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Self-Control-Centered Empowerment Model: Health Consciousness and Health Knowledge as Drivers of Empowerment-Seeking through Health Communication

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ABSTRACT

This article proposes a self-control-centered model to explain why certain people perceive health messages as credible, attend to health messages, and change their behaviors in accordance with the suggestions in those messages. Such reactions imply empowerment seeking or empowering strategies. The proposed model predicts that people with self-control are more likely to seek empowerment, such that those with stronger self-control are more likely to adopt empowering strategies. The model also identifies two driving forces that prompt health-related self-control: health consciousness and health knowledge. Moreover, it postulates that two values, conservation and self-transcendence, trigger health consciousness, which further enhances the adoption of empowering strategies, and bonding and bridging social capital both increase health knowledge, which encourages these empowering strategies even further. Study 1 uses responses from a representative sample of Taiwanese participants to test the proposed model; Study 2 confirms the prediction, among a sample of Taiwanese college students, that health consciousness and health knowledge drive self-control. After exposure to health news, people with greater health-related self-control respond with more empowering strategies.

In an environment rich in health information—rendered so by the greater variety of new media and expanded numbers of information channels—does everyone benefit? Arguably, not every user would be empowered by increased accessibility to health-related information. Rather, perhaps only those consumers who already have developed a greater sense of self-control or power benefit from it, in a sort of “the strong get stronger” effect. In addition to testing these predictions, the current manuscript seeks to fill a gap in extant literature and move beyond prior health information-related models that focus mainly on the content and characteristics of available health information. That is, this article proposes a model that prioritizes the degree to which people respond to health information, an effect that arises regardless of its content and characteristics.

Three main groups of health-related models predict the outcomes of communicating risks in general or health risks in particular to the public. In the first group, associated with preventive health behaviors (e.g., theory of planned behavior, health belief model; Ajzen, 1991; Rosenstock, 1974), models focus on risk characteristics (e.g., severity and susceptibility) and control beliefs associated with unhealthy behaviors. They do not directly address communication but still imply that a message that presents risks or strengthens control beliefs should evoke behavioral changes. A second group of models (e.g., extended parallel process model; Witte, 1992) pertains directly to health communication and suggests that appraisals of presented message components – such as threats (e.g., susceptibility and vulnerability) or efficacy (e.g., self-

efficacy and response efficacy) – determine message acceptance and behavioral changes. Their primary utility is for exploring the effects of particular appeals (e.g., fear). Finally, other models depict how people seek information about risks (e.g., risk information seeking and processing; Griffin, Dunwoody, & Neuwirth, 1999) by identifying the factors that drive such information seeking, including knowledge insufficiency or uncertainty. In turn, this group of models helps clarify when people feel motivated to seek information actively about certain risks.

Among these three groups though, what is missing is a model that can explain the degree to which people respond to health information, regardless of its content and characteristics, when they encounter it incidentally and regularly. In the modern age, in which mobile devices render vast media content instantly accessible, people are constantly bombarded with massive amounts and varieties of content, ranging from entertaining to informative, suggesting the need to understand how they respond when they are exposed to health information. In particular, considering the limited time and cognitive resources modern consumers generally have, they may have grown selective in their attention. If health information competes with other appealing or entertaining information, for example, different factors could determine whether a person attends and responds to health information that is available through mass media. A sense of self-control might be one such determinant factor, because it reflects beliefs that the person’s own behaviors determine her or his health

outcomes (Wallston, Wallston, & DeVellis, 1978), which already has been shown to be associated with health behaviors (Raja, Williams, & McGee, 1994).

The current study postulates that people who seek a strong sense of control over their own health seek empowerment and value health information, which makes them more attentive and responsive to health information. With regard to how self-control might enhance healthy behaviors, Clark and Zimmerman (2014) cite health motivation and health knowledge as two important drivers of people's self-control efforts. Health consciousness, as a motivational state, and health knowledge together might enhance self-control over health and account for empowerment-seeking behaviors. Therefore, by proposing a *self-control-centered empowerment model*, featuring *health consciousness* and *health knowledge* and their antecedents, this article seeks to explain why certain people believe in and are attentive to health information, then change their behaviors to comply with that information (Figure 1). To detail who tends to be more responsive to health messages, due to their health consciousness and health knowledge, this proposed model also identifies two antecedents of health consciousness: convention-related values and self-transcendence values. Moreover, it identifies two antecedents of health knowledge: bridging and bonding social capital.

Study 1 tests this proposed model by analyzing data from a nationwide, face-to-face survey among a representative sample of Taiwanese adults over 18 years of age, to identify their responses to health information in general. Study 2 provides a further, directed test of the prediction that health consciousness and health knowledge drive health-related self-control, among a sample of college students. It confirms that their responses to a specific news article reflect the model predictions. This coherent model therefore can explain who has greater intentions to adopt empowerment-seeking strategies and what motivates such strategies. In turn, it contributes to extant literature in three important ways. First, it identifies two motivational factors that facilitate empowerment-seeking strategies (health consciousness and

health knowledge). Second, it identifies important antecedents of these motivational factors. Third, it addresses three possible empowerment strategies, relying on health information communicated through mass media, for people who exhibit a strong motivation to control their health status.

Self-control and empowerment seeking

Self-control entails "altering one's own responses so as to bring them into line with standards for socially desirable thoughts, feelings, and behaviors" (DeWall, Baumeister, Mead, & Vohs, 2011, p. 48), such that it is regarded as "a capacity to change and adapt the self so as to produce a better, more optional fit between self and world" (Tangney, Baumeister, & Boone, 2004, p. 275). A personal sense of control is associated with beneficial health behaviors; a loss of such control relates to risky health behaviors (Rodin & Timko, 1992). Therefore, self-control, including a person's belief that he or she has control over his or her health and can maintain it by adapting behaviors, is critical for exploring health behaviors. Self-control has been used interchangeably with self-regulation (DeWall et al., 2011). Discussing the role of self-regulation for enhancing healthy behaviors, Clark and Zimmerman (2014) suggest that health motivation and health knowledge are two important drivers, though they do not test whether these two facilitators of self-control also relate to pro-health behaviors.

Self-control over health and life also should be positively associated with empowerment (Tengland, 2007). In a general sense, empowerment is "a process by which individuals gain control over their lives" (Cleary & Zimmerman, 2004, p. 542), though it spans both processes and outcomes (Perkins & Zimmerman, 1995). According to Perkins and Zimmerman (1995), empowerment processes involve engaging in actions or adopting strategies that are empowering; the outcome is that people feel empowered. The current research takes a similar perspective to argue that people who exhibit higher self-control, driven by their health motivation and knowledge, are likely to

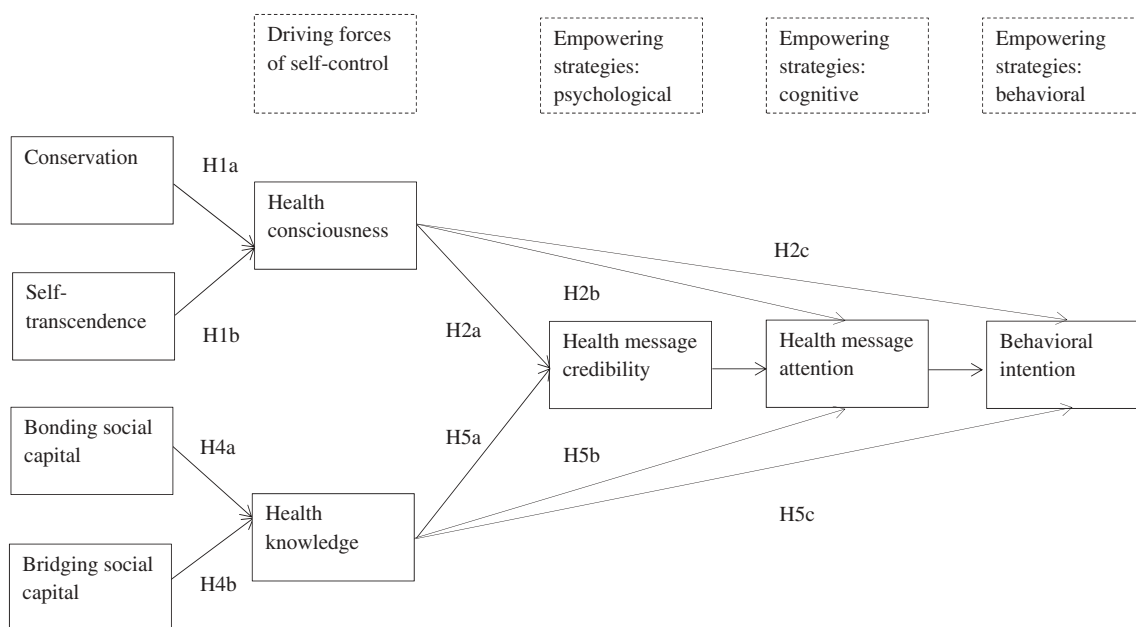


Figure 1. Proposed model.

adopt empowering strategies, such as perceiving health information as more credible (psychological strategy), paying attention to health information in media (cognitive strategy), and changing their behaviors after they receive health information (behavioral strategy) so that they can stay healthy (Figure 1).

Health consciousness: Driving forces of self-control

For this study, *health consciousness* is “the extent to which health concerns are integrated into a person’s daily activities” (Jayanti & Burns, 1998, p. 10). Early research identifies health consciousness as a behavioral orientation, such that people with greater health consciousness adopt a wellness-oriented lifestyle (Jayanti & Burns, 1998; Kraft & Goodell, 1993). Subsequent research has taken a different perspective, by identifying health consciousness as a goal-focused orientation. For example, Dutta-Bergman (2004a) suggests it is an important element of health orientation, which is associated with a motivation to be healthy, such that people with high health consciousness are more likely to express motives to engage in cognition and behaviors that help them stay healthy. Similarly, Hong’s (2011) discussion of health consciousness indicates that an important underlying construct is health motivation. Therefore, health consciousness refers to a motivational state that orients people toward wellness-driven cognition and lifestyles and is associated with health-related self-control.

Value orientations as antecedents

Conservation values

Conscientiousness reflects “individual differences in the propensity to follow socially prescribed norms for impulse control, to be task- and goal-directed, to be planful, to delay gratification, and to follow norms and rules” (Bogg & Roberts, 2004, p. 887). According to a meta-analysis of health psychology literature, conscientiousness-related traits relate positively to beneficial health-related behaviors but negatively to risky health-related behaviors (Bogg & Roberts, 2004). Bogg and Roberts (2004) reason that problem-behavior theory, as proposed by Donovan and colleagues (Donovan, Jessor, & Costa, 1991; Jessor, Chase, & Donovan, 1980), might explain conscientiousness-related traits’ strong association with health behaviors. This theory proposes that personality and perceived environment systems both determine health orientations and pro-health behaviors. The central dimension that underlies these systems is conventionality–unconventionality, such that conventional personalities and social systems encourage pro-health behaviors, whereas unconventional ones lead to risky behaviors. Building on this theory, Bogg and Roberts (2004) identify such personality traits as important elements of conscientiousness that can predict health orientations or health-related behaviors.

Nevertheless, prior studies focus on personality traits, not value systems. Value literature has identified conventionality as an important dimension of value systems; Schwartz’s (1992) value theory specifically cites *conservation* as an important dimension in people’s value systems that constitutes three values: tradition, conformity, and security. Extending Bogg and Roberts’ (2004) suggestion of a relationship between conventionality personality traits and health consciousness, the current study postulates that conservation, a convention-related value,

may help explain people’s health orientation in general or health consciousness in particular.

H1a: *Conservation* values are positively associated with health consciousness.

Self-transcendence values

In addition to conventionality, Bogg and Roberts (2004) indicate that responsibility is another aspect of conscientiousness that relates to health orientations and health-related behaviors. Dutta-Bergman (2004b) proposes that health consciousness represents an overall commitment to responsibility, in both personal and social domains, which derives from a willingness to take responsibility for the self, reflecting an orientation toward engaging in responsible behaviors. Such commitment to being responsible to the self might extend to a willingness to be responsible to the community too (Dutta-Bergman, 2004b). Furthermore, in value literature, value systems include self-transcendence (Schwartz, 1992), which comprises benevolence and universalism. People with self-transcendence values worry about preserving and enhancing the welfare of others and are motivated to be responsible both to themselves and human beings in general (Schwartz, 1992). As an extension of prior literature (Bogg & Roberts, 2004), this article therefore argues that self-transcendence, driven by a goal to be responsible, can explain people’s health orientation or health consciousness.

H1b: *Self-transcendence* values are positively associated with health consciousness.

Effects of health consciousness on empowerment seeking strategies

Psychological strategies

Hong (2011) demonstrates that after exposure to health news, people with high health consciousness perceive greater response efficacy and self-efficacy. This finding implies that health consciousness should be associated with a motivation to seek empowerment from health information, such that people with high health consciousness gain greater efficacy after being exposed to health news. If information represents an important source of empowerment among people with high health consciousness, they also should appreciate this information more and evaluate it as more credible. The enhanced perception of the credibility of a health message entails a psychological influence, because it is important for people to believe in what can empower them.

H2a: Health consciousness is positively associated with the perceived *credibility* of health information delivered through mass media.

Cognitive strategies

As noted previously, health consciousness is a motivational state that triggers wellness-focused cognitions. Dutta-Bergman (2004a) includes health consciousness as an important element of health orientation, which also consists of elements such as health

information orientation (e.g., willingness to seek health information). The same author has demonstrated that people with higher levels of health consciousness engage in more health information seeking (Dutta-Bergman, 2005), recall more health information (Dutta-Bergman, 2006), and report more learning of health information from watching televised news and talk shows (Dutta-Bergman, 2007). These findings suggest that people with higher health consciousness pay more attention to health information delivered through mass media. In a similar vein, the current study proposes that health-conscious people are more attentive to health information. Attention to health messages is a cognitive strategy, because people allocate more cognitive resources to their empowerment seeking.

H2b: Health consciousness is positively associated with *attention* to health information.

Behavioral strategies

Health consciousness is an internal characteristic that manifests in healthful lifestyles or action orientations (Jayanti & Burns, 1998). As noted, Dutta-Bergman (2004a) includes health consciousness as an important component of health orientation, which also includes the behavioral element of “healthy behaviors,” defined as the frequency with which people engage in health-oriented behaviors. In this conceptualization, health consciousness must be associated with a behavioral orientation, and prior research provides some empirical evidence for this association. For example, Jayanti and Burns (1998) indicate that health consciousness is associated with greater health care behaviors, and Iversen and Kraft (2006) find that people with high health consciousness are more likely to adopt adaptive coping strategies, which result in more intentions to engage in health-promoting behaviors such as fruit and vegetable consumption and exercise. Therefore, health consciousness should be positively associated with intentions to adopt advocated behaviors.

H2c: Health consciousness is positively associated with behavioral intention.

The mediating process through health consciousness

The preceding arguments suggest a mediating role of health consciousness, between values (conservation and self-transcendence) and three empowering strategies, each of which features different characteristics. Believing health messages are credible is *psychological*, attention to them is *cognitive*, and compliance is *behavioral*. Therefore, the causal influence should flow from psychological to cognitive and finally to behavioral strategies (see Figure 1).

H3a: *Conservation* is positively associated with empowerment-seeking strategies (perceived credibility of health information, attention to health messages, and behavioral intention) through its association with health consciousness.

H3b: *Self-transcendence* is positively associated with empowerment-seeking strategies (perceived credibility of health

information, attention to health messages, and behavioral intention) through its association with health consciousness.

Health knowledge: Driving forces of self-control

Health knowledge refers to the information that people possess about health-related issues, including behaviors, medicines, and disease-related issues. There are two possible measures of health knowledge: objective and subjective. Both are associated with pro-health behaviors. For example, Moorman and Matulich (1993) measure subjective health knowledge and report that it is positively associated with healthy lifestyles. Similarly, Jayanti and Burns (1998) measure objective health knowledge and find that it is associated with healthy lifestyles, through its influence on response efficacy and health value. The current study considers subjective health knowledge as a driving force of self-control and explores how it might encourage people’s empowerment-seeking strategies.

Social capital as antecedents

Social capital generally is a resource acquired through social networks (Putnam, 1995). Regardless of its specific definition, social capital involves three important elements: social networks, norms of reciprocity, and mutual trust (e.g., Ferlander, 2007), as illustrated in Putnam’s (1995, p. 67) definition that refers to “features of social organization such as networks, norms, and social trust that facilitate co-ordination and co-operation for mutual benefit.” Social capital also can be assessed at the individual level, which refers to support through personal networks. Researchers in turn suggest two forms of social capital, bonding and bridging (e.g., Putnam, 2001), such that the former is based on social networks that are similar, whereas the latter relies on social networks that are heterogeneous and outward looking. At the individual level, both bonding and bridging forms of social capital are associated with self-rated health (Beaudoin, 2009; Iwase et al., 2012). This study explores whether people have greater perceived health knowledge through social resources.

Bonding social capital

With respect to bonding social capital, Beaudoin (2009) reveals a positive relation with self-rated health at the individual level, and Kim, Subramanian, and Kawachi (2006) report a positive association with self-rated health at both individual and community levels. Ferlander (2007) suggests an important mechanism that might explain this positive relationship: Bonding social capital increases self-efficiency and self-control, which further enhance self-rated health. Kim, Lim, and Park (2015) confirm that bonding social capital is positively associated with health information seeking and self-efficacy. Health knowledge is also associated with self-control (Beier & Ackerman, 2003). Therefore, the relationship between bonding social capital and self-control implies the presence of health information or knowledge, and the current study predicts:

H4a: *Bonding social capital* is positively associated with subjective health knowledge.

Bridging social capital

With regard to bridging social capital, Iwase et al. (2012) note a positive correlation with self-rated health. Ferlander (2007) reasons that an important mechanism underlying this positive relationship is the ability of bridging social capital to increase access to new information and resources. Kim et al. (2015) also demonstrate that bridging social capital is positively and significantly associated with the scope of health information sources. Prior research has suggested that community participation (an indicator of bridging social capital) increases health information seeking (Dutta-Bergman, 2005) and health information orientation (Basu & Dutta, 2008), though no extant research directly tests the underlying mechanism, through knowledge gains. In other words, social resources provide more opportunities for accessing health information, such as through interpersonal discussions or posts shared on social network sites. Accordingly, this study argues that health knowledge is an important mediating variable in the relationship between bonding social capital and health empowering strategies, such that

H4b: *Bridging social capital* is positively associated with subjective health knowledge.

Effects of health knowledge on empowerment seeking strategies

Psychological strategies

Because people with self-control seek empowerment, health knowledge, as an element of self-control, should be associated with empowerment seeking. Prior research provides indirect evidence of this proposition. For example, Moorman and Matulich (1993) find that health knowledge increases the amount of health information people acquire from media (e.g., newspapers, magazines, radio programs, advertising), likely because information represents an important source of empowerment among people with greater health knowledge. In this case, people with more health knowledge should also appreciate health information to a greater degree and evaluate it as more credible.

H5a: Health knowledge is positively associated with the perceived *credibility* of health information.

Cognitive strategies

Greater health knowledge is associated with more information acquired from mass media (Moorman & Matulich, 1993), and Tian and Robinson (2009) also document that it is positively associated with incidental health information exposure in mass media, such as from newspapers, magazines, television, or the Internet. Therefore, people with greater health knowledge may be more likely to pay attention to health information, leading to their greater exposure to it.

H5b: Health knowledge is positively associated with *attention* to health information.

Behavioral strategies

People with greater health knowledge engage in pro-health behaviors, including more preventive health behaviors, as demonstrated among both the general public (Moorman & Matulich, 1993) and patients in health care facilities (Jayanti & Burns, 1998). Therefore, health knowledge should encourage intention to adopt advocated behaviors.

H5c: Health knowledge is positively associated with *intention to adopt advocated behaviors*.

The mediating process through health knowledge

These arguments in turn suggest that health knowledge has a mediating role, between bonding and bridging social capital and the three empowering strategies.

H6a: Bonding social capital is positively associated with empowerment-seeking strategies (perceived credibility of health information, attention to health messages, and behavioral intention), through its association with health knowledge.

H6b: Bridging social capital is positively associated with empowerment-seeking strategies (perceived credibility of health information, attention to health messages, and behavioral intention), through its association with health knowledge.

Overview of the studies

Study 1 tests the proposed hypotheses using responses to a survey among a representative sample of Taiwanese adults. In turn, Study 2 checks the predictions underlying the proposed model, namely, that health consciousness and health knowledge are associated with health-related self-control, among a sample of Taiwanese college students. In terms of the types of health information, Study 1 explores respondents' responses to general health information, using 5-point scales, whereas Study 2 examines their responses to a particular health news story, rated on 7-point scales. The online supplementary materials detail the specific health status and health-information-seeking behaviors of Taiwanese people, relative to those of U.S. consumers.

Study 1

Data

This study used secondary data from the Taiwan Communication Survey (2016), a long-term project supported by the Ministry and Science Technology in Taiwan. It surveys a representative sample of people 18 years of age or older (N = 2,098) in Taiwan annually and explores media use behaviors among the general public. The themes of the 2016 survey centered on health, risk, and disaster communication.

Measurements

Control variables

Demographics, including gender, age, and education, were included in the analyses. *Gender* was coded 1 for men and 0 for women. *Education* was categorized into six levels: 1 for none; 2 for self-study and elementary school; 3 for junior high and vocational junior high; 4 for senior high school and vocational senior high school; 5 for cadet school, five-year junior college, two-year junior college, three-year junior college, military junior college, or college; and 6 for graduate school.

Because health status relates to self-control, it also was included in the analyses (Seeman & Seeman, 1983). The three indicators span one subjective indicator, satisfaction with health, and two objective indicators, clinic or hospital visits and body mass index (BMI). The measure for *satisfaction with health* relies on one item: "Overall, are you satisfied or dissatisfied with your current health conditions?" *Clinic/hospital visits* also was tapped with a single item: "How many times have you visited a doctor in the past year?" with five choices: (1) 0, (2) 1–5 times, (3) 6–10 times, (4) 11–15 times, and (5) 16 times or more. The *BMI* was calculated using the weight and height provided by participants. The average BMI for the sample is 23.61.

Values

The measure of Schwartz's (1992) 10 values used the World Value Survey items, with one item for each value. Using an adapted version, participants read a list of descriptions that exemplified each designated value and indicated, for each description, whether that person is (1) not like me, (2) a little like me, (3) somewhat like me, or (4) very much like me. For *conservation* values, the survey measured three dimensions, each with a single item: security ("Living in secure surroundings is important to this person; to avoid anything that might be dangerous"), conformity ("It is important to this person to always behave properly; to avoid doing anything people would say is wrong"), and tradition ("Tradition is important to this person; to follow the customs handed down by one's religion or family"). Responses to the three items were summed and averaged to represent conservation values. *Self-transcendence* values constitute two dimensions, benevolence ("It is important for this person to help people nearby; to care for their well-being") and universalism ("Looking after the environment is important to this person; to care for nature and save life resources"). Responses to these two single-item measures similarly were summed and averaged to represent self-transcendence values.

Social capital

The measure of *bonding social capital* included three items, adapted from Williams (2006): "There are some people I trust to help solve my problems," "There are some people that I feel comfortable talking to about intimate personal problems," and "When I feel lonely, there are several people I can talk to" (Cronbach's alpha = .80). Then three other items tapped *bridging social capital*, also adapted from Williams (2006): "Interacting with people makes me want to try new things," "Interacting with

people makes me interested in what people unlike me are thinking," and "Talking with people makes me curious about other places in the world" (Cronbach's alpha = .86).

Health consciousness

The respondents responded to two items from Dutta-Bergman (2004a), "Living life in the best possible health is very important to me" and "I do everything I can to stay healthy" (Cronbach's alpha = .87), to indicate their health consciousness.

Health knowledge (subjective)

Respondents answered a single question to tap their subjective health knowledge: "How well do you think you understand health-related topics?" on a scale from (1) not at all, (2) slightly, and (3) moderately, to (4) mostly, along with (99) I don't know and (91) no information. The responses by those who selected (99) and (91) were replaced by mean values.

Psychological empowering strategies: Believing messages are credible

The participants were asked, "Do you believe health-related information from XX?" where [XX] was replaced by (1) television (e.g., news, talk shows), (2) newspapers (hard copies only), (3) radio, (4) Internet, (5) friends and relatives (face-to-face or online), (6) medical staff at medical centers or pharmacies, and (7) government health-related units and medical centers. Responses to the seven items were summed and averaged (Cronbach's alpha = .78).

Cognitive empowering strategies: Paying attention to health messages

Participants indicated the degree to which they paid attention to health-related information from media, such as television, newspapers, radio, and the Internet. This scale ranged from 1 (no attention at all), to 2 (some attention), 3 (moderate attention), and 4 (a lot of attention).

Behavioral empowering strategies: Adopting advocated behaviors

Finally, for behavioral intention, respondents rated the item: "How often do you adjust your behaviors or habits according to health-related information or suggestions from television, newspapers, radio, and the Internet?" The scale values were 1 (never), 2 (seldom), 3 (sometimes), and 4 (often).

Results and analyses

Hayes's (2013) bootstrapping process model (model 6 with 5,000 bootstrapping resamples) provides the means to test the hypotheses, with demographics and three indicators of health status serving as control variables. As Figures 2 and 3 show, conservation and self-transcendence are significant predictors of health consciousness, in support of both H1a and H1b. Women, $\beta = .11$, $t(2084) = 5.00$, $p < .01$, older people, $\beta = .32$, $t(2084) = 12.46$, $p < .01$, and people with more education, $\beta = .15$, $t(2084) = 5.67$, $p < .01$, exhibit greater levels of health consciousness. Among the indicators of health status, health satisfaction is a positive predictor of health consciousness, $\beta = .05$, $t(2084) = 2.38$, $p = .02$, but clinic/hospital visits and

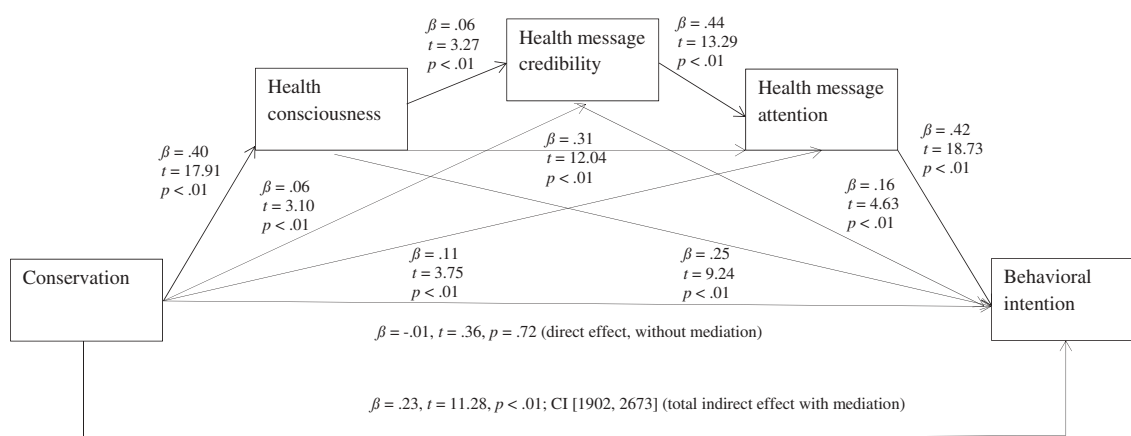


Figure 2. Results for H3a in study 1.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health consciousness as a single mediator: [.0777, .1305]. b. Health consciousness and health message credibility as two serial mediators: [.0014, .0071]. c. Health consciousness, health message credibility and health message attention as three serial mediators: [.0017, .0071].

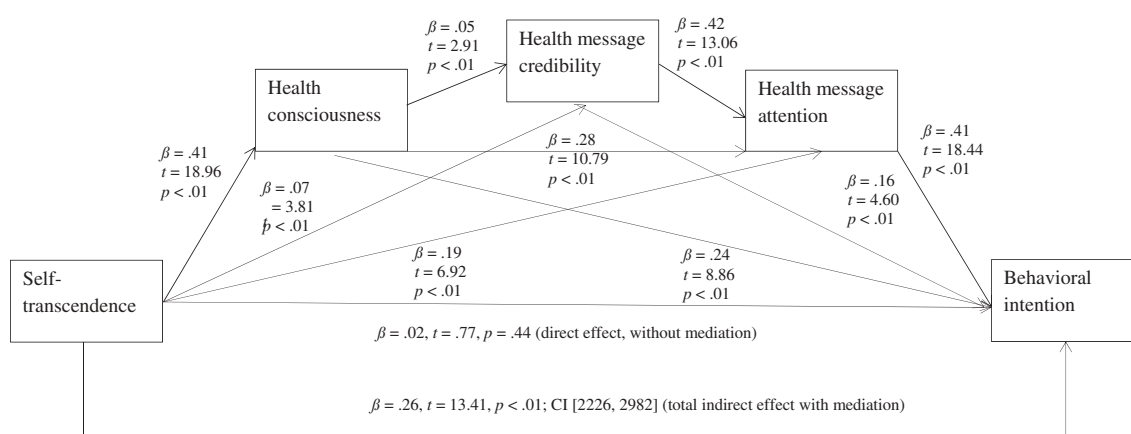


Figure 3. Results for H3b in study 1.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health consciousness as a single mediator: [.0745, .1276]. b. Health consciousness and health message credibility as two serial mediators: [.0011, .0068]. c. Health consciousness, health message credibility and health message attention as three serial mediators: [.0013, .0066].

BMI are not. Moreover, health consciousness is a significant predictor of empowering strategies. As predicted by H2a, H2b, and H2c, health consciousness offers a significant predictor of health message credibility, health message attention, and behavioral intention, respectively (see Figures 2 and 3).

The test of the mediation process model proposed in H3a confirms that the association between *conservation* and behavioral intention is mediated by health consciousness, health message credibility, and health message attention (95% confidence interval [CI]: [.0017, .0071]; see Figure 2). The test of H3b confirms that the association between *self-transcendence* and behavioral intention is mediated by health consciousness, message credibility, and message attention too (95% CI: [.0013, .0066]; see Figure 3).

As Figures 4 and 5 show, bonding and bridging social capital are significant predictors of health knowledge, in support of both H4a and H4b. Women, $\beta = .06$, $t(2084) = 2.69$, $p < .01$, older people, $\beta = .27$, $t(2084) = 10.30$, $p < .01$, and people with more education, $\beta = .28$, $t(2084) = 10.75$, $p < .01$, also indicate greater levels of health knowledge. Among the indicators of health status, health satisfaction, $\beta = .09$, $t(2084) = 4.08$,

$p < .01$, and BMI, $\beta = .06$, $t(2084) = 2.51$, $p = .01$, are positive predictors of health knowledge, but clinic/hospital visits do not significantly predict it. Moreover, health knowledge is a significant predictor of empowering strategies. As predicted by H5a, H5b, and H5c, health knowledge offers a significant predictor of health message credibility, health message attention, and behavioral intention (see Figures 4 and 5).

The test of the mediation process model predicted in H6a confirms a significant serial mediation effect of *bonding social capital* on behavioral intention through health knowledge, health message credibility, and health message attention (95% CI: [.0015, .0039]; see Figure 4). As predicted by H6b, the findings also confirm the significant serial mediation effect of *bridging social capital* on behavioral intention through these three mediators (95% CI: [.0008, .0026]; see Figure 5).

Discussion

These results provide evidence in support of the proposed model, in which health consciousness and health

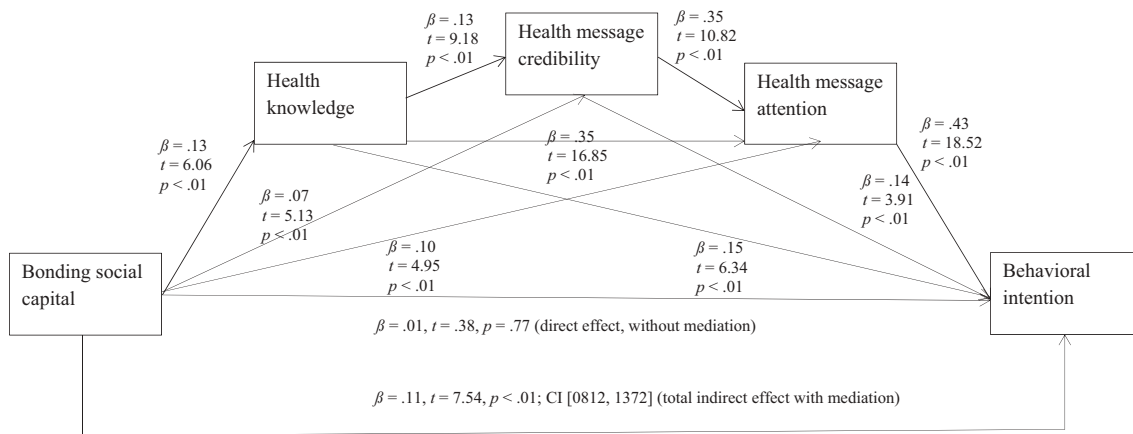


Figure 4. Results for H6a in study 1.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health knowledge as a single mediator: [.0112, .0308]. b. Health knowledge and health message credibility as two serial mediators: [.0010, .0042]. c. Health knowledge, health message credibility and health message attention as three serial mediators: [.0015, .0039].

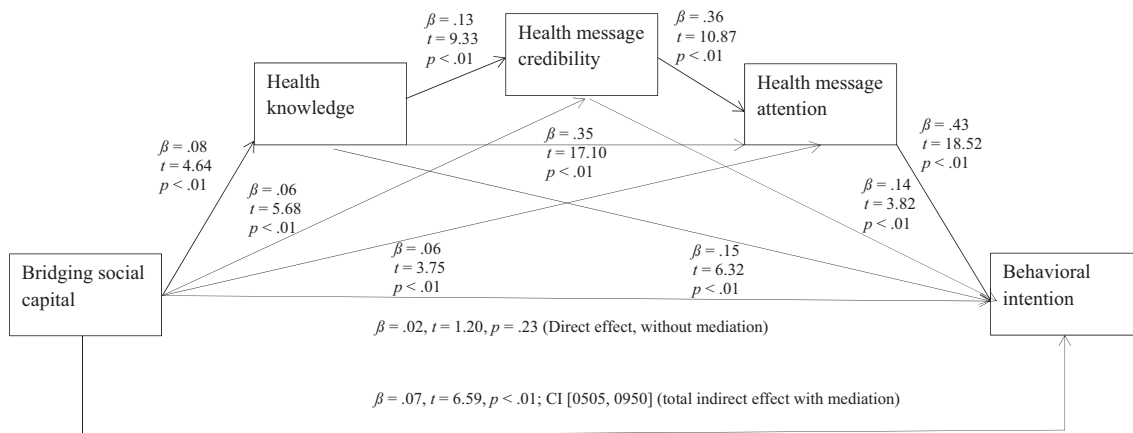


Figure 5. Results for H6b in study 1.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health knowledge as a single mediator: [.0062, .0205]. b. Health knowledge and health message credibility as two serial mediators: [.0006, .0027]. c. Health knowledge, health message credibility and health message attention as three serial mediators: [.0008, .0026].

knowledge, two drivers of self-control orientation, encourage empowering strategies. Specifically, people with greater health consciousness and health knowledge perceive health messages as more credible, are more attentive to health information, and change their behaviors in accordance with suggestions provided in health messages to a greater degree. The findings also confirm that two values, conservation and self-transcendence, are associated with health consciousness and that perceived bonding and bridging social capital are associated with health knowledge.

However, the link of both health consciousness and health knowledge with self-control is merely assumed, not tested, in Study 1. Therefore, Study 2 tests this link. Furthermore, whereas Study 1 investigates people's perceptions or orientations toward general health information, Study 2 tests their responses to specific, health-related news stories.

Study 2

Design, participants, stimuli, and procedures

This study involves 124 participants (50% male), recruited from a major university in Taiwan, who read a news article about a health issue that is relevant to college students. An initial pretest (N = 30) identified three main health issues that concern college students: staying up late, not exercising, and eating midnight meals (after dinner but before going to bed). Then Pretest 2 (N = 40) asked participants to identify which of these three health issues they had tried to address but failed. Eating midnight meals (70%) surpassed staying up (65%) and not exercising (65%). The average bedtime for college students in Taiwan is 1:25 a.m. (Lee, Chang, Tseng, & Chung, 2017), so such late-night meals are common. Therefore, the article for the main study cites the negative impacts of eating midnight meals, such as excessive calories and detrimental impact on sleep quality.

Participants responded to a recruitment ad and signed up to participate in designated time slots. When they arrived at the lab, they were told that the study consisted of two parts, one designed by a psychology professor who is interested in knowing about their lifestyles and another created by a communication professor who is interested in understanding how people comprehend news articles. In the presumed first study, they rated their sense of self-control over health, health consciousness, subjective health knowledge, and frequency with which they engaged in various behaviors (e.g., eating midnight meals, drinking, smoking, exercising). Then they proceeded to the alleged second study, in which they read an online news article and completed some filler scales (e.g., how easily they understood it). Finally, they rated their intentions to adopt the advocated behaviors and rated the article's credibility and the degree to which they paid attention to its messages.

Measurements

Covariate: Self-relevancy

Participants indicated how frequently they eat midnight meals, from never (1) to always (5), as an indicator of self-relevancy.

Health consciousness

Participants rated the full health consciousness scale from Dutta-Bergman (2004a), which includes five items (Cronbach's $\alpha = .71$).

Health knowledge (subjective)

Participants rated Lambert-Pandraud, Laurent, and Lapersonne (2005) subjective knowledge scales, with three items. The wording was altered to refer to health issues, such as "I know a lot about health issues," "I could give good advice on health issues if I was asked to," and "I am informed about news of health issues" (Cronbach's $\alpha = .91$).

Sense of health-related self-control

Participants rated Wallston et al.'s (1978) health internal locus control scale, with five items (e.g., "I am in control of my health," "If I take the right actions, I can stay healthy") (Cronbach's $\alpha = .88$).

Psychological empowering strategies: Believing messages are credible

Participants rated the article using Appelman and Sundar (2016) three-item scale: "The article is believable/accurate/authentic" (Cronbach's $\alpha = .87$).

Cognitive empowering strategies: Paying attention to health messages

Participants completed Laczniaak and Muehling (1993) five-item scale (e.g., "How much attention did you pay to the written message in the article?" "How involved were you with the written message in the article?") (Cronbach's $\alpha = .88$).

Behavioral empowering strategies: adopting advocated behaviors

Participants rated items from Chang (2007): "I probably/likely/possibly will reduce midnight meals" (Cronbach's $\alpha = .91$).

Results and analyses

Using PROCESS model 6 (5,000 bootstrapping resamples; Hayes, 2013), the findings suggest that health consciousness is a significant predictor of self-control, and self-control significantly predicts message credibility, message attention, and behavior intention. The test of the mediation process model confirms that the association between health consciousness and behavioral intention is mediated by self-control, health message evaluation credibility, and health message attention (95% CI: [.0103, .0905]; see Figure 6).

Findings also indicate that health knowledge is a significant predictor of self-control, and self-control significantly predicts message credibility, message attention, and behavior intention. In PROCESS model 6, the test of the mediation process model confirms that the associations of health knowledge with behavioral intention are mediated by self-control, health message credibility, and health message attention (95% CI: [.0111, .0728]; see Figure 7).

Discussion

These results provide evidence in support of the prediction that health consciousness and health knowledge drive health-related self-control. Moreover, the findings confirm that people with greater self-control perceive a news story as more credible, attend more to its messages, and change their behaviors in accordance with suggestions it provides to greater degrees.

General discussion

Findings and contributions

This study develops a self-control-centered empowerment model to explore how variations in people's health-related self-control influence their empowerment seeking strategies. Furthermore, drawing on Clark and Zimmerman (2014), Study 2 demonstrates that health consciousness and health knowledge constitute two driving forces for health-related self-control. Both studies show that people with greater health self-control are more responsive to general health information (Study 1) or particular health news stories (Study 2). Although extant models can reveal how people choose their prevention behaviors by assessing risks (e.g., health belief model) and message characteristics (e.g., extended parallel process model) or what drives people to seek information (e.g., risk information seeking and processing model), the proposed model extends this literature stream by describing which people are most responsive to daily, common exposure to health information and why. Notably, this model also offers utility for explaining people's perceptions of general health information and particular health messages, two common contexts that interest researchers.

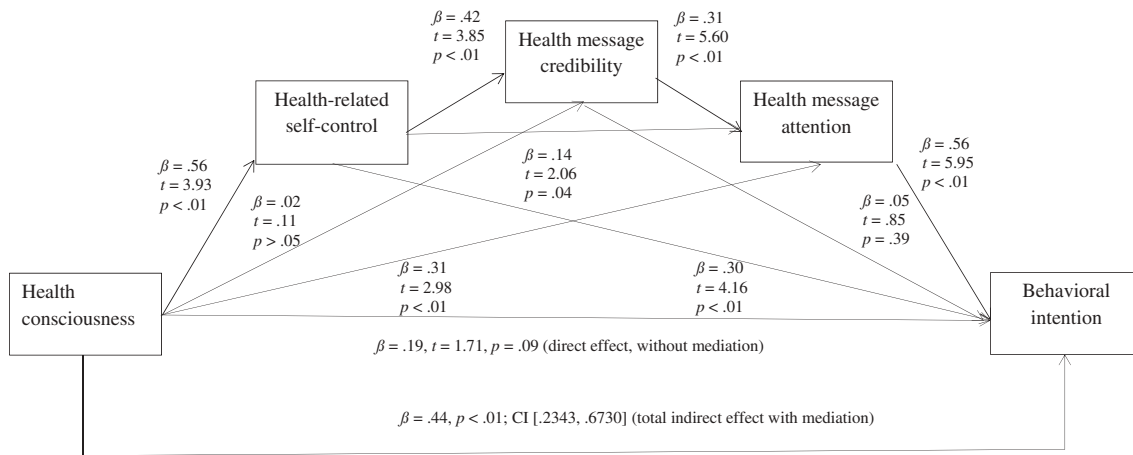


Figure 6. Test of health consciousness as a driver of self-control, which leads to empowering strategies, in study 2.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health-related self-control as a single mediator: [.0554, .3128]. b. Health-related self-control and message credibility as two serial mediators: [−.0163, .0449]. c. Health-related self-control, message credibility and message attention as three serial mediators: [.0103, .0905].

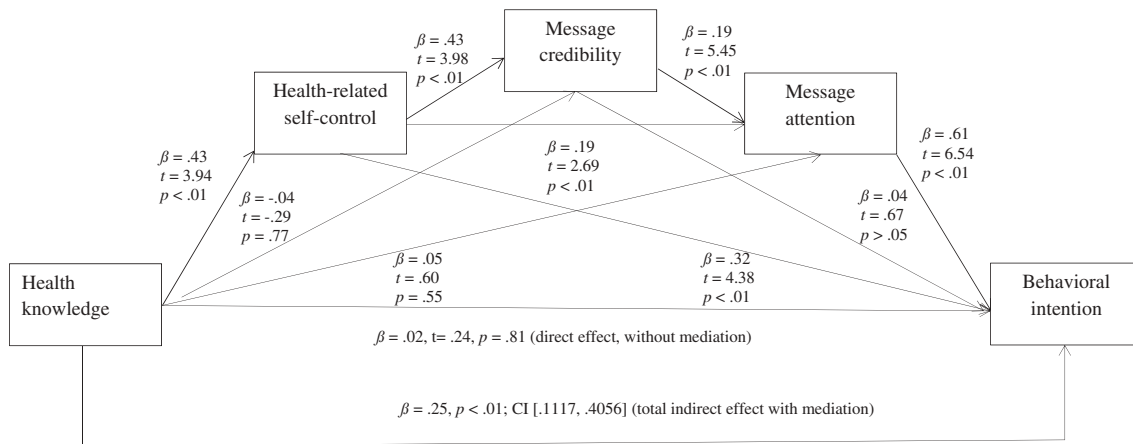


Figure 7. Test of health knowledge as a driver of self-control, which leads to empowering strategies, in study 2.

Notes: The bootstrapped 95% bias-corrected confidence intervals (CI), using 5,000 bootstrap samples, were as follows: a. Health-related self-control as a single mediator: [.0553, .2446]. b. Health-related self-control and message credibility as two serial mediators: [−.0160, .0353]. c. Health-related self-control and message credibility and message attention as three serial mediators: [.0111, .0728].

The findings suggest that people with certain value orientations tend to exhibit greater health consciousness. Study 1 identifies conservation and self-transcendence values as two important predictors of health consciousness. Among the four value dimensions, as expected, only conservation (pertaining to convention) and self-transcendence (relating to responsibility) can account for variance in health consciousness. This study accordingly extends Bogg and Roberts (2004) findings, which suggest that conscientiousness-related personality traits are associated with more pro-health behaviors. First, it shows that convention- and responsibility-related values are associated with health consciousness. Second, the findings demonstrate that health consciousness has a mediating role in this process. In other words, conservation and self-transcendence values may be associated with health-related behaviors because they trigger greater health consciousness.

In addition to personal differences in value orientation, social networks are important, and the current findings confirm that bonding and bridging social capital offer significant predictors of

health knowledge. This finding extends extant literature that indicates that bonding and bridging social capital both are associated with self-rated health but that has not demonstrated the mechanism that underlies these associations (Beaudoin, 2009; Kim et al., 2006). As Ferlander (2007) has speculated, self-control has a role in this process. The findings from both studies reported herein suggest that people with greater bonding and bridging social capital believe they have more health knowledge, which gives them a sense of control over their health.

Among the three indicators of health status (health satisfaction, clinic/hospital visits, and BMI), none is positively associated with empowering strategies when the analysis also includes health consciousness or health knowledge. This finding confirms another element of the proposed model: It is the psychological state of a need for self-control that encourages empowerment seeking, not deteriorated health status. Such findings are consistent with extant literature, which suggests the importance of self-control for maintaining health behaviors (Stepstone & Wardle, 2001).

The findings reported herein also indicate that women, older people, and those with more education exhibit greater health consciousness and health knowledge. Moreover, these same groups tend to pay more attention to health-related messages and change their behaviors accordingly. Yet these findings conflict with some research conducted in the United States that shows that gender and age do not affect health consciousness (Gould, 1990).

Further research directions

This study includes three possible empowerment-seeking strategies that possess different characteristics. Enhanced credibility perceptions constitute a psychological strategy, attention to health messages is a cognitive strategy, and compliance is a behavioral strategy. Various other strategies could empower people too, such as active health information seeking (Griffin et al., 1999) or information sharing, as is common on social network sites (Kite, Foley, Grunseit, & Freeman, 2016). Further research should explore such empowering strategies too.

Moreover, all three strategies are likely to empower people who seek control of their health. If they sense their own power, people may feel empowered by adopting the strategies. Continued research thus might examine whether those who seek self-control actually feel more empowered after adopting these strategies. In another interesting note, respondents with greater health satisfaction tended to exhibit greater health consciousness and health knowledge. If people who have a need for self-control are more health conscious and knowledgeable, which encourages them to engage in empowering strategies, it might bring about greater health satisfaction. Further research therefore could explore health satisfaction as an outcome of empowerment seeking strategies, rather than as a covariate. Health satisfaction is a key component of people's quality of life (Michalos & Zumbo, 2002), and it deserves more research attention.

Implications for practitioners

These findings raise some concerns for practitioners, because they indicate that people with poor health status are not more responsive to health information. Furthermore, men are less responsive to health information than women. Yet these findings also suggest important opportunities for practitioners. For example, campaigns that help develop people's health consciousness or health knowledge can boost their sense of self-control and make them more responsive to health messages. Such campaigns should target men and people with poorer health status. As for how to increase the effectiveness of a campaign that aims at increasing self-control, our findings suggest some possibilities. First, with regard to increasing health consciousness, a trigger of self-control, a campaign can first prime people's conservation and self-transcendence values, because priming such corresponding values has the potential to increase the campaign's effectiveness. Second, with regard to improving perceived health knowledge, which is another trigger of self-control, a campaign may involve

arranging community activities because they are positively associated with social capital and can effectively expand sources of health information and increase perceived health knowledge. Nevertheless, practitioners should remain conscious of the potential ethical issues involved in promoting beliefs in self-control, especially for people whose efficacy for overcoming their health problems is limited (e.g., those with genetic conditions).

Limitations

The cross-sectional data cannot disentangle cause-and-effect relationships. The documented relationships might be triggered by other variables not controlled for in the analyses. Moreover, some of the constructs in this nationwide, face-to-face survey rely on single-item measures, which helpfully reduces the length of the survey but also could reduce validity (McIver & Carmines, 1981). Therefore, the findings reported herein should be interpreted with caution and in recognition of these limitations.

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