MUNI FSS

JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE
CYBERPSYCHOLOGY

Malloch, Y. Z., Zhang, J., & Qian, S. (2023). Effects of social comparison direction, comparison distance, and message framing on health behavioral intention in online support groups. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 17*(3), Article 10. https://doi.org/10.5817/CP2023-3-10

Effects of Social Comparison Direction, Comparison Distance, and Message Framing on Health Behavioral Intention in Online Support Groups

Yining Zhou Malloch, Jingwen Zhang, & Sijia Qian

Department of Communication, University of California Davis, Davis, United States

Abstract

This study advances prior research on social comparison by testing the effects of social comparison direction, comparison distance, as well as message framing on perceived similarity, self-esteem, and health behavioral intention in the context of an online support group (OSG) for diet and weight loss. A 2 (comparison direction: up vs. down) by 2 (comparison distance: high vs. low) by 2 (framing: gain vs. loss) factorial experiment involving 275 adult participants was conducted online in the United States. Findings showed that participants perceived themselves to be more similar to the comparison target who was doing better than themselves than the target who was doing worse. The difference of perceived similarity between comparison directions was greater when comparison distance was low than high. However, upward comparison decreased self-esteem whereas downward comparison enhanced self-esteem. Perceived similarity and self-esteem both contributed to health efficacy, which led to health behavioral intention. Message framing did not show a significant impact on perceived similarity or self-esteem. Theoretical and practical implications are discussed.

Keywords: social comparison; comparison distance; framing; online support group

Editorial Record

First submission received:
January 5, 2022

Revisions received:
August 12, 2022
December 9, 2022
March 31, 2023

Accepted for publication:
May 26, 2023

Editor in charge:
David Smahel

Introduction

Individuals with health concerns visit online support groups (OSGs) to seek, obtain, and offer social support (Tanis, 2008). To better achieve these goals, many disclose their health conditions and personal experiences (Barak & Gluck-Ofri, 2007). Despite that participants joining the same OSG usually share similar health concerns (Coulson & Greenwood, 2012; Tanis, 2008), individuals can have different health statuses, emotional appraisals, or care management plans (Lieberman et al., 2005). Social comparison is a common psychological and functional process for people to evaluate available information and appraise their own situations (Zhang & Centola, 2019). However, the resultant effects of social comparison can vary, depending on the directionality and distance of comparison made between the comparer and the target. One key theoretical mediator is perceived similarity, namely, the perception of being similar to the target (Montoya et al., 2008). Past research suggests that whether social comparison serves a self-enhancement function depends on whether the comparer identifies or contrasts oneself relative to the target; however, findings have not shown consistent predictions, partly because theoretical tests on the interaction of social comparison direction and distance are lacking (Gerber et al., 2011).

Upward (comparing to people who are superior) and downward (comparing to people who are inferior) comparisons are the two common directions of social comparison (A. P. Buunk & Dijkstra, 2017; Taylor & Lobel, 1989). The identification-contrast model (A. P. Buunk & Dijkstra, 2017) and related research in health contexts suggests that identifying with a superior target provides hope and thus motivations to engage in health behaviors, while contrasting with an inferior target can boost one's self-esteem and mental state (e.g., Diel & Hofmann, 2019; Peng et al., 2019; see also Taylor & Lobel, 1989). Given the differences of health statuses and progress in OSGs (Lieberman et al., 2005), comparison direction can have salient impacts on participants' health outcomes.

In the current study, we also advance the research by integrating the concepts of social comparison distance. Some research refers to social comparison distance as how attainable or unattainable comparison standards are (Diel & Hofmann, 2019). We define social comparison distance as the degree to which a comparison target is objectively similar to the comparer. For instance, the distance between a healthy and obese individual is greater than the distance between a healthy and overweight individual. In this study, we test how health status distance translates to perceived similarity. Given that both comparison directions can both be beneficial, it is also important to examine whether distance functions similarly or differently in inducing health benefits. For example, when encountering an inferior target who is very much different from the comparer, will the comparison still be able to boost the comparer's self-esteem?

In online communications deprived of physical cues, social comparison can be triggered by not only users' health statuses, but also user messages. When people self-disclose their health concerns, the framing of the illness experiences signal their thinking and emotions (Lachmar et al., 2017; Malloch & Taylor, 2019). Theoretically, messages can be broadly categorized by gain and loss framing (Nabi et al., 2020; Penţa & Băban, 2018). The current study tests how a target's objective health status and subjective message framing influence comparer's cognitive responses. In cases when the two sets of signals diverge, would the comparer more likely to be influenced by the objective or subjective comparison benches? Answers may help explain why upward comparison's risk of generating self-deflating contrast can be suppressed in online mediated communication contexts. We propose that message framing may play a moderating role in conditioning the comparison effects on perceived similarity and resultant self-esteem and health outcomes.

Social Comparison Direction, Perceived Similarity, and Self-Esteem

According to the social comparison theory, people need to maintain a stable and accurate appraisal of themselves for identity or decision-making purposes (Festinger, 1954). The identification-contrast model suggests that individuals can either identify or contrast themselves to a superior or inferior target (A. P. Buunk & Dijkstra, 2017). In general, people evaluate themselves by comparing their abilities or opinions to the target others; lateral comparison serves self-evaluation, downward comparison serves self-enhancement, and upward comparison serves self-improvement (Corcoran et al., 2011).

Social comparison direction can affect perceived similarity between the comparer and the target. Upward assimilation theory (Collins, 1996) argues that upward comparison can provide useful information and facilitate self-improvement. People are more likely to believe that they are similar when comparing themselves to a superior target than to an inferior target (Collins, 1996, 2000), as the individual's global self-concept tends to focus on positive traits and characteristics of oneself (Alicke, 1985).

In health contexts, the superior target can be a role model who gives the comparer hope that situations can be improved, and that the comparer can become the target (B. P. Buunk, 1995). The tendency for focusing on the bright side can drive up the similarity perception even when actual similarity is lacking. For instance, patients with chronic illness tend to either identify with superior targets or contrast to inferior others (Terol Cantero et al., 2021). Indeed, upward comparison is more likely to motivate people to maintain healthy behaviors than downward comparison (Mahler et al., 2010), especially when the health issue is controllable compared to uncontrollable (Collins, 2000). Even in cancer treatment, patients exhibited greater desire for support from the target that was doing well than poorly (Stanton et al., 1999). It is thus hypothesized:

H1: Comparer's perceived similarity with the target will be higher when reading support group messages from a target whose health status is better than the comparer's than when the target's health status is worse.

Because OSGs are often anonymous and primarily for seeking and sharing support, users tend to disclose honest experiences, including struggles and negative sentiments (Low et al., 2020; Yang et al., 2019). Therefore, downward comparisons can often happen in these settings. Downward comparison serves to enhance self-esteem, which is

one's evaluation of whether the self is worthy and capable (Beaumont & Kenealy, 2004; Franz et al., 2000; Heatherton & Wyland, 2003). Downward comparison maintains one's belief that "I am doing better than other people", implying contrast, rather than similarity (Beaumont & Kenealy, 2004; Franz et al., 2000). Individuals prefer downward comparison especially when they feel self-esteem was threatened to boost self-evaluation, positive emotion, and to reduce anxiety (Beaumont & Kenealy, 2004; Crocker et al., 1987; Franz et al., 2000; Gibbons & Gerrard, 1991). Self-enhancement theory suggests that individuals strive to maintain positive perceptions of the self (Swann et al., 1987). Prior research has shown that state self-esteem can be influenced by a variety of external stimulations, such as one's achievement and social support (Ross & Broh, 2000), group membership and identity (Jetten et al., 2015), self-presentation on social media (Toma, 2013), as well as the number of likes individuals receive on social media (Burrow & Rainone, 2017). Self-esteem can also be temporarily influenced by social comparison manipulations (e.g., Alfasi, 2019; Vogel et al., 2014, 2015). The stress and anxiety posed by health problems triggered the need for social comparison, especially downward comparison (VanderZee et al., 1995). These effects hold true when it comes to social comparison in online contexts (Schmuck et al., 2019; Vogel et al., 2014). Thus, it is hypothesized:

H2: Comparers' self-esteem will be lower when reading support group content from a target whose health status is better than the comparer's than when the target's health status is worse than the comparer's.

Effects of Social Comparison Distance

As hypothesized, in health contexts, upward assimilation provides hope and motivation while downward comparison boosts comparers' self-esteem. However, will targets with much different health status or progress affect comparers to the same extent as targets with slightly different status or progress? In contrast to social comparison direction, comparison distance has received less research attention, yet can be quite influential to comparer's health. Social comparison theory suggests that as the distance between the comparer and the target increases, the comparer is less likely to engage in the comparison (Festinger, 1954). The evaluation of the comparer's ability will not be perceived to be accurate if the available comparison is vastly different from the comparer (Festinger, 1954). The related attributes similarity hypothesis (Goethals & Darley, 1977; Read et al., 1989) proposes that people are more likely to compare to those who are within range of their abilities (see also Wood, 1989). In OSG, the exact matching of health status between interactants can result in high perceived similarity (Malloch & Zhang, 2019; Montoya et al., 2008). When their health status did not match, however, the distance of social comparison can impact perceived similarity (Malloch & Zhang, 2019). Greater distance can result in lower perceived similarity than smaller distance (Diel & Hofmann, 2019; Malloch & Zhang, 2019; see also Diel et al., 2021). Thus, it is hypothesized:

H3: As the difference between the target and the comparer's health status increases, the comparer's perceived similarity will decrease.

As suggested above, social comparison direction's effects on perceived similarity and self-esteem can be attenuated when the distance between the comparer and the target is higher than lower. Comparing oneself to targets whose attributes are very different is not useful for fulfilling the self-evaluation goal because the comparer can be less familiar with the target's attributes and abilities, which hinders the understanding of how oneself is doing among peers (Garcia et al., 2013; Wood, 1989). It is reasonable to propose that low-distance upward comparison has more impact on the comparer's perceived similarity than high-distance upward comparison, and low-distance downward comparison boosts self-esteem more than high-distance downward comparison.

H4: Social comparison direction (upward vs. downward comparison) and distance (low vs. high) will interact in predicting (a) perceived similarity and (b) self-esteem, such that social comparison direction will exert less effect on perceived similarity and self-esteem when comparison distance is higher than lower.

Moderation Effects of Message Framing

Gain and loss frames are the two types of message framing and they have received substantial research investigation. In health contexts, gain frame emphasizes the benefits of a health action and loss frame focuses on the negative consequences of noncompliance with the recommendation (Rothman et al., 2006). Loss frame can amplify the effects of comparison direction on perceived similarity and self-esteem. Downward comparison triggers contrasts and loss aversion ("I don't want to be like that one day"; Beaumont & Kenealy, 2004; Franz et al.,

2000); loss-framed messages, compared to gain-framed messages, can thus make the contrast more salient and further reduce perceived similarity. Similarly, loss framing can make the target whose health status is worse than the comparer appear to be even more worse in contrast to using the gain framing. Therefore, downward comparison with loss-framed messages can boost the comparer's self-esteem more than gain-framed ones.

H5: Social comparison direction (upward vs. downward comparison) will interact with message framing (gain vs. loss frame) in predicting (a) perceived similarity and (b) self-esteem such that social comparison direction exerts stronger effect on perceived similarity and self-esteem when the message is using loss frame than using gain frame.

Since comparers tend to be less affected by high-distance targets than low-distance ones as articulated earlier, how the former frames the message should have less effects compared to the latter. Specifically, in low-distance comparison, loss-framed messages tend to trigger lower perceived similarity between the comparer and the target than gain-framed messages (T. K. Lee & Su, 2020); in high-distance comparison, the framing effects on perceived similarity could be attenuated.

H6: Social comparison distance will interact with message framing in predicting perceived similarity, such that in low-distance comparison, target with loss-framed messages will lead to lower perceived similarity levels than target with gain-framed messages; these differences will be smaller in high-distance comparison.

Health Self-Efficacy and Behavioral Intention as Outcomes

Perceived similarity and self-esteem can be impactful on health intention. Social cognitive theory (Bandura, 1982, 2001; Fox & Bailenson, 2009) suggests that individuals can learn from watching how role models perform a behavior and through this vicarious learning, individuals' self-efficacy will be boosted, making them ready to adopt the behavior. Vicarious learning is most effective when the target is perceived similar to the comparer (Bandura, 2001).

H7: Perceived similarity is positively related to health self-efficacy.

Self-esteem encompasses the attitude, either positive or negative about the self as a source of power, which affects one's perceived capability of achieving tasks (Bandura, 1995; Huitt, 2004). Prior research found positive correlation between self-esteem and self-efficacy (Lane et al., 2004; Phan & Ngu, 2014; Sahin, 2017).

H8: Self-esteem is positively related to health self-efficacy.

Self-efficacy influences the individual's initiation of the behavior and people with higher self-efficacy spend more effort and are more persistent in the process (Bandura, 1989). Health self-efficacy has strong positive effects on health behavior intention, behavior change, and maintenance (Sheeran et al., 2016; Strecher et al., 1986).

H9: Health self-efficacy is positively related to health behavioral intention.

In sum, the study proposes a path model from social comparison direction and distance to perceived similarity and self-esteem, which then predicts health efficacy and eventually health behavioral intention (Appendix A).

Methods

Design

A 2 (comparison direction: up vs. down) by 2 (comparison distance: high vs. low) by 2 (framing: gain vs. loss) online factorial experimental design was employed to test the hypotheses. The study was approved by the Institutional Review Board of the authors' institution.

Sample

An Amazon Mechanical Turk sample of 559 was recruited for the study in April 2021. Eligible participants should be (1) adults living in the U.S., (2) whose self-reported height and weight yielded a Body-Mass-Index (BMI) of at least 25 (i.e., weight statuses of overweight with a BMI ranging from 25 to less than 30, obese with a BMI ranging from 30 to less than 40, or extremely obese with a BMI of 40 or higher (National Heart, Lung, and Blood Institute,

2018), and (3) who used OSGs related to weight control or fitness in the last month and recalled and provided the forum name. As stated in the subsequent section, 284 participants' data were eliminated from analyses as they did not pass the manipulation check. Therefore, 275 samples were included in study analyses.

Participants' age ranged from 18 to 76 with a mean age of 33.87 (*SD* = 9.20). Most of the samples were white (48.72%) males (60.36%) with a college degree or higher (78.18%). Detailed demographic characteristics can be found in Table 1.

Table 1. *Demographic Characteristics of Participants.*

	n (%, total *N* = 275)
Gender	
Female	109 (39.64)
Race and ethnicity	
White	134 (48.72)
Asian	93 (33.82)
Hispanic	27 (9.81)
Black or African American	21 (7.64)
American Indian or Alaskan	7 (2.54)
Education	
High school graduate or lower	13 (4.73)
Some college or associate degree	47 (17.09)
College degree or higher	215 (78.18)
Annual household income	
Less than $40,000	139 (50.55)
$40,000 to $69,999	80 (29.09)
$70,000 or higher	56 (20.36)
BMI status	
Overweight	156 (56.73)
Obese	85 (30.91)
Extremely obese	34 (12.36)

Procedure

Participants were first asked for their location of residence, then height and weight and finally OSG usage to assess their qualification status for the study. Disqualified participants were screened out at the question where their answer did not meet study criteria and were not paid.

Qualified participants first provided digital consent. Then they were immediately informed of their current BMI values and weight statuses based on the height and weight information they provided. They were then randomly assigned to one of the eight experiment conditions. Participants were instructed to read a support group post message with three supportive comments. After reading, participants were directed to answer the questions for theoretical measurements. Lastly, participants reported demographic backgrounds and answered manipulation check questions. Ineligible participants were not paid, and they were informed of the payment policy before starting the screening.

Stimuli

Experimental stimuli consist of two parts. First, all participants were informed of their BMI value and weight status (i.e., overweight, obese or extremely obese) after they filled in height and weight information: "Based on the information you just provided, your BMI value is x. Your weight status is: x". This line was followed by an explanation of what BMI was.

The second part of the stimuli executed the experiment. A mockup OSG conversation started with a short post revealing the poster's weight status and concerns on weight control, followed by three supportive comments. The

poster's weight status varied from overweight, obese to extremely obese. Comments were identical across all conditions.

Social comparison direction was manipulated by assigning participants to read the stimuli that featured the gender-neutral poster "Alex" whose weight status was worse (downward comparison) or better (upward comparison) than the participants' weight status. Given that the name "Alex" could have the potential implication of the poster's race, ANOVA was run to test if participants' race and ethnicity affected perceived similarity levels. Results revealed no significant effects of participant race and ethnicity on perceived similarity.

Social comparison distance was manipulated by assigning participants to the poster whose weight status was two levels (high distance) different from the participant's, e.g., overweight participants reading extremely obese poster's message, or one level (low distance) different from the participants' weight status, e.g., obese participants reading overweight poster's message. Participants coming in with different weight statues were randomly assigned to the upward or downward comparison conditions and the two distance conditions (Appendix B).

Framing was manipulated in the post message (Appendix C). In the gain-framed message, the poster talked about how diet and exercise will help him/her control weight. The loss-framed message stated that if he/she did not take actions, he/she will soon suffer from diabetes and will need life-time treatments. The length of the gain vs. loss-framed messages was held constant.

Measures

The following measures, except noted, were rated on a seven-point Likert-type scale ranging from *Strongly Disagree* to *Strongly Agree*.

Perceived similarity regarding health conditions was measured by using a three-item scale (Malloch & Zhang, 2019). An example of the items was *The poster's weight status is the same as mine*. This three-item scale achieved excellent internal consistency (Cronbach α = .86). A composite score was then created by averaging all item responses per participant.

Self-esteem was measured on the well-established 10-item Rosenberg's self-esteem scale (Rosenberg, 1965). The scale has demonstrated construct validity in numerous previous studies (Burrow & Rainone, 2017; Jetten et al., 2015; Ross & Broh, 2000). The scale achieved good reliability (Cronbach α = .87) and a composite score was created by retrieving means of all item responses.

Health efficacy was measured using a five-item scale (S. Y. Lee et al., 2008). Example items included *I am confident I can have a positive effect on my diet and I feel that I am in control of how and what I learn about my diet*. The five items demonstrated good reliability (Cronbach α = .86). We created a composite score by averaging all item responses.

Behavior intention was measured using the established behavior intention measurement with three items (Fishbein & Ajzen, 2011; Montano & Kasprzyk, 2015). An example item was *It's very likely that I will go on a weight-loss diet*. A Cronbach Alpha of .92 was obtained for the three-item scale. We then took the mean scores as the composite score.

Manipulation Check

At the end of the experiment, participants were asked to recall the weight status of the poster in their assigned stimuli and only those who correctly recalled were included in the analyses to ensure that participants paid attention to the stimuli. This stringent check is a proxy that suggests participants noticed the weight signal thus social comparison processes could be triggered. Out of 559 participants who completed the experiment, 275 passed the manipulation check. Participants who passed the manipulation check did not differ significantly from those who did not pass regarding gender, age, education, annual household income, or BMI status. All study analyses were based on the 275 samples who passed the manipulation check.

Analytical Strategy

Analysis of Variance (ANOVA) was employed to test H1 to H3. Comparison direction or distance was entered as the predictor while perceived similarity or self-esteem was treated as the outcome variable. ANOVA was also

conducted to evaluate the interaction effects in H4 to H6. The interaction factors were independent variables and perceived similarity and self-esteem were dependent variables.

H7 to H9 were tested using the structural equation modeling approach. Social comparison direction was assigned to predict perceived similarity and self-esteem; comparison distance was assigned to predict perceived similarity. Perceived similarity and self-esteem were then entered to be related to health efficacy, which then predicted health intention. In all the above statistical tests, obtaining a *p*-value of less than .05 will support the hypotheses, otherwise rejecting the hypotheses.

Results

Means and standard deviations of dependent variables are listed in Table 2. Correlations of dependent variables are summarized in Table 3.

Table 2. *Mean and Standard Deviations of Perceived Similarity and Self-Esteem by Experiment Conditions.*

Comparison direction	Comparison distance	Message framing	Perceived similarity	Self-esteem	Health efficacy	Health intention
Up	Low	Gain	4.94 (1.21)	4.12 (0.96)	4.92 (1.15)	5.34 (1.54)
		Loss	4.77 (1.06)	4.35 (1.11)	5.08 (1.11)	5.54 (1.12)
	High	Gain	3.17 (1.17)	4.32 (1.21)	4.00 (1.34)	4.67 (1.12)
		Loss	5.05 (1.34)	4.49 (.86)	5.31 (1.08)	5.76 (1.34)
Down	Low	Gain	3.96 (1.69)	4.42 (1.30)	4.97 (1.11)	5.27 (1.33)
		Loss	4.04 (1.70)	4.75 (1.28)	4.95 (1.32)	5.36 (1.36)
	High	Gain	3.67 (1.82)	4.70 (1.18)	5.39 (1.10)	5.49 (1.62)

Note. Entries are means and entries in the parentheses are standard deviations.

Table 3. *Correlations, Mean and Standard Deviation of Dependent Variables.*

	1	2	3	4	Mean (*SD*)
1. Perceived similarity	—				4.10 (1.64)
2. Self-esteem	−.42***	—			4.56 (1.18)
3. Health efficacy	.04	.41***	—		5.07 (1.16)
4. Health intention	.25***	.11	.57***	—	5.38 (1.34)

Note. Entries are Pearson's *r*; *SD*: Standard Deviation; ***$p < .001$.

H1 suggests that perceived similarity will be higher in upward than in downward comparison. The hypothesis was tested using ANOVA with comparison direction as the predictor and perceived similarity as the outcome. H1 was supported, with $F(1, 273) = 22.11$, $p < .001$, $\eta^2 = .07$. Mean perceived similarity was indeed higher in upward ($M = 4.80$, $SD = 1.20$) than in downward comparison condition ($M = 3.88$, $SD = 1.71$).

H2 suggests that self-esteem will be higher in downward than in upward comparison. Based on the same analytical approach, H2 was supported, with $F(1, 273) = 7.87$, $p < .01$, $\eta^2 = .03$. Mean self-esteem was higher in downward ($M = 4.68$, $SD = 1.23$) than in upward comparison condition ($M = 4.25$, $SD = 1.02$).

H3 suggests social comparison distance reduces perceived similarity. H3 was tested using ANOVA with comparison distance as the predictor and perceived similarity as the outcome. H3 was supported, $F(1, 273) = 11.52$, $p < .001$, $\eta^2 = .04$. Perceived similarity was higher in low distance ($M = 4.31$, $SD = 1.57$) than high distance condition ($M = 3.59$, $SD = 1.71$).

H4 suggests the interaction effect between social comparison direction and distance on (a) perceived similarity and (b) self-esteem. ANOVA with comparison distance x direction as the predictor and perceived similarity as the outcome found that although the interaction factor was not statistically significant, $F(1, 271) = .002$, $p = .96$, Tukey honestly significant difference (Tukey HSD) test showed that perceived similarity was significantly higher in upward

(*M* = 4.86, *SD* = 1.14) than downward comparison (*M* = 4.00, *SD* = 1.69) when the comparison distance is low ($p < .01$). In contrast, when the comparison distance is high, comparison direction did not have a significant influence on perceived similarity ($p = .30$). H4(a) was partially supported. The similar approach was employed to test H4(b). However, the interaction factor was not significant, $F(1, 271) = .004$, $p = .95$, and Tukey HSD did not reveal any moderation effects on self-esteem. H4(b) was rejected.

H5 posits the interaction effect between social comparison direction and framing on (a) perceived similarity and (b) self-esteem. Neither the ANOVA with comparison direction x framing as the predictor and perceived similarity as the outcome nor the corresponding Tukey HSD tests revealed significant interaction effect. Similar findings were shown in predicting self-esteem. H5 was rejected.

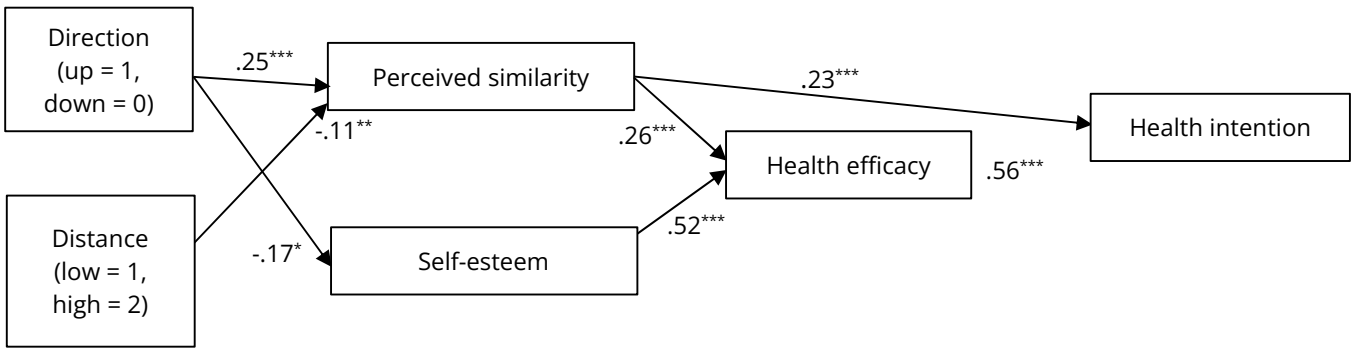
H6 suggests the interaction between social comparison distance and framing on perceived similarity. ANOVA with comparison distance x framing as the predictor and perceived similarity and its Tukey HSD tests revealed no significant interaction effects. H6 was rejected.

H7 to H9 suggest correlations among perceived similarity, health efficacy, and health behavioral intention. Results of the structural equation model showed a fair fit, $\chi^2(7) = 29.51$, $p < .001$; CFI = .92, TLI = .83, RMSEA = .11, SRMR = .07. Modification indices suggested that adding a path from perceived similarity to health intention can improve the model fit. After adding the path, the model showed good fit indices, $\chi^2(6) = 7.88$, $p = .25$; CFI = .99, TLI = .98, RMSEA = .03, SRMR = .04, and the improvement compared to the original model was significant, $\Delta\chi^2(1) = 21.64$, $p < .001$. All paths were significant in the directions suggested by the hypotheses. The path model is summarized in Table 4 and visualized in Figure 1. H7, H8 and H9 were supported.

Table 4. *Standardized Regression Coefficients and Standard Errors of the Path Model.*

	b (*SE*)	*p value*
Direction → perceived similarity	.25 (.21)	< .001
Direction → self-esteem	−.17(.16)	.005
Distance → perceived similarity	−.11(.19)	.038
Perceived similarity → health efficacy	.26(.04)	< .001
Self-esteem → health efficacy	.52(.06)	< .001
health efficacy → health intention	.56(.06)	< .001
Perceived similarity → health intention	.23(.04)	< .001
Perceived similarity R^2 (%)	8.8	
Self-esteem R^2 (%)	2.8	
Health efficacy R^2 (%)	22.4	
Health intention R^2 (%)	37.4	

Figure 1. *Model from Social Comparison to Health Intention.*



Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Discussion

The current study examined the impact of social comparison direction and distance and message framing on health behavioral intention in OSGs. This study enriched the social comparison theory by showing the interaction effects of comparison direction and distance on perceived similarity, which further linked to efficacy and behavior intention. Findings suggested that social comparison direction influenced comparers' perceived similarity (H1) and self-esteem (H2), which then contributed to health efficacy leading to health behavioral intention (H7, H8 and H9). Social comparison distance, while independently affecting perceived similarity (H3), also interacted with comparison direction in predicting perceived similarity (H4). Message framing did not show a significant interaction impact on perceived similarity or self-esteem (H5 and H6).

The finding that social comparison direction and distance can influence health behavioral intention in OSG is particularly important for online health communication research. Prior research had shown that merely observing peers and their supportive interaction in OSGs can impact health behavioral outcomes (Malloch & Zhang, 2019). The current study built on this prior research and revealed that social comparison can also trigger similarity perception. This is another mechanism that can impact health outcomes in OSGs.

When further unpacking the mechanism through which social comparison affects health, the study revealed three different paths. Specifically, observing targets that were doing better than the comparer can increase perceived similarity, which contributed to health efficacy and then health intention. This path is consistent with upward assimilation theory (Collins, 1996) and further extends the theory by demonstrating the mechanism through which upward assimilation facilitate self-improvement and contributes to forming health behavioral intention. However, the flip side was also identified. Upward comparison reduced health behavioral intention through reducing the comparer's self-esteem, which was the second independent path leading to behavioral intention. Someone doing better than the comparer can remind the comparer that he/she is not doing as well, thus serving to magnify challenges or form self-doubt in abilities. The third path of how social comparison impacts health behavioral intention was through the chain of comparison distance—perceived similarity—health efficacy—health intention. Peers who are closer to the comparer in health status are the better reference point for comparing how one is doing than peers whose health status is a lot different from the comparer's (Goethals & Darley, 1977; Read et al., 1989). Having these similar peers in an OSG likely provides a sense of belongingness and community (Mejias et al., 2014; Thomas et al., 2014), and the fact that there are people who are also struggling with the similar health status can afford a sense of efficacy which ultimately leads to behavioral intention.

Message framing did not interact with social comparison direction or distance in their effects on perceived similarity or self-esteem. One possible reason could be that the persuasiveness difference of gain vs. loss frames is small (O'Keefe & Jensen, 2007) and social comparison overpowered message framing in affecting the outcomes. In other words, in OSGs, how peers are doing in relative to the comparer could matter more to the comparer in self-evaluation and health outcomes than how peers talk about health. This implies that social comparison may be a confounding factor in studying the effect of message framing on persuasion and future research should consider examining social comparison processes as one possible persuasion mechanism.

This research contributes to theoretical advancement in social comparison, health communication and supportive communication. It shows that individuals engage in social comparison when observing anonymous others online and that social comparison direction interacts with comparison distance in determining perceived similarity. When comparison distance is low, comparison direction matters more in evaluating perceived similarity than when comparison distance is high. Additionally, this research enriches understanding of health communication by showing the mechanisms through which different social comparisons in support groups impact determinants of health outcomes. This study also revealed that even though OSG communication relies heavily on text-based interaction, what may be more impactful is who the peers or participants are in these groups compared to how they frame their messages. This finding is especially critical for rethinking framing and narrative persuasion theory in that who the narrator is may be more influential than the message itself. Further, the study contributes to supportive communication research through demonstrating that engagement in OSGs does not necessarily implies that the participant has to actually interact with peers, rather, observing peers can trigger perceived similarity and self-evaluation that ultimately leads to health outcomes (Duong et al., 2020; Malloch & Zhang, 2019).

There are several practical implications of the findings. Participating in OSGs and social comparison in those groups are common, but not all social comparison is beneficial. As seen in the study, upward comparison can provide hope to the comparer but can also be detrimental to the comparer's self-esteem. Therefore, interventions

may be needed to help patients understand how to cope with social comparison to ensure that participants can maximize the benefits of participating in OSGs. Moderators of these groups should also be aware of social comparison and strive to create a supportive place for participants with different health status.

The study is not without limitations. The MTurk sample may not be representative of the general population, but the study was focused on OSG participants and we only included MTurk workers who had been active in such groups. Through screening, the experimental design was able to reach the target population. Proper payment should be ensured so that participants were compensated fairly at a market rate. The experimental stimuli were hypothetical online posts and comments but they served to mimic the real-world scenario where support group participants were observing peers' interaction. Also, only one health concern, i.e., weight loss and diet, was tested in the study. Weight loss issues have the advantage of being quantifiable as BMI has distinct weight statuses (i.e., overweight, obese etc.) thus weight loss suits the theoretical purpose for the experimental design in the current study. Future research can replicate and test social comparison effects in other health behaviors, such as preventive and detection behaviors.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Yining Malloch: conceptualization, formal analysis, investigation, methodology, writing—original draft. **Jingwen Zhang:** conceptualization, funding acquisition, supervision, writing—review & editing. **Sijia Qian:** data curation, project administration, writing—review & editing.

References

Alfasi, Y. (2019). The grass is always greener on my friends' profiles: The effect of Facebook social comparison on state self-esteem and depression. *Personality and Individual Differences*, *147*, 111–117. https://doi.org/10.1016/j.paid.2019.04.032

Alicke, M. D. (1985). Global self-evaluation as determined by the desirability and controllability of trait adjectives. *Journal of Personality and Social Psychology*, *49*(6), 1621–1630. https://doi.org/10.1037/0022-3514.49.6.1621

Åžahin, H. (2017). Emotional intelligence and self-esteem as predictors of teacher self-efficacy. *Educational Research and Reviews*, *12*(22), 1107–1111. https://doi.org/10.5897/ERR2017.3385

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*(2), 122–147. https://doi.org/10.1037/0003-066X.37.2.122

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*(9), 1175–1184. https://doi.org/10.1037/0003-066X.44.9.1175

Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, *52*(1), 1–26. https://doi.org/10.1146/annurev.psych.52.1.1

Barak, A., & Gluck-Ofri, O. (2007). Degree and reciprocity of self-disclosure in online forums. *CyberPsychology & Behavior*, *10*(3), 407–417. https://doi.org/10.1089/cpb.2006.9938

Beaumont, J. G., & Kenealy, P. M. (2004). Quality of life perceptions and social comparisons in healthy old age. *Ageing & Society*, *24*(5), 755–769. https://doi.org/10.1017/S0144686X04002399

Burrow, A. L., & Rainone, N. (2017). How many likes did I get?: Purpose moderates links between positive social media feedback and self-esteem. *Journal of Experimental Social Psychology*, *69*, 232–236. https://doi.org/10.1016/j.jesp.2016.09.005

Buunk, A. P., & Dijkstra, P. (2017). Social comparisons and well-being. In M. D. Robinson & M. Eid (Eds.), *The happy mind: Cognitive contributions to well-being* (pp. 311–330). Springer International Publishing. https://doi.org/10.1007/978-3-319-58763-9_17

Buunk, B. P. (1995). Comparison direction and comparison dimension among disabled individuals: Toward a refined conceptualization of social comparison under stress. *Personality and Social Psychology Bulletin*, *21*(4), 316–330. https://doi.org/10.1177/0146167295214002

Collins, R. L. (1996). For better or worse: The impact of upward social comparison on self-evaluations. *Psychological Bulletin*, *119*(1), 51–69. https://doi.org/10.1037/0033-2909.119.1.51

Collins, R. L. (2000). Among the better ones: Upward assimilation in social comparison. In J. Suls & L. Wheeler (Eds.), *Handbook of social comparison* (pp. 159–171). Kluwer Academic Publishers. https://doi.org/10.1007/978-1-4615-4237-7_9

Corcoran, K., Crusius, J., & Mussweiler, T. (2011). Social comparison: Motives, standards, and mechanisms. In D. Chadee (Ed.), *Theories in social psychology* (pp. 119–139). Wiley Blackwell.

Coulson, N. S., & Greenwood, N. (2012). Families affected by childhood cancer: An analysis of the provision of social support within online support groups. *Child: Care, Health and Development*, *38*(6), 870–877. https://doi.org/10.1111/j.1365-2214.2011.01316.x

Crocker, J., Thompson, L. L., McGraw, K. M., & Ingerman, C. (1987). Downward comparison, prejudice, and evaluations of others: Effects of self-esteem and threat. *Journal of Personality and Social Psychology*, *52*(5), 907–916. https://doi.org/10.1037/0022-3514.52.5.907

Diel, K., Grelle, S., & Hofmann, W. (2021). A motivational framework of social comparison. *Journal of Personality and Social Psychology*, *120*(6), 1415–1430. https://doi.org/10.1037/pspa0000204

Diel, K., & Hofmann, W. (2019). Inspired to perspire: The interplay of social comparison direction and standard extremity in the context of challenging exercising goals. *Social Cognition*, *37*(3), 247–265. https://doi.org/10.1521/soco.2019.37.3.247

Duong, H. T., Vu, H. T., & Nguyen, L. T. V. (2020). Influenced by anonymous others: Effects of online comments on risk perception and intention to communicate. *Health Communication*, *36*(7), 909–919. https://doi.org/10.1080/10410236.2020.1723050

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117–140. https://doi.org/10.1177/001872675400700202

Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*. Psychology Press. https://doi.org/10.4324/9780203838020

Fox, J., & Bailenson, J. N. (2009). Virtual self-modeling: The effects of vicarious reinforcement and identification on exercise behaviors. *Media Psychology*, *12*(1), 1–25. https://doi.org/10.1080/15213260802669474

Franz, M., Meyer, T., Reber, T., & Gallhofer, B. (2000). The importance of social comparisons for high levels of subjective quality of life in chronic schizophrenic patients. *Quality of Life Research*, *9*(5), 481–489. https://doi.org/10.1023/A:1008938011554

Garcia, S. M., Tor, A., & Schiff, T. M. (2013). The psychology of competition: A social comparison perspective. *Perspectives on Psychological Science*, *8*(6), 634–650. https://doi.org/10.1177/1745691613504114

Gerber, M. M., Boals, A., & Schuettler, D. (2011). The unique contributions of positive and negative religious coping to posttraumatic growth and PTSD. *Psychology of Religion and Spirituality*, *3*(4), 298–307. https://doi.org/10.1037/a0023016

Gibbons, F. X., & Gerrard, M. (1991). Downward comparison and coping with threat. In J. Suls & T. A. Wills (Eds.), *Social comparison: Contemporary theory and research* (pp. 317–345). Lawrence Erlbaum Associates.

Goethals, G. R., & Darley, J. M. (1977). Social comparison theory: Self-evaluation and group life. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (21–47). Springer Series in Social Psychology. https://doi.org/10.1007/978-1-4612-4634-3_2

Heatherton, T. F., & Wyland, C. L. (2003). Assessing self-esteem. In S. J. Lopez & C. R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures* (pp. 219–233). American Psychological Association. https://doi.org/10.1037/10612-014

Huitt, W. (2004). Self-concept and self-esteem. *Educational Psychology Interactive*, *1*, 1–5. http://www.edpsycinteractive.org/col/regsys/self.html

Jetten, J., Branscombe, N. R., Haslam, S. A., Haslam, C., Cruwys, T., Jones, J. M., Cui, L., Dingle, G., Liu, J., Murphy, S., Thai, A., Walter, Z., & Zhang, A. (2015). Having a lot of a good thing: Multiple important group memberships as a source of self-esteem. *PloS One*, *10*(5), Article e0124609. https://doi.org/10.1371/journal.pone.0124609

Lachmar, E. M., Wittenborn, A. K., Bogen, K. W., & McCauley, H. L. (2017). #MyDepressionLooksLike: Examining public discourse about depression on Twitter. *JMIR Mental Health*, *4*(4), Article e8141. https://doi.org/10.2196/mental.8141

Lane, J., Lane, A. M., & Kyprianou, A. (2004). Self-efficacy, self-esteem and their impact on academic performance. *Social Behavior and Personality: An International Journal*, *32*(3), 247–256. https://doi.org/10.2224/sbp.2004.32.3.247

Lee, S. Y., Hwang, H., Hawkins, R., & Pingree, S. (2008). Interplay of negative emotion and health self-efficacy on the use of health information and its outcomes. *Communication Research*, *35*(3), 358–381. https://doi.org/10.1177/0093650208315962

Lee, T. K., & Su, L. Y.-F. (2020). When a personal HPV story on a blog influences perceived social norms: The roles of personal experience, framing, perceived similarity, and social media metrics. *Health Communication*, *35*(4), 438–446. https://doi.org/10.1080/10410236.2019.1567440

Lieberman, M. A., Wizlenberg, A., Golant, M., & Di Minno, M. (2005). The impact of group composition on internet support groups: Homogeneous versus heterogeneous Parkinson's groups. *Group Dynamics: Theory, Research, and Practice*, *9*(4), 239–250. https://doi.org/10.1037/1089-2699.9.4.239

Low, D. M., Rumker, L., Talkar, T., Torous, J., Cecchi, G., & Ghosh, S. S. (2020). Natural language processing reveals vulnerable mental health support groups and heightened health anxiety on Reddit during COVID-19: Observational study. *Journal of Medical Internet Research*, *22*(10), Article e22635. https://doi.org/10.2196/22635

Mahler, H. I. M., Kulik, J. A., Gerrard, M., & Gibbons, F. X. (2010). Effects of upward and downward social comparison information on the efficacy of an appearance-based sun protection intervention: A randomized, controlled experiment. *Journal of Behavioral Medicine*, *33*(6), 496–507. https://doi.org/10.1007/s10865-010-9279-3

Malloch, Y. Z., & Taylor, L. D. (2019). Emotional self-disclosure in online breast cancer support groups: Examining theme, reciprocity, and linguistic style matching. *Health Communication*, *34*(7), 764–773. https://doi.org/10.1080/10410236.2018.1434737

Malloch, Y. Z., & Zhang, J. (2019). Seeing others receive support online: Effects of self-disclosure and similarity on perceived similarity and health behavior intention. *Journal of Health Communication*, *24*(3), 217–225. https://doi.org/10.1080/10810730.2019.1595226

Mejias, N. J., Gill, C. J., & Shpigelman, C.-N. (2014). Influence of a support group for young women with disabilities on sense of belonging. *Journal of Counseling Psychology*, *61*(2), 208–220. https://doi.org/10.1037/a0035462

Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research and practice* (pp. 95–124). John Wiley & Sons.

Montoya, R. M., Horton, R. S., & Kirchner, J. (2008). Is actual similarity necessary for attraction? A meta-analysis of actual and perceived similarity. *Journal of Social and Personal Relationships*, *25*(6), 889–922. https://doi.org/10.1177/0265407508096700

Nabi, R. L., Walter, N., Oshidary, N., Endacott, C. G., Love-Nichols, J., Lew, Z. J., & Aune, A. (2020). Can emotions capture the elusive gain-loss framing effect? A meta-analysis. *Communication Research*, *47*(8), 1107–1130. https://doi.org/10.1177/0093650219861256

National Heart, Lung, and Blood Institute. (2018). *Body mass index table*. https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_tbl.pdf

O'Keefe, D. J., & Jensen, J. D. (2007). The relative persuasiveness of gain-framed loss-framed messages for encouraging disease prevention behaviors: A meta-analytic review. *Journal of Health Communication*, *12*(7), 623–644. https://doi.org/10.1080/10810730701615198

Peng, C.-T., Wu, T.-Y., Chen, Y., & Atkin, D. J. (2019). Comparing and modeling via social media: The social influences of fitspiration on male Instagram users' work out intention. *Computers in Human Behavior*, *99*, 156–167. https://doi.org/10.1016/j.chb.2019.05.011

Penţa, M. A., & Băban, A. (2018). Message framing in vaccine communication: A systematic review of published literature. *Health Communication*, *33*(3), 299–314. https://doi.org/10.1080/10410236.2016.1266574

Phan, H., & Ngu, B. (2014). Interrelations between self-esteem and personal self-efficacy in educational contexts: An empirical study. *International Journal of Applied Psychology*, *4*(3), 108–120. https://hdl.handle.net/1959.11/16048

Read, S. J., Druian, P. R., & Miller, L. C. (1989). The role of causal sequence in the meaning of actions. *British Journal of Social Psychology*, *28*(4), 341–351. https://doi.org/10.1111/j.2044-8309.1989.tb00877.x

Rosenberg, M. (1965). *Rosenberg Self-Esteem Scale (RSES)* [Database record]. APA PsycTests. https://doi.org/10.1037/t01038-000

Ross, C. E., & Broh, B. A. (2000). The roles of self-esteem and the sense of personal control in the academic achievement process. *Sociology of Education*, *73*(4), 270–284. https://doi.org/10.2307/2673234

Rothman, A. J., Bartels, R. D., Wlaschin, J., & Salovey, P. (2006). The strategic use of gain-and loss-framed messages to promote healthy behavior: How theory can inform practice. *Journal of Communication*, *56*(suppl_1), S202–S220. https://doi.org/10.1111/j.1460-2466.2006.00290.x

Schmuck, D., Karsay, K., Matthes, J., & Stevic, A. (2019). "Looking up and feeling down". The influence of mobile social networking site use on upward social comparison, self-esteem, and well-being of adult smartphone users. *Telematics and Informatics*, *42*, Article 101240. https://doi.org/10.1016/j.tele.2019.101240

Sheeran, P., Maki, A., Montanaro, E., Avishai-Yitshak, A., Bryan, A., Klein, W. M. P., Miles, E., & Rothman, A. J. (2016). The impact of changing attitudes, norms, and self-efficacy on health-related intentions and behavior: A meta-analysis. *Health Psychology*, *35*(11), 1178–1188. https://doi.org/10.1037/hea0000387

Stanton, A. L., Danoff-Burg, S., Cameron, C. L., Snider, P. R., & Kirk, S. B. (1999). Social comparison and adjustment to breast cancer: An experimental examination of upward affiliation and downward evaluation. *Health Psychology*, *18*(2), 151–158. https://doi.org/10.1037/0278-6133.18.2.151

Strecher, V. J., McEvoy DeVellis, B., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, *13*(1), 73–92. https://doi.org/10.1177/109019818601300108

Swann, W. B., Griffin, J. J., Predmore, S. C., & Gaines, B. (1987). The cognitive–affective crossfire: When self-consistency confronts self-enhancement. *Journal of Personality and Social Psychology*, *52*(5), 881–889. https://doi.org/10.1037/0022-3514.52.5.881

Tanis, M. (2008). Health-related on-line forums: What's the big attraction? *Journal of Health Communication*, *13*(7), 698–714. https://doi.org/10.1080/10810730802415316

Taylor, S. E., & Lobel, M. (1989). Social comparison activity under threat: Downward evaluation and upward contacts. *Psychological Review*, *96*(4), 569–575. https://doi.org/10.1037/0033-295X.96.4.569

Terol Cantero, M. C., Bernabé, M., Martín-Aragón, M., Vázquez, C., & Buunk, A. P. (2021). Social comparison and stress appraisal in women with chronic illness. *International Journal of Environmental Research and Public Health*, *18*(10), Article 5483. https://doi.org/10.3390/ijerph18105483

Thomas, L., Herbert, J., & Teras, M. (2014). A sense of belonging to enhance participation, success and retention in online programs. *The International Journal of the First Year in Higher Education*, *5*(2), 69–80. https://doi.org/10.5204/intjfyhe.v5i2.233

Toma, C. L. (2013). Feeling better but doing worse: Effects of Facebook self-presentation on implicit self-esteem and cognitive task performance. *Media Psychology*, *16*(2), 199–220. https://doi.org/10.1080/15213269.2012.762189

VanderZee, K. I., Buunk, B. P., & Sanderman, R. (1995). Social comparison as a mediator between health problems and subjective health evaluations. *British Journal of Social Psychology*, *34*(1), 53–65. https://doi.org/10.1111/j.2044-8309.1995.tb01048.x

Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences*, *86*, 249–256. https://doi.org/10.1016/j.paid.2015.06.026

Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-esteem. *Psychology of Popular Media Culture*, *3*(4), 206–222. https://doi.org/10.1037/ppm0000047

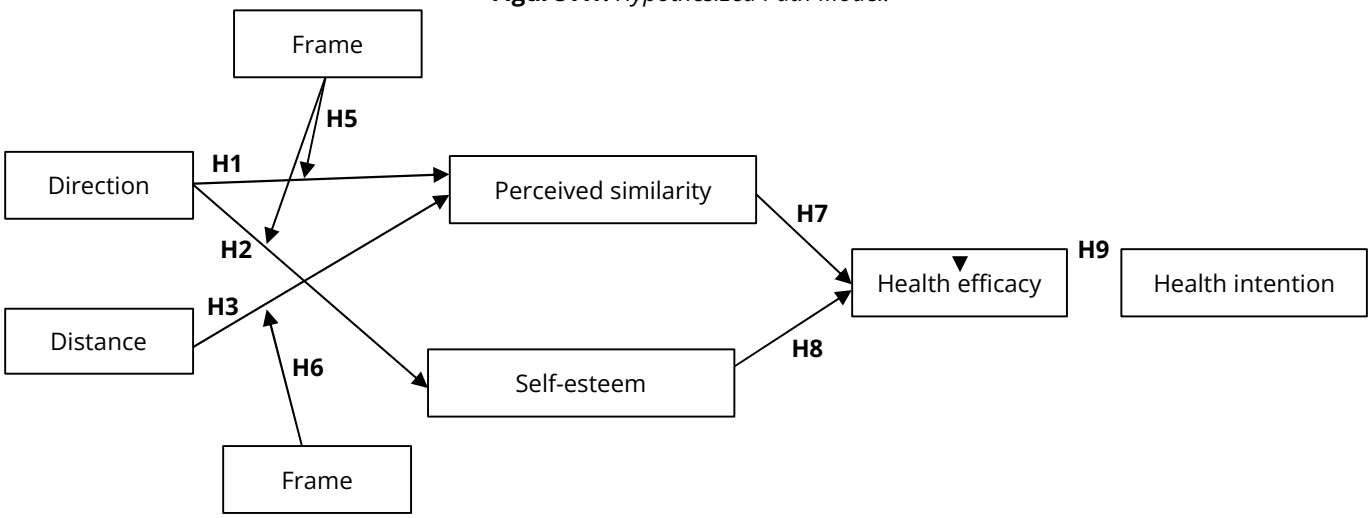
Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin*, *106*(2), 231–248. https://doi.org/10.1037/0033-2909.106.2.231

Yang, D., Yao, Z., Seering, J., & Kraut, R. (2019). The channel matters: Self-disclosure, reciprocity and social support in online cancer support groups. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1–15). ACM. https://doi.org/10.1145/3290605.3300261

Zhang, J., & Centola, D. (2019). How social networks shape social comparison. In J. Suls, R. L. Collins, & L. Wheeler (Eds.), *Social comparison in judgment and behavior*. Oxford University Press USA.

Appendix A

Figure A1. *Hypothesized Path Model.*



Appendix B

Table 1B. *Experiment Scheme and Number of Participants Randomized to Each Condition.*

Participant weight status	Stimuli weight status	Message framing	Experimental condition (direction—distance—frame)	*N* of experimental condition
Overweight (*n* = 156)	Obese	Gain	Down—Low—Gain	41
		Loss	Down—Low—Loss	43
	Extremely Obese	Gain	Down—High—Gain	27
		Loss	Down—High—Loss	45
Obese (*n* = 85)	Overweight	Gain	Up—Low—Gain	25
		Loss	Up—Low—Loss	21
	Extremely Obese	Gain	Down—Low—Gain	16
		Loss	Down—Low—Loss	23
Extremely Obese (*n* = 34)	Overweight	Gain	Up—High—Gain	4
		Loss	Up—High—Loss	7
	Obese	Gain	Up—Low—Gain	13
		Loss	Up—Low—Loss	10

Appendix C

The following post and comments are from the online support group you have been to. Read the post and comments carefully, and then proceed to the next page.

Example stimulus: Overweight target with loss frame messages

iamAlex: My BMI is 27 (overweight). I've been feeling tired at work all the time. Went to the doctor yesterday. I was told that I am overweight. I can soon get diabetes and all sorts of other serious diseases if I keep like this. Then I will have to take medicine for my whole life and suffer from many complications like blood vessel problems. I'll probably die early.

Example stimulus: Extremely obese target with gain frame messages

iamAlex: My BMI is 41 (Extremely Obese). I've been feeling tired at work all the time. Went to the doctor yesterday. I was told that I am extremely obese. I can soon get diabetes and all sorts of other serious diseases if I keep like

this. The doctor told me if I diet and exercise regularly, I will lose weight and lower the risk of getting diabetes and many complications like blood vessel problems. I don't need to take medicine forever and I can also extend my lifespan.

Supportive comments held constant across experimental conditions

fungy: Sorry to hear that. Hugs!!

teakit: I know how it feels! I was extremely fat and in danger of getting diabetes a year ago too. I got rid of all my frozen pizzas and alcohol at home and went to the fitness class three times every week. Now I'm completely fit and strong! Cheer up! You can definitely do something to stay healthy! Things will be better!

GreekGold: Stay strong!

JamieK: Same here! i just started the strict diet and workout my doctor recommended to me. Already feeling much better!

About Authors

Yining Zhou Malloch, PhD is a Research Associate in the Department of Communication at the University of California, Davis. Her research focuses on health communication in computer-mediated communication contexts.

https://orcid.org/0000-0001-9055-109X

Jingwen Zhang, PhD is an Associate Professor in the Department of Communication at the University of California, Davis. She designs and tests emerging persuasive and social media technologies in shaping public attitudes and behaviors. Her recent work focuses on developing conversational AI or chatbot in persuasion and health promotion.

Sijia Qian, (M.A., University of Utah) is a PhD candidate in the Department of Communication at University of California, Davis. Her research interests broadly center around computational social science, digital media literacy, and visual misinformation.

Correspondence to
Yining Zhou Malloch, 1 Shields Ave, Davis, CA 95616, California, USA, ymalloch@gmail.com.