there was a moderating effect. Results found no significant three-way interaction*; F*(1, 125) = 0.04, *p* = .845, partial η^2 = .0003, indicating that running the moderated mediation analysis was not necessary. No support was found for Hypothesis 3.

Discussion

Based on previous research, I expected that participants who feel uncertain about themselves and are led by an ideal leader (i.e., a leader who has previously lost weight)

would have greater intentions to lose weight, while participants who feel certain about themselves and are led by a representative leader (i.e., a leader who is losing weight alongside the members of the group) will have greater intentions to lose weight. In addition, I expected that participants engaged in an intergroup competition with another weight loss group would have greater intentions to lose weight than participants not engaged in competition. Those who felt high uncertainty and were engaged in competition would perceive the ideal leader as more prototypical, thus positively impacting weight loss intentions. Research shows that when people feel uncertain, they tend to seek out cohesive social groups to reduce that uncertainty (Gaffney & Hogg, 2017; Crwys et al., 2017). Leaders are an integral part of group cohesion, thus the prototypicality of the leader is important in the identification process (Gaffney & Hogg, 2017; Hogg, 2001; Hogg & van Knippenberg, 2003; van Knippenberg & Hogg, 2003). Competition between groups can amplify the need to differentiate from the outgroup and bolster the similarities of the ingroup, increasing the focus on the extremes of the group prototype, especially under feelings of uncertainty (Gaffney et al., 2014; Hogg, 2001; Kim & Wiesenfeld, 2017). Therefore, ideal leaders, who embody the extremes of the group prototype, should be seen as more prototypical when members feel uncertain and are in competition with another group.

I found that participants with an ideal leader intended to exercise at higher intensity rates than those led by a representative leader, partially supporting Hypothesis 2b. However, for both competition context and uncertainty, I found the opposite of what I expected. Regarding uncertainty, those who felt more certain had greater weight loss

intentions overall than those who felt more certain. As for competition context, participants who were not in a competition were more interested in joining the weight loss group and intended to work out more intensely than those who were engaged in competition. Only the main effects of the analyses reached significance, but all of the interactions were non-significant, indicating that none of my hypotheses were fully supported, and in many cases had partial support in the opposite direction of what was proposed.

There are some methodological limitations that could explain the unexpected and null findings. First, the sample size was relatively small. To achieve adequate power (.80), the sample size should have been 205, but the final sample size of this study was 133. It is possible that with adequate power and number of participants, the findings might be different. Second, the participants were placed in groups with other members they had never met and with a leader whom they only read a short vignette about. Whereas people who are placed in minimal groups demonstrate ingroup favoritism (Tajfel, 1970), the group was entirely online with no face-to-face contact, which could have undermined the extent to which participants identified with the group, thus decreasing the influence of the leader type and competition manipulations. In addition, because the study was conducted entirely online using a fabricated weight loss program, participants could question the legitimacy of the program and the study overall. This could then exacerbate the lack of participants' identification with the group. Third, there was no information present that allowed the ideal leader to distinguish the ingroup from the outgroup, which according to Platow et al. (2015), the ideal leader should have the

ability to separate the ingroup from the relevant outgroup. As a result, the leader type manipulation was rather ineffective. Lastly, this study only measured intentions to lose weight, not actual weight loss behaviors. Research shows that there is a gap between behavioral intentions and actually engaging in physical activity (McEachan et al., 2011). Therefore, measuring actual behaviors instead of behavioral intentions could differ from the findings of this study.

Previous research on the role of threat versus challenge in the uncertainty-identity literature, as well as the role of self-efficacy and perceived behavioral control in the theory of planned behavior could explain why participants low in uncertainty were more likely to join the group, and why those not engaged in competition were more likely to join the group and exercise at higher rates of intensity. As I mentioned previously, the participants might not have felt much of a connection with the group due to the online nature of the study. Participants who did not feel a connection to the group could have had an aversive reaction to the prospect of competing against another group, explaining why they had less interest in joining the group. In addition, participants who did feel uncertain could have perceived the competition as a threat, instead of a challenge. Many of the participants in the high uncertainty condition listed their abilities to lose weight or adopt a healthier lifestyle as a source of their uncertainty (e.g., “being consistent with weight loss,” and “how long I can maintain a healthy lifestyle”). These responses demonstrate that participants high in uncertainty feel like they have low self-efficacy in their ability to lose weight. According to the theory of planned behavior, people who feel that they do not possess the capability to execute a behavior that will result in a specific

outcome (low self-efficacy), they will have lower intentions and will be less likely to engage in that behavior (Ajzen, 1991; Ajzen, 2002). Previous research has demonstrated that when faced with a task, people who feel uncertain in their abilities to complete the task will perceive it as a threat, and therefore will be more likely to shy away from it (Blascovich et al., 2003; Wagoner & Hogg, 2017). On the other hand, those who feel certain in their abilities will view it as a challenge, and will be more likely to take on the task. Accordingly, the participants in the current study who have high uncertainty and low self-efficacy about their weight loss abilities could see the weight loss competition as a threat, and thus will have lower intentions to lose weight.

Limitations

As stated previously, this study has several limitations. First, the sample size was smaller than anticipated. In order to reach adequate power of .80, a sample size of 205 was necessary, but after removing participants that did not consent to the use of their data, did not complete the survey, and failed the attention checks, only 133 participants remained. In addition, the sample size ratios exceeded the 2:1 criteria for the assumption of homogeneity of variance. These problems on their own and combined could have impacted the direction of the results as well as the null findings. Future research should ensure adequate sample size as well as a smaller sample size ratio. The second limitation was the online nature of the study. The participants were informed of a weight loss program they had never heard of, placed in a group with others they had never met, and led by someone they knew very little about. While legitimate online weight loss groups can be effective (Neve et al., 2010), the fact that participants never saw a website or any

other information about the weight loss program could have undermined its legitimacy. Future research should take further steps to legitimize the online weight loss program, use a real online weight loss program, or ideally conducting a longitudinal study using an in-person weight loss program, measuring actual weight lost. Lastly, this study measured intentions to lose weight, not actual weight loss behaviors. The literature shows that there is a large gap between weight loss intentions and actually attempting to lose weight (McEachan et al., 2011). While this study did find significance in increasing weight loss intentions, it does not necessarily mean that the participants would have actually acted on this behavioral intention had this been a real weight loss program. Future research should either study the impact on actual weight loss behaviors in either an online or in-person setting.

Implications

Obesity is a continuously growing problem in the United States that results in many adverse health effects. For more than half the country's population, a change in behavior and efforts to adopt healthier lifestyles is necessary to reduce the risk of diabetes, cardiovascular disease, and many more comorbid health problems. This study expands on the plethora of research surrounding weight loss by examining the influence of uncertainty, leader type, and competition. It was found that people who felt certain and people who were not in a competition had greater weight loss intentions. While these findings were the opposite of what was expected, they are still important in understanding ways to successfully motivate weight loss. For people who have uncertainties about their self-efficacy to lose weight, instilling confidence in their abilities, could positively impact

their intentions, and hopefully lead them to take the behavioral steps necessary to reach a healthy weight. As for the effectiveness of competitions, the findings suggest that some caution must be used when deciding whether or not a competition is appropriate. It is important to establish the group and build entitativity before engaging in any competition, so the members strongly identify with the group. Once the members identify with the group, they will be more willing to engage in a competition to increase their intergroup distinction and bolster their ingroup strengths. If there is not strong identification with the group, then members will not feel invested their team's success, and will be more likely to shy away from competition. The strength of the ideal leader in increasing weight loss intentions is supported by the success of other similar weight loss programs, such as Weight Watchers, in which groups are led by a person who has already lost weight. This implies that having an ideal leader is more influential at motivating group members to lose weight, but more research should be conducted on the conditions in which representative leaders could gain effectiveness. While these findings are important, future research can take steps to improve and build upon the foundations built in this study. Research on improving motivations to lose weight and adopt healthier lifestyles is becoming increasingly important with the country's rapidly rising rates of obesity. This study has laid down some new groundwork in the use and effectiveness of social identity, leadership, and uncertainty in the realm of weight loss. Further research as to how these theories can be utilized to motivate healthy behaviors may provide hope that with enough resources, research, and outreach, the rise in obesity can be reversed, leading this country to a healthier future.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Avolio, B. J., & Yammarino, F. J. (Eds.). (2002). *Transformational and charismatic leadership: The road ahead.* Elsevier.

Blascovich, J., Mendes, W. B., Tomaka, J., Salomon, K., & Seery, M. (2003). The robust nature of the biopsychosocial model challenge and threat: A reply to Wright and Kirby. *Personality and Social Psychology Review*, *7*(3), 234–243. https://doi.org/10.1207/S15327957PSPR0703_03

Conger, J. A., & Kanungo, R. N. (1987). Towards a behavioral theory of charismatic leadership in organizational settings. *The Academy of Management Review*, *12*(4), 637-647. https://doi.org/10.5465/amr.1987.4306715

Crandall, C. S., & Reser, A. H. (2005). Attributions and weight-based prejudice. In K. D. Brownell, R. M. Puhl, M. B. Schwartz, & L. Rudd (Eds.), *Weight bias: Nature, consequences, and remedies.* (pp. 83–96). New York, NY: Guilford Publications.

Cruwys, T., Gaffney, A. M., & Skipper, Y. (2014). Uncertainty in transition: The influence of group cohesion on learning. In Mavor, K. I., Platow, M. J., Bizmunic, B. (Eds.), *Self and social identity in educational contexts* (pp. 193-208). Routledge.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117-140. http://doi.org/10.1177/001872675400700202

Gaffney, A. M., & Hogg, M. A. (2017). Social identity and social influence. In S. G. Harkins, K. D. Williams, & J. M. Burger (Eds.), *The Oxford handbook of social influence* (pp. 259–277). Oxford University Press.

Gaffney, A. M., Rast, D. E., III, Hackett, J. D., & Hogg, M. A. (2014). Further to the right: Uncertainty, political polarization and the American "Tea Party" movement. *Social Influence*, *9*(4), 272–288. https://doi.org/10.1080/15534510.2013.842495

Grant, F., & Hogg, M. A. (2012). Self-uncertainty, social identity prominence and group identification. *Journal of Experimental Social Psychology*, *48*(2), 538–542. https://doi.org/10.1016/j.jesp.2011.11.006

Greer, L. L., de Jong, B. A., Schouten, M. E., & Dannals, J. E. (2018). Why and when hierarchy impacts team effectiveness: A meta-analytic integration. *Journal of Applied Psychology*, *103*(6), 591–613. https://doi.org/10.1037/apl0000291.supp

Gunnars, K. (2018, May 4). *10 Leading Causes of Weight Gain and Obesity.* Healthline. https://www.healthline.com/nutrition/10-causes-of-weight-gain

Hains, S. C., Hogg, M. A., & Duck, J. M. (1997). Self-categorization and leadership: Effects of group prototypicality and leader stereotypicality. *Personality and Social Psychology Bulletin*, *23*(10), 1087–1099. https://doi.org//10.1177/01461672972310009

Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2020, February 27). *Prevalence of obesity ad severe obesity among adults: United States, 2017-2018.* Center for Disease Control and Prevention. https://www.cdc.gov/nchs/products/databriefs/db360.htm

Halevy, N., Berson, Y., & Galinsky, A. D. (2011). The mainstream is not electable: When vision triumphs over representativeness in leader emergence and effectiveness. *Personality and Social Psychology Bulletin,37*(7), 893-904. https://doi.org/10.1177/0146167211402836

Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (2009). Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology: An International Review, 58*(1), 1-23. https://doi.org/10.1111/j.1464-0597.2008.00379.x

Hermans, R. C. J., Larsen, J. K., Herman, C. P., & Engels, R. C. M. E. (2008). Modeling of palatable food intake in female young adults: effects of perceived body size. *Appetite, 51*(3), 512-518. http://dx.doi.org/10.1016/j.appet.2008.03.016

Higgs, S. (2015). Social norms and their influence on eating behaviours. *Appetite, 86*(1), 38-44. http://dx.doi.org/10.1016/j.appet.2014.10.021

Hogg, M. A. (2001). A social identity theory of leadership. *Personality and Social Psychology Review*, *5*(3), 184-200. https://doi.org/10.1207/S15327957PSPR0503_1

Hogg, M. A. (2006). Social identity theory. In P. J. burke (Ed.), *Contemporary social psychological theories* (pp. 111-136). Stanford University Press.

Hogg, M. A., & Adelman, J. (2013). Uncertainty–identity theory: Extreme groups, radical behavior, and authoritarian leadership. *Journal of Social Issues, 69*(3), 436-454. http://dx.doi.org/10.1111/josi.12023

Hogg, M. A., Cooper-Shaw, L., & Holzworth, D. W. (1993). Group prototypicality and depersonalized attraction in small interactive groups. *Personality and Social Psychology Bulletin*, *19*(14), 452-465. https://doi.org/10.1177/0146167293194010

Hogg, M. A., & Gaffney, A. M. (2014). Prototype-based social comparisons within groups. In Z. Križan & F. X. Gibbons (Eds.) *Communal Functions of Social Comparison* (pp. 145-174). Cambridge University Press.

Hogg, M. A., & Hains, S. C. (1996). Intergroup relations and group solidarity: Effects of group identification and social beliefs on depersonalized attraction. *Journal of Personality and Social Psychology*, *70*(2), 295-309. https://doi.org/10.1037/0022-3514.70.2.295

Hogg, M. A., Hains, S. C., & Mason, I. (1998). Identification and leadership in small groups: Salience, frame of reference, and leader stereotypicality effects on leader

evaluations. *Journal of Social Psychology, 75*(5), 1248-1263. https://doi.org/10.1037/0022-3514.75.5.1248

Hogg, M. A., & Hardie, E. A. (1991). Social attraction, personal attraction, and self-categorization: A field study. *Personality and Social Psychology Bulletin, 17*(2), 175-180. https://doi.org/10.1177/014616729101700209

Hogg, M. A., Meehan, C., & Farquharson, J. (2010). The solace of radicalism: Self-uncertainty and group identification in the face of threat. *Journal of Experimental Social Psychology, 46*(6), 1061-1066. https://doi.org/10.1016/j.jesp.2010.05.005

Hogg, M. A., & Reid, S. A. (2006). Social identity, self-categorization, and the communication of group norms. *Communication Theory, 16*(1), 7-30. https://doi.org/10.1111/j.1468-2885.2006.00003.x

Hogg, M. A., Sherman, D. K., Dierselhuis, J., Maitner, A. T., & Moffitt, G. (2007). Uncertainty, entitativity, and group identification. *Journal of Experimental Social Psychology, 43*(1), 135-142. https://doi.org/10.1016/j.jesp.2005.12.008

Hogg, M. A., & Turner, J. C. (1987). Social identity and conformity: A theory of referent informational influence. In W. Doise & S. Moscovici (Eds.), *Current issues in European social psychology* (Vol. *2*, pp. 139-182). Cambridge University Press.

Hogg, M. A., & van Knippenberg, D. (2003). Social identity and leadership processes in groups. In M. P. Zanna (Eds.), *Advances in Experimental Social Psychology* (pp. 1-52). Academic Press.

Hogg, M. A., van Knippenberg, D., & Rast, D. E. III. (2012). The social identity theory of leadership: Theoretical origins, research findings, and conceptual developments. *European Review of Social Psychology, 23*(1), 258-304. https://doi.org/10.1080/10463283.2012.741134

Hohman, Z. P., Gaffney, A. M., & Hogg, M. A. (2017). Who am I if I am not like my group? Self-uncertainty and feeling peripheral in a group. *Journal of Experimental Social Psychology*, *72*, 125–132. https://doi.org/10.1016/j.jesp.2017.05.002

Hunger, J. M., Major, B., Blodorn, A., & Miller, C. T. (2015). Weighed down by stigma: How weight-based social identity threat contributes to weight gain and poor health. *Social and Personality Psychology Compass*, *9*(6), 255-268. http://dx.doi.org/10.1111/spc3.12172

Jetten, J., Haslam, S. A., Cruwys, T., Greenaway, K. H., Haslam, C., & Steffens, N. K. (2017). Advancing the social identity approach to health and well-being: Progressing the social cure research agenda. *European Journal of Social Psychology, 47*(7), 789-802. http://dx.doi.org/10.1002/ejsp.2333

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology, 89*(5), 755–768. https://doi.org/10.1037/0021-9010.89.5.755

Kim, H. Y., & Wiesenfeld, B. M. (2017). Who represents our group? The effects of prototype content on perceived status dispersion and social

undermining. *Personality and Social Psychology Bulletin, 43*(6), 814-827. https://doi.org/10.1177/0146167217699581

Mullin, B., & Hogg, M. A. (1998). Dimensions of subjective uncertainty in social identification and minimal intergroup discrimination. *British Journal of Social Psychology, 37*(3), 345-365. https://doi.org/10.1111/j.2044-8309.1998.tb01176.x

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review, 5*(2), 97–144. https://doi.org/10.1080/17437199.2010.521684

Neve, M., Morgan, P. J., Jones, P. R., & Collins, C. E. (2010). Effectiveness of web-based interventions in achieving weight loss and weight loss maintenance in overweight and obese adults: A systematic review with meta-analysis. *Obesity Reviews*, *11*(4), 306–321. https://doi.org/10.1111/j.1467-789x.2009.00646.x

Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., ... Gakidou, E. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: A systematic analysis for the global burden of disease study 2013. *The Lancet*, *384*(9945), 766–781. https://doi.org/10.1016/S0140-6736(14)60460-8

Oakes, P., Haslam, S. A., & Turner, J. C. (1998). *The role of prototypicality in group influence and cohesion: Contextual variation in the graded structure of social categories.* In S. Worchel, J. F. Morales, D. Páez, & J.-C. Deschamps

(Eds.), *Social identity: International perspectives* (p. 75–92). Sage Publications, Inc.

Platow, M. J., Haslam, S. A., & Reicher, S. D. (2015). The Social Psychology of Leadership. In S. G. Harkins, K. D. Williams, & J. M. Burger (Eds.), *Oxford Handbook of Social Influence* (pp. 339-357). https://10.1093/oxfordhb/9780199859870.013.14

Prinsen, S., de Ridder, D. T. D., & de Vet, E. (2013). Eating by example. effects of environmental cues on dietary decisions. *Appetite, 70,* 1-5. http://dx.doi.org/10.1016/j.appet.2013.05.023

Rast, D. E., III, Gaffney, A. M., Hogg, M. A., & Crisp, R. J. (2012). Leadership under uncertainty: When leaders who are non-prototypical group members can gain support. *Journal of Experimental Social Psychology, 48*(3), 646-653. http://dx.doi.org/10.1016/j.jesp.2011.12.013

Rast, D. E., III, Hogg, M. A., & Giessner, S. R. (2016). Who trusts charismatic leaders who champion change? the role of group identification, membership centrality, and self-uncertainty. *Group Dynamics: Theory, Research, and Practice, 20*(4), 259-275. http://dx.doi.org/10.1037/gdn0000053

Sluss, D. M., & Ashforth, B. E. (2007). Relational identity and identification: Defining ourselves through work relationships. *The Academy of Management Review*, *32*(1), 9–32. https://doi-org.ezproxy.humboldt.edu/10.2307/20159278

Smith, E. R., & Henry, S. (1996). An in-group becomes part of the self: Response time evaluation. *Personality and Social Psychology Bulletin, 22*(6), 635-642. https://doi.org/10.1177/0146167296226008

Spencer-Rogers, J., Hamilton, D. L., & Sherman, S. J. (2007). The central role of entitativity in stereotypes of social categories and task groups. *Journal of Personality and Social Psychology, 92*(3), 369-388. https://doi.org/10.1037/0022-3514.92.3.369

Steffens, N. K., Haslam, S. A., & Reicher, S. D. (2014). Up close and personal: Evidence that shared social identity is a basis for the 'special' relationship that binds followers to leaders. *The Leadership Quarterly, 25*(2), 296-313. https://doi.org/10.1016/j.leaqua.2013.08.008

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In M. J. Hatch & M. Schultz (Eds.), *The social psychology of intergroup relations*, (pp. 33-47). Brooks/Cole Pub.

Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American*, *223*(5), 96–102. https://doi.org/10.1038/scientificamerican1170-96

Turner, J. C. (1991). *Social influence*. Open University Press.

Van Knippenberg, D., & Hogg, M. A. (2003). A social identity model of leadership in organizations. In R. M. Kramer and B. M. Staw (Eds.), *Research in organizational behavior* (pp. 243-95). JAI Press.

Wagoner, J. A., & Hogg, M. A. (2017). Uncertainty-identity theory. In V. Zeigler-Hill & T. K. Shackelford (Eds.), *Encyclopedia of Personality and Individual Differences*. Springer, Cham.