APPLYING THE SITUATIONAL JUDGMENT TEST METHOD TO ASSESS INDIVIDUAL

DIFFERENCES IN HEALTH COMPETENCE

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ABSTRACT

People regularly make decisions about their health, yet they clearly differ in their ability to successfully make healthy decisions. We sought to understand this important individual difference by developing a scenario-based measure of health competence (HC) modeled from the Situation Judgment Test (SJT) method. People were required to judge certain responses to health-related scenarios in terms of how healthy the response was and the likelihood that they would enact the response. In study 1, we showed that those with high HC scores tended to participate in less risky health behaviors and more protective health behaviors. In study 2, we used a daily diary methodology to show that HC scores were predictive of daily substance use, healthy eating, impulsivity, and coping. These findings suggest that this HC assessment will contribute to our knowledge of how people make health decisions and how those decisions affect their health.

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INTRODUCTION

Health researchers have long sought to understand why people struggle to preserve, maintain, and improve their health. In modern days, a majority of health problems stem from behavioral issues such as smoking, poor diet, physical inactivity, and alcohol consumption (Mokdad, Marks, Stroup, & Gerberding, 2004), suggesting that altering unhealthy behaviors and maintaining healthy ones should contribute to better overall health (McKinlay, 1993). Unfortunately, even if people have the ability and motivation to improve or sustain their health behaviors (Schwarzer, 2001), they still face a myriad of health-related challenges in everyday life. For instance, cooking healthy meals often has an associated time cost (Eikenberry & Smith, 2004), unsupportive friends and partners can derail a weight loss plan (Kalodner & DeLucia, 1990), and preventative checkups can cost money (Ogedegbe et al., 2005).

The way a person responds to a single health challenge may not necessarily have a large impact on his or her overall health. However, impediments to healthy living are fairly ubiquitous. If people were to consistently resolve their health-related challenges in unhealthy manners, the cumulative effects of their behaviors would be likely to produce negative health outcomes (Colditz, Manson, & Hankinson, 1997; Kvaavik, Batty, Ursin, Huxley, & Gale, 2010). Identifying the people who tend towards ineffective and unhealthy problem-solving solutions would therefore lend insight as to why some people are less healthy than others (Elliot & Marmarosh, 1994), a phenomenon that we term "health competence".

Health Competence

In order to be a competent problem solver, one must be able to recognize and evaluate problems, generate plans and solutions, and carry out the actions required by those plans (Heppner & Krauskopf, 1987). When applied to a health context, it is clear that people vary at

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each of these steps. Research has shown that some people are not knowledgeable about important health information such as the consequences of poor sleep (Brown, Buboltz, & Soper, 2006), the importance of healthy eating (Evans, Gilpin, Farkas, Shenassa, & Pierce, 1995), and the value of regular exercise (Dunlap & Barry, 1999). Others have difficulty with developing alternative solutions to perceived health problems (Schwarzer, 2008) and there is a robust literature showing that people's knowledge and intentions do not always predict their behaviors (see Webb & Sheeran, 2006 for a meta-analytic review).

This variance in health related problem-solving ability is reflected in a person's health competence. People who are high in health competence should be able to recognize health challenges, know when they need to alter their current behavior, and sufficiently avoid threats to their health (Heppener & Baker, 1997). In essence, health competent people should be able effectively resolve challenges to their health. Being able to assess people's level of health competence seems as if it would be a useful tool for making sense of individual differences in health outcomes. However, there are currently no assessments that are able to appropriately model this problem-solving approach to health.

The difficulty in measuring health competence is that it is inherently more complex than simply knowing the answer to a black and white health question (Ownby, Acevedo, Walldrop, Jacobs, & Caballero, 2014; Wagner & Sternberg, 1985). Unlike more explicit forms of health knowledge, there are often multiple solutions to health challenges that all vary in terms of their "correctness" (Wagner & Sternberg, 1985). Furthermore, effectively handling health challenges often requires competencies outside the health domain, as is the case when one must balance health needs with duties, social relationships, and desires (Kalodner & DeLucia, 1990; Veenhoven, 2003). Effective solutions for the broad array of health challenges people face are

far too variable and context dependent for people to learn through formal education. Rather, their knowledge represents a much more informal tacit-based know-how (Wagner & Sternberg, 1985) that is difficult to capture using more traditional assessments.

A second difficulty to assessing health competence is the issue of the level of specificity at which the construct should be measured. The problems that arise to challenge health are often very specific in nature (Pajares, 1997), and are often subtle and/or irregularly occurring. If people are asked to make broad, global assessments of their health competence, it is debatable how accurately they will be able to do so (Brackett & Mayer, 2003; Paulhus, Lysy, & Yik, 1998; Tangney, et al. 1996). A person could easily misperceive their health competence as being high because they simply do not recall the specific incidents in which they failed to successfully manage their health (Podsakoff & Organ, 1986). In order to increase the accuracy and reliability of a measure, one would need to increase the specificity and objectivity of the items on the scale (Christensen, Sullaway & King, 1983). However, there are others who argue that scales that are highly specific to particular health issues (e.g. the chronic pain self-efficacy scale: Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995) are unlikely to meaningfully predict any health behaviors outside of the ones they assess (Schwarzer, 1993).

Fully addressing these difficulties poses quite a challenge. There are several scales that assess problem-solving or the ability to manage health, but tend to either focus on more formal or explicit forms of knowledge (e.g. Tower of Hanoi: Simon, 1975; Fostering Literacy for Good Health Today (FLIGHT) Scale: Ownby et al., 2013) or are based on global self-report (e.g. the Perceived Health Competence Scale: Smith, Wallston, & Smith, 1995; the Problem Solving Inventory: Heppner & Petersen, 1982). An ideal assessment would recognize the multiplicity and ambiguity of problem-solving solutions, and be able to ask about specific health challenges while

still capturing a generalizable problem-solving ability. We believe that an ability-based test that uses scenarios to model real-world issues and challenges would be able to meet these requirements. For an example of an ability-based test of this nature, we now turn to the job performance literature.

Situational Judgment Tests

When employers evaluate potential new employees, they will often administer tests called situational judgment tests (SJTs). Typically, SJTs present applicants with work-related scenarios and a variety of possible responses. For example, an applicant might be asked to read a scenario in which a person is worried about not being able to meet a deadline. The response options would then reflect a variety of ways the applicant could handle the situation, such as delegating tasks (e.g. ask a coworker for help), avoiding the problem (e.g. quit your job), and working harder (e.g. work an extra 4 hours a day). The applicant would rate each possible way of responding for either the effectiveness of the response (as a measure of knowledge) or for how likely he or she would be to respond in that manner (as a measure of behavioral tendency) (McDaniel, Hartman, Whetzel & Grubb, 2007; Whetzel & McDaniel, 2009). Each scenario typically includes responses options that range from very good to very poor ways of handling the situation (Weekley, Ployhart, & Hotlz, 2006). If people consistently respond positively to the poorer responses, this indicates that they have a low ability to do the job.

SJTs are excellent predictors of job performance (Chan & Schmitt, 2002; McDaniel, Morgeson, Finnegan, Champion, & Braverman, 2001), predicting job success better than measures of general cognitive ability and Big Five personality traits (Lievens, Peeters, & Schollaert, 2008). Furthermore, SJTs have been shown to have long-term predictive power, predicting job performance even up to nine years following the initial assessment (Lievens &

Sackett, 2012). These tests have been popular both historically and currently (Whetzel & McDaniel, 2009), and have been shown to predict job performance for a variety of positions including supervisors (Bruce & Learner, 1958), soldiers (Northrop, 1989), salespeople (Phillips, 1992), factory foremen (Bruce, 1953), and insurance agents (Dalessio, 1994).

There are several theoretical reasons that explain why SJTs are such good predictors of job performance. The first is that the hypothetical situations presented in SJTs function as low-fidelity simulations of the actual job environment (Motowidlo, Dunnette, & Carter, 1990). The scenarios become stand-ins for actual workplace problems and conflicts, and the response options represent real behaviors that an applicant might do to resolve certain issues. Following from the behavioral consistency model (Wernimont & Campbell, 1968), people's future behavior should be highly similar to their current behavior. Thus, a person who endorses a certain behavior in the context of a SJT should perform that behavior when they encounter a similar scenario in the workplace (Motowidlo, et al., 1990). Similar to this line of thinking, SJTs can also be thought to measure intentions to do a behavior (Brooks & Highhouse, 2006) which predicts future behavior (Fishbein & Ajzen, 2010). In either case, SJTs are theorized to do a good job of predicting future job performance because they provide a future glimpse at whether employees will choose effective or ineffective methods workplace challenges.

The second reason is that SJTs indirectly measure key personality traits through Implict Trait Policies (ITPs) (Motowidlo, Hooper, & Jackson, 2006). The concept of ITPs presumes that people implicitly consider the level of each personality trait present in a response in their judgment of the response's effectiveness. If the level of the personality trait in a response is similar to the respondent's own personality, the person will be more likely to judge that response favorably. For instance, an agreeable person should be more likely to endorse a response option

that could be considered agreeable (e.g. help a struggling coworker finish a project) than they would a disagreeable response (e.g. tell everyone that the coworker is incompetent). Knowing that SJTs measure ITPs allows researchers to write SJT scenarios and response options that target certain personality traits of interest, which then allows the researchers to indirectly assess that personality trait.

The third reason why SJTS work so well is that the scenario-based format allows SJTs to be multidimensional, assessing a variety of constructs related to job performance including cognitive ability, personality, interpersonal skills, and emotional intelligence (Barrick & Mount, 1991; Cote & Miners, 2006; McDaniel & Whetzel, 2005). Naturally, SJTs tend to be modestly correlated with these related constructs (Krishnakumar, Hopkins, Szmerekovsky, & Robinson, 2015; McDaniel et al., 2007). However, they are able to outpredict single construct measures (Lievens et al., 2008). This is for two reasons. First, the effective response in a situation often requires a combination of attributes. For instance, in an argument with a supervisor, one would need the cognitive ability to understand the situation, the interpersonal skills to properly engage with the supervisor, and the appropriate combination of personality traits to handle the situation. A single assessment of say, cognitive ability, would predict that a high scorer would do well in this situation, but the SJT method shows that a person high in cognitive ability may still endorse ineffective options due to poor interpersonal skills or high levels of undesirable personality traits. Second, what is effective can vary from situation to situation (Mischel, 1984; Stemler & Sternberg, 2006). For example, in many cases, an agreeable response would be most effective (Ilies, Scott, & Judge, 2006), but there are some cases where it would not (Hegelson & Fritz, 1988). So while expressing high or low levels of certain personality traits may typically be effective, the most successful people will be able to recognize the times in which it would not be,

and alter their behavior accordingly. SJTs are able to reward this adaptive flexibility where other single construct measures may not.

With all this in mind, SJTs should provide an excellent model for testing health competence. The two main difficulties in creating an assessment of health competence were acknowledging the presence of different potential solutions to health challenges and finding an appropriate balance between specificity and generalizability. The SJT method recognizes that there are multiple possible responses for a given situation, and allows for the emergence of individual differences in the ratings of those responses. Additionally, SJTs contain scenarios that model a variety of situations, yet the score is aggregated across situations (McDaniel et al., 2001; Motowidlo et al, 2006). Essentially, a person's total score would reflect their effectiveness at responding to a gamut of problems that could potentially arise, rather than their effectiveness at handling, for example, an angry customer or an unmanageable deadline. This is because to be successful overall, a person would need to be successful in each of these areas. Instead of asking people to cognitively reflect on their general sense of their ability to do a job, SJTs ask people how they would respond in specific situations, which increases the accuracy of their responses (Christensen et al., 1983; Motowidlo et al., 1990). However, because SJTs are scored by averaging across all situations, they are able to use these highly specific scenarios to predict general job performance.

Importantly, although SJTs are most commonly used to assess job performance, the SJT method is in no way confined to organizations. Rather, the method is flexible, allowing for the adaptation of almost any variable of interest into an SJT (Motowidlo, Hanson, & Crafts, 1997). SJTs have been developed to assess broad range of constructs including leadership (Legree, 1995), perseverance (Oswald, Schmitt, Kim, Ramsay, & Gillespie, 2004), and emotional

intelligence (Krishnakumar et al., 2015). Because the SJT method is adaptable to realms outside of job performance, we believe that a health-based SJT would be a suitable tool for assessing health competence. In accordance with ITPs, people who are high in health competence should endorse health competent responses as being more effective, and following from behavioral consistency, people who endorse health competent responses should be more likely to do these behaviors when confronted with health challenges in everyday life.

<div style="text-align: center;">Moderators and Mediators of Health Competence</div>

Stress

The presence of chronic stress has been consistently shown to have a negative influence on people's health and well-being (Keefer, Parker, & Sakofske, 2009; Mokdad et al., 2004; Sapolsky, 2004). In addition, stress has been linked to an increase in unhealthy behaviors (Steptoe, Wardle, Pollard, Canaan, & Davis, 1996) and shown to reduce performance in both cognitive (Cowen, 1952) and personal (Heppner & Krauskopf, 1987) problem-solving tasks. Thus, stress should interact with health competence in two ways. To begin, despite the presence of stress in everyday life, many are able to manage their stress using a variety of strategies. These strategies include reappraisal of the stressor (Lazarus & Folkman, 1984), stress-reducing interventions (Grossman, Niemann, Schmidt, & Walach, 2004), and seeking social support (Cohen & Wills, 1985). Those who are low in health competence may not be as successful in implementing these strategies to manage their stress, which would leave them exposed to the associated negative health outcomes (Keefer et al., 2009; Mokdad et al., 2004; Sapolsky, 2004). Second, a stress-related decrease the ability to effectively solve problems may disproportionately affect those low in health competence (as they are already somewhat lacking in this skill). So,

although stress should negatively impact health, this should be especially so for those low in health competence as they are already ill-equipped to handle their health-related problems.

Coping

When people are presented with a stressor, they can choose to cope with the stress in fundamentally different ways (Lazarus & Folkman, 1984; Roth & Cohen, 1986). While there are many ways to cope with stress (Skinner, Edge, Altman, & Sherwood, 2003), coping can be broadly conceptualized in terms of avoidance and approach oriented coping – either avoiding the stress or actively doing something to confront it (Roth & Cohen, 1986). In the context of health, avoidance coping has been shown to be maladaptive (Penley, Tomaka, & Wiebe, 2002), whereas approach-focused coping has been shown to be much more adaptive, predicting greater use of protective and preventative health behaviors (Leventhal, Leventhal, & Contrada, 1998) and overall physical health (Park & Adler, 2003). In fact, previous research has shown that active coping and planning strategies are instrumental in transforming behavioral intentions into actual behavioral change (Scholz, Sniehotta, Burkert, & Schwarzer, 2007). Because health competence reflects a person's ability to actively manage their health in response to health challenges, people who are high in health competence should be more likely to use approach-oriented coping strategies and less likely to use avoidance-oriented ones (Smith et al., 1995). That is, when confronted with a threat to their health, health competent people should be less likely to avoid the threat and more likely do something about it, which should then lead to better overall health.

DEVELOPMENT OF THE SJT-HC AND PILOT RESULTS

Because there are no existing SJTs concerning health competence, it was necessary to develop create an SJT designed specifically to measure health competence (SJT-HC). In the development of the SJT-HC, three judges knowledgeable about health first generated 166 scenarios. Each scenario was one to two sentences and involved a character who was in a situation that presented a challenge to his or her health. These challenges targeted a wide variety of health outcomes and behaviors (e.g. alcohol use, exercise, healthy eating, sexual behavior) so as to provide comprehensive coverage of possible issues related to health. The three judges then voted on each of the 166 scenarios and selected the top 50 scenarios for further consideration. After this step, the judges generated 9 to 10 possible response options for each of the scenarios. The goal was to make the average response option moderately effective, so as to not make any response option so obviously effective or ineffective that we would encounter floor or ceiling effects. The judges then selected 4 responses for each scenario, making sure that the responses represented a variety of actions, inactions, psychological adjustments, problem solving, and compromises.

Following the creation of the SJT-HC, we tested the 50 item measure using North Dakota State University undergraduates (N= 123, 64 Female, M_{age} = 19.50, SD_{age} = 2.13). Participants judged each response based on the "effectiveness of the way that (character's name) could deal with the situation" (McDaniel et al, 2007) on a 5 point scale ranging from *1 = not at all effective* to *5 = very effective*. The measure was scored using consensus norms, following procedures adapted from Mayer, Salovey, Caruso, & Sitarenois (2003). SJTs do not have a predetermined correct answer, instead relying on the "wisdom of the crowd" principle to determine which responses are considered effective and which ones are not (Legree, 1995). Essentially, this

principle states that the collection of responses made by a group of non-experts is similar to or even better at predicting an actual outcome than individual experts (Surowiecki, 2004). In support of the wisdom of the crowd approach, Mayer et al., 2003 found incredibly high consistency between their emotional intelligence test scored with expert and non-expert norms. Thus, the "right" answer was considered to be the response that the most people endorsed, and so people who agreed with the highest percentage received the highest health competence score. Please see Table 1 for an illustration of the scoring method.

Table 1

Example HC Scenario, Norms for the Scenario, Hypothetical Responses, and Their Scoring

Scenario: Kaylee has not eaten all day and is feeling faint.
Rating Dimension: Rate the effectiveness of each of the following ways Kaylee could deal with the situation. 1 = not very effective; 5 = very effective
Responses: *i*. Stop what she is doing and find something to eat; *ii*. Lay down; *iii*. Buy a couple of candy bars; *iv*. Tell herself she can wait a little longer to eat

Responses	% of Sample Choosing a Particular Rating					Hypothetical Participant Rating	Score
	1	2	3	4	5		
i. Find food	0%	3%	6%	30%	61%	4	0.30
ii. Lay down	6%	14%	31%	32%	17%	3	0.31
iii. Buy candy	16%	27%	25%	24%	8%	4	0.24
iv. Wait to eat	61%	28%	8%	1%	2%	1	0.61

Note: The hypothetical participant would receive the following score for the example scenario: (.30 + .31 + .24 + .61)/4 = .365. Scoring procedures are identical for the other nineteen scenarios. The participant's HC-E score would then average across the 20 scenarios.

To further refine the scale, we took an average of the 50 item scale and then correlated each of the 50 scenarios with the average score (Krishnakumar et al. 2015). Correlations ranged from r = .03 to r = .65. We retained the 20 scenarios that were most highly correlated with the average score and used this 20-item version for the analysis of the rest of the data. This set of 20 scenarios and each of their responses can be found in the appendix.

The preliminary results appeared promising. The 20-item scale had a high internal reliability ($M = .35$, $SD = .048$, $\alpha = .89$). A quick look at the responding revealed that some responses that appeared intuitively effective were rated as effective while responses that appeared intuitively ineffective were rated as ineffective. As shown in Table 1, for the scenario "Kaylee has not eaten all day and is feeling faint", 91% of participants rated the response "stop what she is doing and get something to eat" as either effective or very effective, and 89% of the participants rated the response of "tell herself she can wait a little longer to eat" as either not effective or not at all effective.

To test the validity of the scale, we correlated participants' scores on the SJT-HC with a variety of health-relevant outcomes. These outcomes included risky behaviors (Cognitive Appraisal of Risky Events: Katz, Fromme & D'Amico, 2000), General Health (SF-36: Ware, Kosinski, Dewey, & Gandek, 2000), mental health (General Health Questionnaire; Goldberg & Williams, 1998), coping style (COPE: Carver, Scheier, & Weintraub, 1989), health anxiety (a subscale of the CAT-PD-SF: Simms et al. 2011), personality (Goldberg's IPIP Big Five scale: Goldberg, 1999), ACT, health self-efficacy, and general self-efficacy (Schwarzer & Jerusalem, 1981).

Participants who scored higher on the SJT-HC scale reported participating in fewer risky behaviors ($r = -.19$, $p = .044$), had higher physical functioning ($r = .33$, $p < .001$), and had a better ability to perform physical roles ($r = .26$, $p = .005$). They also reported a lower use of negative coping styles such as denial ($r = -.29$, $p = .002$), behavioral disengagement ($r = -.33$, $p < .001$), and substance use ($r = -.22$, $p = .021$), and higher use of positive coping styles such as active coping ($r = .27$, $p = .005$) and planning ($r = .32$, $p < .001$). They also reported lower anxiety about health ($r = -.23$, $p = .002$).

As expected, the SJT-HC scale was correlated with higher general self-efficacy ($r = .29$, $p = .005$), higher health self-efficacy ($r = .19$, $p = .047$), and ACT ($r = .28$, $p < .001$). However, we also controlled for these three variables to ensure that our scale was not simply assessing self-efficacy or general cognitive ability (Lievens et al., 2008; Sternberg & Wagner, 1993). We found that the SJT-HC remained a significant predictor of risky behavior, physical functioning, physical limitations, active, planning, denial and behavioral disengagement, and health anxiety, ps $< .05$, when controlling for health self-efficacy. When controlling for general self-efficacy, 5 of the 8 outcomes remained significant, ps $< .02$, with active coping ($p = .096$), CARE ($p = .096$), and Health Anxiety ($p = .087$) becoming marginally significant. SJT remained a significant predictor for 6 of the 8 outcomes when controlling for ACT, ps $< .04$. In this case, physical limitations, $p = .10$, and health anxiety, $p = .21$ became non-significant.

The pilot results did raise some questions. First, HC correlated with agreeableness ($r = .34$, $p < .001$), but not the personality traits of conscientiousness ($r = .03$, $p = .469$) and neuroticism ($r = -.11$, $p = .210$). The high correlation with agreeableness raised concern about our scoring method and instructions. Because agreeable people tend to present themselves as normative (Leary & Allen, 2011), we worried that our particular scoring method favored those who are agreeable. Additionally, the instructions to rate responses based on their effectiveness may have too vague, as it may have led people to rate effectiveness based on some dimension other than health. This issue was addressed in Study 1.

Secondly, HC did not significantly correlate with mental (General Health Questionnaire, $r = .10$, $p = .265$) or general subjective health scales (SF-36 – General Health Subscale, $r = .14$, $p = .145$). We cautiously interpret this finding to mean that the HC scale is effective for predicting behaviors and physical health outcomes more so than psychological health. Finally, we did not

find a correlation between HC and the PILL, a 54 item checklist of somatic symptoms such as nausea, upset stomach, and headaches (Pennebaker, 1982). However, despite these issues, the pilot results did appear promising. The following two studies address some of the issues that were raised and demonstrate the promise of this method of assessing health competence.

OVERVIEW OF THE STUDIES

If people are unable to make appropriate judgments concerning the effectiveness of possible responses to health-related challenges, we should see this inability manifested in their health behaviors and health outcomes. The pilot study provided support for this hypothesis, but we identified a few issues in our methodology. In study 1, we focused on improving and correcting issues that were found through the pilot study. Most notably, we altered the SJT-HC instructions to more specifically reflect effectiveness for health, and added a new judgment of behavioral tendency (McDaniel, et al., 2007; Whetzel & McDaniel, 2009). We then attempted to replicate the pilot study findings using the edited scales, and examined some more specific predictions through the use of mediation and moderation. We hypothesized the following:

> *Hypothesis 1*: Our pilot study showed that the SJT-HC predicted several measures of physical functioning and health behaviors. We hypothesized that study 1 would replicate these findings by showing that the two health competence measures have high criterion-related validity though the prediction of health-related outcomes.
>
> *Hypothesis 2*: Stress is present in everyday life, yet stress can influence people differently (Lazurus & Folkman, 1984). We hypothesized that perceived stress would be moderated by health competence such that people who are highest in perceived stress and lowest in health competence would have the most negative health outcomes.
>
> *Hypothesis 3*: When people are confronted with stress, they can cope with stress by either using approach or avoidance oriented coping strategies. Because taking an active approach to handling health challenges is most adaptive for overall health, we predicted that the relationship between health competence and health outcomes will be mediated by

a greater use of approach oriented coping strategies and a lesser use of avoidance oriented coping strategies.

In study 1, we examined health competence and health outcomes in a laboratory setting. However, we recognized that health is often contextual (Cauce et al., 2002) and often varies from day to day. So, in study 2, we extended our findings by examining health competence in daily life through asking participants to provide daily reports of health related events, behaviors, and outcomes over a two-week period. This not only allowed us to see whether health competence is predictive of daily health, but is also allowed us to test whether health competence moderates the effects daily health challenges have on health. We had the following predictions:

Hypothesis 4: The two health competence measures should demonstrate high criterion-related validity by predicting daily health behaviors and daily health outcomes.

Hypothesis 5: Similar to *hypothesis 2*, we predict that health competence and daily stress should interact to predict somatic symptoms and unhealthy behaviors, with people who have low health competence and high daily stress reporting the highest somatic symptoms, and the greatest use of unhealthy behaviors.

Hypothesis 6: When people are confronted with health challenges, they may fail to respond effectively or they may succeed. Successes should result in the presence of healthier behaviors whereas failures should result in unhealthier behaviors and worse health outcomes. We hypothesized that HC and daily health challenges would interact to predict daily health variables. People with low HC should report the greatest number of unhealthy behaviors and worst health on days in which they were exposed to a greater number of health challenges.

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STUDY 1

Although the pilot study was overall promising, there were areas that could be improved. In the first study, we sought to correct these issues. First, in the pilot study, we had asked participants to rate the effectiveness of the possible ways of responding following common models in the SJT literature. However, upon further consideration, we became concerned "effectiveness" was not the proper judgment dimension. To begin, there are several scenarios in which what is considered effective may vary by how people define the word "effective". For instance, one such scenario reads "Fred is a recovering alcoholic and a close friend has invited Fred to a wedding where Fred knows he will be tempted to drink." A response option is "don't go to the wedding". This way of responding could be considered effective in terms of Fred avoiding a potential relapse, but would be ineffective if Fred had a goal to maintain a positive relationship with his friend.

In addition, having knowledge of what is effective or ineffective does not necessarily mean that a person will behave accordingly (Schwarzer, 2008; Webb & Sheeran, 2006). In fact, only weak to modest correlations between knowledge and behavior have been found for highly health relevant domains such as diet (Rimal, 2000), exercise (Ferguson, Yesalis, Pomrehn, & Kirkpatrick, 1989), and alcohol use (Scheier & Botvin, 1997). It can be assumed that in order for health to benefit, one would need to actually enact the appropriate health behaviors. Thus, simply asking people to judge the effectiveness of a behavior misses a vital piece of information for understanding health outcomes. Due to these concerns, we broke the original SJT-HC scale into two different assessments. One assessed a form of knowledge that was more specific to health (Health Competence: Knowledge), and the other used a behavioral tendency judgment that is common in the SJT literature (HC-BT) (McDaniel et al., 2007).

Secondly, because the pilot data showed that health competence is better at predicting health behaviors and physical health outcomes than general or mental health outcomes, we focused more strongly on physical functioning, physical symptoms, risky behaviors, and preventative health behaviors. Third, we further investigated the nature of the relationship between health competence and health outcomes and behaviors by testing stress as a moderating variable and coping as a mediator.

<div align="center">Method</div>

Participants and Procedures

Participants were 128 undergraduate students (42 female, M_{age} = 19.58, SD_{age} = 1.78) from NDSU who received course credit for their participation. This number gave us sufficient power to detect a correlation of r = .22 with an alpha of .05 and power of .80. Participants were recruited via the university's online subject pool with no special restrictions on participation. Participants were asked to report to a lab that was able to accommodate 6 participants at a given time. After giving informed consent, participants were assigned to individual rooms, each equipped with its own personal computer where they completed the health competence SJTs as well as several other relevant questionnaires that are listed in detail below.

Measures

Health Competence. We adapted the original SJT-HC scale into two different assessments by asking participants to read through the scenarios twice, each time altering the instructions. For the Health Competence – Knowledge assessment (HC-K), we asked a more health focused question than the previous "effectiveness" instructions. We asked participants to respond to each scenario on the basis of "how good/bad it would be for (the character's) physical health" on a 5 point scale ranging from *1 = very bad for physical health* to *5 = very good for*

physical health, *M* = .378, *SD* = .036, α = .78. For the Health Competence – Behavioral

Tendency assessment (HC-BT), we borrowed the behavioral tendency phrasing most commonly

used in the SJT literature (McDaniel et al., 2007) by asking participants to respond to "how

likely it be that you would do the following [response]" if they were the character and they were

in that particular situation on a 5 point scale ranging from *1 = very unlikely* to *5 = very likely*, *M*

= .299, S*D* = .047, α = .78.

  Personality. To assess personality, we used the Goldberg IPIP Big Five Scale (Goldberg,

1999). The Big 5 scale is a 50 items measure of the Big 5 personality traits of neuroticism (e.g.,

"I worry about things", *M* = 2.68, *SD* = 0.92, α = 0.91), agreeableness (e.g., "I take time out for

others", *M* = 4.07, *SD* = 0.63, α = 0.88), extraversion (e.g., "I am the life of the party", *M* = 3.28,

SD = 0.87, α = 0.91), openness (e.g., "I have a vivid imagination", *M* = 3.65, *SD* = 0.60, α =

0.79) and conscientiousness (e.g., "I pay attention to the details", *M* = 3.58, *SD* = .48, α = 0.78).

Participants were asked to indicate how well each statement described them on a 5-point scale

ranging from *1 = very inaccurate* to *5 = very accurate*.

  Coping. The COPE is a 52 item measure with 13 subscales that can be broadly

categorized into problem-focused coping, emotion-focused coping, and passive/avoidance

oriented coping (Carver et al., 1989). Because coping is hypothesized to mediate the relationship

between health competence and health outcomes primarily through active and avoidance coping

(Leventhal, 1998; Penly et al., 2002) we only used two subscales related to problem focused

coping (active coping and planning) and, two subscales related to avoidance oriented coping

(denial and behavioral disengagement). Participants responded to each scale item by indicating

the frequency in which they used each coping strategy to handle stressful events on a 4-point

scale ranging from *1 = I usually don't do this* to *4 = I usually do this*. Active coping was

represented by statements such as "I concentrate my efforts on doing something about the problem", $M = 2.94$, $SD = 0.61$, $\alpha = 0.73$, and planning was represented by statements such as "I try to come up with a strategy about what to do", $M = 3.16$, $SD = 0.63$, $\alpha = 0.76$. An example item of the denial subscale was "I act as though it hasn't happened", $M = 1.52$, $SD = 0.50$, $\alpha = 0.59$, and an example of behavioral disengagement was "I give up the attempt to get what I want", $M = 1.66$, $SD = 0.51$, $\alpha = 0.51$. Each subscale had 4 items, for a total of 16 items.

Perceived Stress Scale (PSS). The PSS (Cohen, Kamarck, & Mermelstein, 1983) is a 14 item scale that measures perceptions of stress over the past month. The scale asks participants to indicate how often they had felt or thought a certain way on a 5-point scale that ranges from *1 = never* to *5 = very often, M = 2.60, SD = 0.61, α = 0.72*. An example item is "In the last month, how often have you felt that you were unable to control the important things in your life?"

Health Outcomes

Short Form-36 (SF-36). The SF-36 (Ware et al., 2000) is a 36 item inventory that is commonly used as a measure of general health (Garratt, Ruta, Abadalla, Buckingham, & Russell, 1993). It was designed to cover a variety of uses from clinical assessment in a health care setting to self-administration in research laboratories. The SF-36 has eight subscales, however many of these subscales regard social and emotional functioning. In the pilot study, we found the SJT-HC tended to predict physical health more so than relational or mental health. Therefore, we chose to focus only on the two most pertinent subscales. These two subscales concerned physical functioning (10 items, e.g. "does your health limit you in vigorous activities?", $M = 86.40$, $SD = 20.35$, $\alpha = 0.92$), and general health (5 items, e.g. "my health is excellent", $M = 67.63$, $SD = 17.01$, $\alpha = 0.72$). Both subscales were scored on a 0-100 scale with 0 representing worse health and 100 representing better health.

SMU Health Questionnaire (SMU-HQ). Our pilot results showed that HC did not correlate with the PILL (Pennebaker, 1982). This may have been due to the fact that the PILL primarily measures somatic symptoms, the reporting of which are susceptible to the influence of personality variables such as neuroticism (Costa & McCrae, 1987). In order to assess slightly more objective health issues, we turned to the SMU-HQ (Watson & Pennebaker, 2013). The SMU-HQ is a 63 item checklist of physical symptoms experienced in the past year that assesses a wider range of health problems than the PILL (Watson & Pennebaker, 1989). These health problems include symptoms and complaints (e.g. headache, sore throat, constipation), minor illnesses (e.g. cold, flu, migraines), and more severe health problems (e.g. cancer, diabetes, ulcer). With the inclusion of more serious illnesses, the scale measures slightly more objective health problems than does the PILL (Watson & Pennebaker, 2013). Participants were presented with each symptom and asked to indicate whether they had or had not experienced the symptom in the past year. Their SMU score reflected the summed number of times they had reported experiencing a symptom, $M = 9.53$, $SD = 5.06$, $\alpha = 0.81$.

Health Behaviors

Cognitive Appraisals of Risky Events - Revised (CARE-R). The CARE-R questionnaire (Katz et al., 2000) presents 28 risky activities that have been categorized into 3 domains: risky sexual activities (16 items, e.g. "had sex with someone I have just met or don't know well", $M = 1.28$, $SD = 0.49$, $\alpha = 0.87$), heavy drinking (6 items, e.g. "drank more than 5 alcoholic beverages", $M = 1.76$, $SD = 0.45$, $\alpha = 0.54$) and illicit drug use (6 items, e.g. "tried/used cocaine", $M = 1.22$, $SD = 0.45$, $\alpha = 0.82$). We also calculated a total score that averaged across the three subscale, $M = 1.32$, $SD = 0.32$, $\alpha = 0.88$. There are four different assessments that can be done using these 28 activities (past frequency, expected involvement, expected benefits, and

expected consequences), but due to time constraints and the focus on health behaviors, we only used the past frequency assessment. The past frequency assessment asked participants to indicate the number of times they had engaged in each behavior in the past 6 months on a scale of *1 = 0 times* to *7 = 31+ times*.

Protective Health Measure (PHM). The protective health measure asks participants to report the frequency at which they tended to perform 30 different health protective activities and behaviors (Harris & Guten, 1979). Participants rated the frequency of health behaviors on a 7 point scale from *1 = never* to *7 = often, M* = 4.49, *SD* = 0.64, α = 0.78. In addition to the total score, we also wanted to examine more specific health protective behaviors. Salovey, Rudy, and Turk (1987) identified four distinct categories of health behaviors within this measure: safety (9 items, e.g. "wear a seatbelt; *M* = 4.59, *SD* = 0.91, α = 0.64), weight control (4 items, e.g. "eat sensibly, *M* = 4.74, *SD* = 1.08, α = 0.34), rest and relaxation (4 items, e.g. "get enough sleep", *M* = 4.44, *SD* = 1.25, α = 0.52), and medical avoidance (3 items, e.g. "avoid doctors when feeling okay", *M* = 4.33, *SD* = 1.03).

<div align="center">

Results

</div>

In study 1, we tested health competence by assessing knowledge of what is good or bad for one's health (HC-K) and behavioral tendency for doing what is good for one's health (HC-BT). The HC-K was scored using the previously described norm-based scoring system and had good internal reliability, α = .78. The raw, un-normed data showed that ratings of the response options had a fairly large range. Using the 5 point scale from *"1 = very bad for health"* to *"5 = very good for health"*, responses to scenarios ranged from very bad options (Scott, who hates exercising, should stop exercising; *M* = 1.27, *SD* = 0.56) to very good (Emily, who had lost a number of relatives to cancer, should get regular screenings; *M* = 4.80, *SD* = 0.63). An average

of all 80 response options showed that the responses were, in general, neither good nor bad for health with some variation ($M = 3.17$, $SD = 0.89$), suggesting that we were successful at creating a mix of good and bad responses.

The HC-BT was scored in a slightly different manner than the HC-K. Because people often do things that are unhealthy, scoring the HC-BT with its own norms would only reveal whether a person's behaviors were normative, not whether that person was doing things that were healthy. For instance, people who said they would be likely to drive drunk could still get a high score if others in the norming pool also reported a tendency towards driving drunk. Due to this problem, we instead scored the HC-BT using the norms for the HC-K. This is illustrated in table 2. Using this scoring system, a person would receive a low score if he or she reported being either unlikely to do a behavior that the HC-K norms considered healthy or likely to do a behavior considered unhealthy.

Table 2

Example Scoring of Knowledge and Behavioral Tendency Responses

Scenario: Scott wants to get in shape but realizes he hates exercising.
Knowledge: If Scott did the following, how good or bad would it be for his physical health? 1 = very bad for physical health; 5 = very good for physical health
Behavioral Tendency: If you were Scott and you were in the situation, how likely would it be that YOU would do the following? 1 = not at all likely; 5 = very likely

Ways of Responding: *i.* Try out a few different types of exercise to see what works; *ii.* Work out very hard for a short period of time; *iii.* Try dieting instead; *iv.* Stop exercising

Way	Effectiveness Norms (%)					E.Rat.	E.Sco.	BT.Rat	BT.Sco.
	1	2	3	4	5				
i. Types	1%	2%	15%	33%	49%	4	0.33	4	0.33
ii. Short	16%	26%	30%	20%	8%	3	0.30	1	0.16
iii. Dieting	7%	15%	37%	28%	13%	2	0.15	3	0.37
iv. Stop	78%	13%	7%	2%	0%	1	0.78	4	0.02

Note: The hypothetical participant made ratings of 4, 3, 2, and 1 for effectiveness (E.Rat.) and would receive a scenario-specific health competence score of .3900 (the average of .33, .30, .15, and .78). The hypothetical participant gave self-likelihood ratings (S.Rat.) of 4, 1, 3, and 4, and the person's self-effectiveness score for this scenario is .2200 (the average of .33, .16, .37, and .02).

The HC-BT had high reliability similar to the HC-K, $\alpha = .78$, and the average of all 80 un-normed responses once again tended to be neither good nor bad with substantial variation, $M = 3.16$, $SD = 1.18$. However, the mean for the HC-BT was significantly lower than the HC-K, $t(126) = 16.99$, $p < .001$, and the two measures were only slightly correlated, $r = .21$, $p = .019$. This was partially the case because responses to the HC-BT did not contribute to the norms used to score the measure as they did in the HC-K. More significantly though, people's behavioral tendency ratings were often not aligned with their knowledge ratings. This was true even if they had a high HC-K score.

Having certain knowledge does not necessarily result in the associated behavior (Webb & Sheeran, 2006), and this appeared to be the case in our study. For example, for a scenario in which a character wanted to go on a jet ski but could not find a life jacket, one response was to not go out on the jet ski. People tended to think that this option was very good for the character's health ($M = 4.41$, $SD = .94$), but they reported being significantly less likely to do that action if they were in the character's position ($M = 2.69$, $SD = 1.48$). For another example, in a scenario in which a character hit his head on the ice, a response was to "shake it off". People saw this response as being very unhealthy ($M = 1.59$, $SD = 0.72$), but still reported being somewhat likely to do it if they were in the character's position ($M = 2.80$, $SD = 1.37$). In both example given, the HC-K and HC-BT scores were significantly different, ps $< .001$. Therefore, it appears as if knowledge of what's good for one's health and tendency to do what is good for one's health are somewhat related, but may be assessing different aspects of problem solving.

Correlations

Health Behaviors. We found some support for our hypotheses concerning risky and protective health behavior. The HC-K was marginally correlated with risky sexual behavior, $r = -$

.169, p = .078. The HC-BT showed a correlation with the CARE total score, r = -.20, p = .039, and a significant relationship with the alcohol use subscale, r = -.24, p = .012. The HC-K was only significantly related to the safety behaviors subscale of the PHM, r = .21, p = .036. The HC-BT was a slightly better predictor of healthy behaviors, showing a positive correlation with safety behaviors, r = .42, p < .001, getting adequate rest, r = .20, p = .047, and the PHM total score, r = .39, p = <.001.

Although not all the correlations were significant, the pattern across subscales tended to suggest that people high in HC-K and HC-BT were less likely to do risky behaviors and more likely to do health protective behaviors. Please see table 2 for a complete listing of all correlations found in Study 1.

Physical Health. We were not able to find any significant correlations between physical functioning, general health, or symptoms and illnesses (SMU) and either the HC-K or the HC-BT. In fact, the correlations for both general health and the SMU were near zero. Physical functioning was at least in the predicted direction for HC-K, with those higher in HC-K reporting better higher levels of physical functioning, r = .11, p = .236. However, physical functioning went in the opposite direction for HC-BT, r = -.11, p = .225.

Coping. As expected, we found that people with high HC-K scores were less likely to use avoidance based coping strategies such as denial (r = -.33, p = .001) and behavioral disengagement (r = -.24, p = .018). However, HC-K scores were not as strongly linked to use of approach oriented coping styles. The HC-K was only marginally correlated with planning (p = .20, p = .0501) and was not correlated with active coping (r = .124, p = .222). The opposite pattern of significance emerged when considering the HC-BT. Those with high HC-BT scores were more likely to use the approach oriented coping strategies of planning (r = .30, p = .003)

Table 3

Correlations for HC-BT and HC-K for Study 1 and Study 2

Measure	HC-BT (S1)	HC-BT (S2)	HC-K (S1)	HC-K (S2)
CARE				
Sex	-.12	-.18	-.18	-.32**
Drugs	-.07	-.04	.02	-.06
Alcohol	-.24*	-.03	-.09	.07
Total	-.19*	-.12	-.13	-.15
PHM				
Safety	.42***	.43***	.21*	-.04
Weight	.10	.38***	.01	-.07
Rest	.20*	.28*	.08	-.04
Medical Avoidance	-.01	-.24*	.01	-.02
Total	.39***	.47***	.14	-.03
SF – 36				
Phys Functioning	-.12	.05	.11	.10
General Health	.03	.01	.02	.02
SMU				
Symptoms and Illnesses	.04	.01	-.13	.12
COPE				
Active	.22*	.20	.12	.14
Planning	.30**	.26*	.20	.26*
Denial	.01	-.16	-.33**	-.35**
Disengagement	-.04	-.21	-.24*	-.31**

Note: * p = <.05, ** p = <.01, *** p = <.001

Table 3. *Correlations for HC-BT and HC-K for Study 1 and Study 2 (continued)*

Measure	HC-BT (S1)	HC-BT (S2)	HC-K (S1)	HC-K (S2)
Stress				
Perceived Stress	-.07	-.23*	-.13	-.19
Personality				
Extraversion	.02	-.02	-.15	-.08
Neuroticism	.10	-.17	-.17	-.26*
Openness	.05	.07	.08	.02
Agreeableness	.24*	.04	.11	.25*
Conscientiousness	.18	.28*	.22*	.19

Note: * p = <.05, ** p = <.01, *** p = <.001

and active coping (*r* =.22, *p* = .028), but HC-BT scores were not significantly related to denial or behavioral disengagement. This finding is somewhat significant because there is a noticeable lack of theory in the SJT literature as to how the knowledge and behavioral tendency instructions differ (McDaniel et al., 2007; Ployhart & Ehrhart, 2003). The different coping strategies recruited by the different forms of competence may represent an important distinction.

Personality. We found a significant correlation between HC-K scores and conscientiousness with those higher in knowledge of what is good for health tending to have higher conscientiousness scores, r = .22, p = .040. There was also a significant correlation between HC-BT scores and agreeableness, r = .24, p = .024, and a marginally significant correlation between HC-BT and conscientiousness, r = .18, p = .101. None of the other correlations with personality traits were significant.

Moderation

We used multiple regression analyses to test the prediction that people with low health competence experience the worst health outcomes when exposed to stress. For this analysis, we specifically targeted health variables, resulting in 10 models ((HC-K, HC-BT) x Stress = (SMU, Physical Functioning, General Health, CARE – total, PHM-total)). Of these 10 models, only one was significant. HC-K interacted with stress to predict the PHM total score, *t* = -2.78, *p* = .007, *β* = -.26. Estimated means (+1/-1 *SD*) are displayed in figure 2 and show that the pattern does not follow what was predicted. People tended to do less health protective behaviors when they were stressed, but this was particularly the case for the people who had high HC-K. Out of curiosity, we looked at the remaining non-significant interactions and found a fairly consistent pattern. In 5 of the 9 remaining models, health and healthy behaviors were the worst for those with high stress and high HC scores. Only stress interactions with HC-BT predicting PHM-total, and HC-K

predicting Physical Functioning (although not significant) produced the predicted interaction pattern in which health was worst for the people low in HC and high in stress.
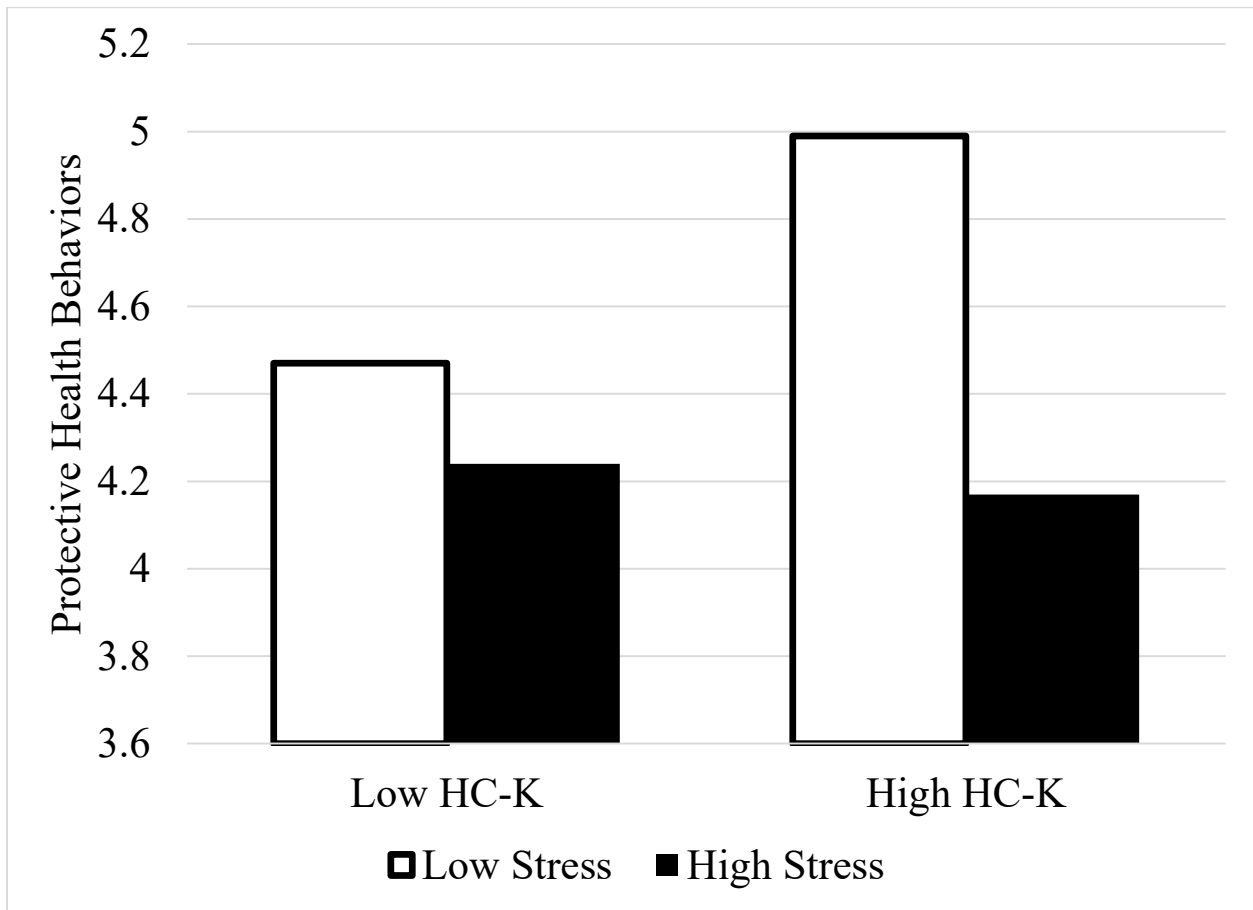

Figure 1. Protective Health Behaviors as a Function of Stress and HC-K

Mediation

We had hypothesized that the way people deal with their problems and stresses should account for the relationship between health competence and health. We had initially planned to test each of the four coping strategies assessed as mediators of the relationship between each of the two HC measures and the health behavior and health outcome variables. However, many of these models broke down due to non-significant relationships between the predictor and mediator, the mediator and outcome, or the predictor and outcome (Baron & Kenny, 1986). Please see table 3 for these relationships. There were two potential models that did meet the

criteria for mediation: active coping mediating the relationship between HC-BT and the PHM total score, and planning mediating the relationship between HC-BT and PHM. Because planning and active coping both represent an approach oriented coping style, we averaged the two subscales to create a new scale.

Figure 2 shows a visual diagram of the mediated relationship. Variables were standardized prior to the analysis to aid in interpretability. Using the PROCESS macro (Hayes, 2013) and following procedures recommended by Baron and Kenny (1986), we found that HC-BT was a significant predictor of PHM (the c pathway), with those higher in HC-BT showing greater use of health protective behaviors, $t(96) = 4.15$, $p <.001$, $b = .39$. HC-BT was also positively correlated with the use of approach oriented coping styles (the a pathway), $t(96) = 2.91$, $p = .005$, $b = .28$. Next, we examined the relationship between approach oriented coping and PHM while controlling for HC-BT (the b pathway) and found that approach coping was positively related to PHM, $t(95) = 3.47$, $p = .008$, $b = .32$. Finally, we tested for a decrease in the relationship between HC-BT and HPB when approach coping was added to the model (the c' pathway). We found partial mediation as there was weaker, but still significant, relationship between HC-BT and PHM, $t(95) = 3.12$, $p = .002$, $b = .30$.

The PROCESS macro also allowed us to test for the significance of the mediation model by computing 95% bias corrected confidence intervals (BCCI) using 1,000 bootstrap samples. The mean estimate for the indirect pathway was .09 with 95% BCCI of .03-.19. Because the confidence interval excluded zero, the mediational pathway was significant (MacKinnon & Fairchild, 2009). A comparison of the ab and c pathways showed that 23.51% of the effect of HC-BT on HPB was mediated by coping.
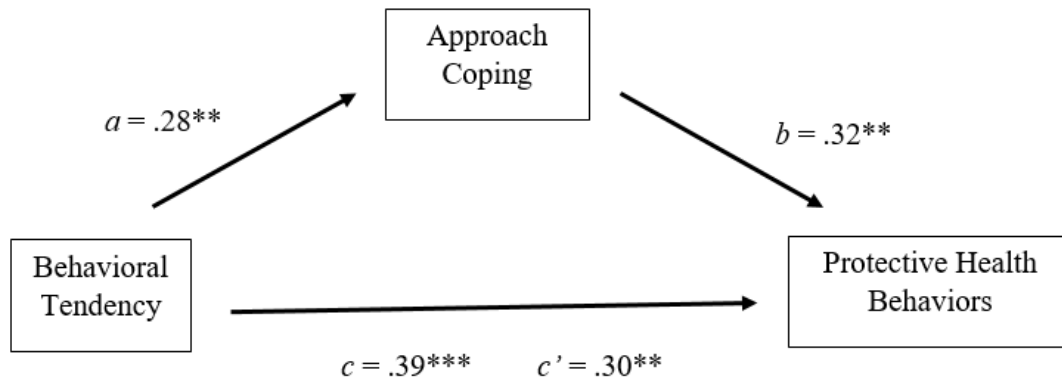
Approach
Coping

$a = .28**$ $b = .32**$

Behavioral
Tendency

Protective Health
Behaviors

$c = .39***$ $c' = .30**$

Figure 2. Approach Oriented Coping as a Mediator of HC-BT and Protective Health Behaviors

Note: * p = <.05, ** p = <.01, *** p = <.001

Discussion

In Study 1, we attempted to improve our measure of health competence by clarifying the pilot study's effectiveness instructions and adding an assessment of behavioral tendency. This study revealed a few insights. First, study 1 showed that people do not always behave in ways that are aligned with their knowledge of what is good or bad for health. Second, the two health competence measures appeared to show some relationship with health related variables (e.g. health behavior, personality, coping). Although the findings were not overwhelmingly conclusive, there appeared to be some support for the criterion-related validity of our measures.

Third, we found an interaction between stress and health competence that was the opposite to our predicted pattern. We had hypothesized that high stress should affect those low in health competence the strongest because they are the least equipped to handle stress. However, we found some evidence hinting that it is the people high in health competence who tend to fall apart in the face of stress. Fourth, we found that the relationship between HC-BT and protective health behaviors was partially mediated by approach-oriented coping. People high in HC-BT were more likely to use active coping and planning in response to their problems, which in turn,

predicted the use of healthy behaviors. However, the partial mediation may suggest that there

still may be other mechanisms that connect health competence to health.

STUDY 2

In study 1, we investigated health and health behaviors in a laboratory setting. However, the problems that arise to challenge health are often quite inconsistent. One day could be replete with health challenges while another could be relatively free (Watson, 1988). In study 2, we sought to examine this day-to-day variability through the use of a daily diary protocol. The pilot study and study 1 showed that those lower in health competence tended engage in a greater number of risky health behaviors and fewer protective health behaviors. We hypothesized that the same will be true when examined in an ecological context, and especially so on days in which there were many health challenges.

Method

Participants and Procedures

Participants were 104 (40 female, 3 unknown, $M_{age} = 19.47$, $SD_{age} = 1.39$) undergraduate students from North Dakota State University who received course credit for their participation. Participants signed up for a two week "daily diary study" through the university's online subject pool with no restrictions on participation. These participants first reported to a laboratory where they completed questionnaires on lab computers. These questionnaires included the HC-K and the HC-BT, and also all of the questionnaires administered in study 1 for the sake of replication. At this point, they also provided contact information

Following the completion of the lab portion of the experiment, participants were contacted via an email that contained a unique subject number and a link to an online Qualtrics survey. This email was sent every day at 7:00 pm for the next 14 days. In order to limit potential errors due to retrospection, we required participants to complete the surveys between 7:00 pm

and 9:00 am the following morning. After 9:00 am, the online survey was deactivated. The contents of the survey are described below.

Daily Outcomes (Level 1 Outcomes)

Health Related Behaviors. Participants were asked to indicate how many times they had done each behavior on a given day on a scale ranging from $0 = 0$ times to $3 = 4+$. There were three items relating to substance use (e.g. "had an alcoholic beverage", "had a cigarette or tobacco product" and "had marijuana or some other drug", $M = 0.12$, $SD = 0.35$, $\alpha = 0.46$), three items relating to healthy eating (e.g. "ate fruits or vegetables", "had healthy carbs and whole grains", and "drank water", $M = 2.02$, $SD = 0.89$, $\alpha = 0.69$), three items relating to unhealthy eating (e.g. "had a sugary soda", "ate fatty or sugary food", and "ate unhealthy fast food", $M = 0.59$, $SD = 0.51$, $\alpha = 0.45$) and three items relating to exercise behavior (e.g. "exercised", "went to the gym", and "did a cardiovascular exercise", $M = 0.53$, $SD = 0.64$, $\alpha = 0.82$).

Impulsive Behaviors. Participants were asked to indicate how many times they had done two impulsive behaviors (e.g. "was self-indulgent", "gave in to an urge") that day using the scale $0 = $ *not a single time* to $3 = $ *more than 5 times*, $M = 0.46$, $SD = 0.53$, $\alpha = 0.76$.

Somatic Symptoms. Participants were asked to report the extent to which they felt four somatic symptoms that day using a scale ranging from $1 = $ *not at all* to $5 = $ *extremely*. Symptoms included headaches, upset stomach, sore muscles, and insomnia, $M = 1.59$, $SD = 0.66$, $\alpha = 0.66$.

Coping. Participants were asked to indicate how much they agreed with the following statements about their day using the scale $1 = $ *strongly disagree* to $5 = $ *strongly agree*. Each item will begin with the phrase "When something stressful happened today…" Two items addressed active coping (e.g. "I concentrated my efforts into doing something about it", "I did what had to be done one step at a time", $M = 3.72$, $SD = 0.86$, $\alpha = 0.85$), and two items addressed denial (e.g.

"I refused to believe that it had happened", "I acted as though it hadn't even happened", $M =$ 1.98, $SD = 0.96$, $\alpha = 0.87$)

Daily Predictors (Level 1 Predictors)

Stressful Events. Participants were asked to indicate how much they agreed with the following statements about their day using the scale 1 = strongly disagree to 5 = strongly agree, $M = 1.77$, $SD =$, $\alpha = 0.71$. There were four items in this scale (e.g. "had a deadline to worry about", "had a lot of responsibilities", "not enough time to meet obligations", "too many things to do at once").

Health Challenges. Participants were asked to indicate how many times the following things happen to them that day using a scale from 1 = not a single time to 4 = more than two times, $M = 1.47$, $SD = 0.63$, $\alpha = 0.84$. There were four items in this scale (e.g. "was tempted to do something unhealthy", "wanted to do what's fun, regardless of health considerations", "thought about doing something unhealthy", "felt pressure to engage in unhealthy behavior").

Results

In study 2, we scored the HC-K and the HC-BT using the same methodology as study 1. However, in this study, we used the norms from study 1 rather than the norms from the study 2 participants. This was to show reliability across samples, and to show that the average decrease in the HC-BT was a function of a knowledge-behavior gap rather than the result of the participants' contribution to the HC-K norming pool. The descriptive findings and comparisons of the two scales were similar to what was found in Study 1. Both scales had high reliability – the HC-K had an alpha of $\alpha = .73$, and the HC-BT had an alpha of $\alpha = .81$. Even with using the independent norms from Study 1, the mean for the HC-BT, $M = 0.247$, $SD = 0.041$, was once again significantly lower than the HC-K mean, $M = 0.308$, $SD = 0.026$, $t(102) = 14.17$, $p<.001$,

and the raw data revealed discrepancies between what people considered good for health and the behaviors they would actually do. The correlation between the two measures was significant but weak, $r = .20$, $p = .041$.

Study 1 Replication

A complete account of the correlational statistics from the replication can be found in table 3. We found some instances where the effects found in study 1 replicated and other instances where they did not. Of note, the correlations between HC-BT and PHM did replicate and had even stronger correlations across all subscales than what was found in study 1, supporting the hypothesis that people higher in HC-BT tend to do more health protective behaviors. The relationship between health competence and coping also mostly replicated. HC-K predicted lower use of denial and behavioral disengagement in both studies 1 and 2, and greater use of planning in study 2 only. HC-BT predicted greater use of planning in both studies 1 and 2, but greater use of active coping was only found in study 1. Findings for the CARE did not replicate in study 2, but a moderate negative correlation between HC-K and risky sex was found in study 2. There were once again no significant relationships found between either of the HC assessments and health outcomes such as the SMU, SF-physical functioning, and SF-general health. As an additional note, we also found a significant negative correlation between stress and HC-BT that was not present in study 1.

Daily Diary Data Screening

The daily diary protocol involved a nested structure in which a single participant could have had up to 14 of the daily reports. To honor this nested design, we used a multilevel modeling (MLM) procedure. Although MLMs are capable of handling missing daily data (Snijders & Bosker, 1999), we had set a rule prior to collecting data that participants could miss

no more than 5 surveys. This was to ensure a high quality data set and make certain that we could examine day-to-day variability in the variables of interest (Robinson, Moeller, Buchholz, Boyd, & Troop-Gordon, 2012). If a participant missed more than 5 surveys, he or she was contacted and politely told that he or she had been removed from the experiment.

Overall, participants did a fairly good job completing the daily surveys ($M_{surveys}$ = 11.21, $SD_{surveys}$ = 2.88). Nineteen participants missed more than 5 surveys (18.10% of level 2 data, 7.69% of level 1 data, $M_{surveys}$ = 4.58, $SD_{surveys}$ = 3.27). These non-compliant participants did not differ from the compliant sample in HC-K, $t(102)$ = -.18, p = .861 or HC-BT, $t(101)$ = -1.17, p = .243, nor did they differ in health behaviors or health outcomes, ps>.165). Using MLPowSim (Browne, Lahi, & Parker, 2009), we determined that we would have an adequately powered sample even after excluding these participants. Therefore, we did not include the participants that did not meet our a priori rule for inclusion. This created a total sample of 86 high-quality participants with a combined total of 1045 surveys.

Level 2 Main Effects

We first tested simple level 2 main effects through MLMs using the PROC MIXED command in SAS (Singer, 1998). This consisted of using HC-K and HC-BT (both level 2 predictors) to predict a variety of daily (level 1) outcomes related to health and health behavior. Please refer to table 4 for a complete record of all level 2 main effects and their estimated means.

Once again, we found some support for our hypothesis concerning the criterion related validity of our measure. Those high in HC-K reported marginally less somatic symptoms, $t(83)$ = -1.80, p = .075, b = -.09 and used marginally less substances, $t(83)$ = -1.81, p = .074, b = -.05, during the 2-week protocol. They were also significantly more likely to use active coping strategies, $t(83)$ = 2.18, p = .032, b = .14, and less likely to use denial, $t(83)$ = -2.22, p = .029, b =

-.16. Interestingly though, people high in HC-K were significantly less likely to exercise, $t(83) =$ -2.95, $p = .004$, $b = -.14$. The HC-BT did a slightly better job of predicting health behaviors. People high in HC-BT were significantly less likely to engage in impulsive behavior, $t(82) = -2.23$, $p = .029$, $b = -.09$, less likely to use substances, $t(82) = -3.03$, $p = .003$, $b = -.08$, and were marginally more likely to eat healthy foods , $t(82) = 1.87$, $p = .065$, $b = .15$. People high in HC-BT were also significantly more likely to use active coping, $t(82) = 3.62$, $p <.001$, $b = .22$ and marginally less likely to use denial, $t(82) = -1.72$, $p = .090$, $b = -.12$.

Table 4

Statistics for Level 2 Main Effects and Corresponding Estimated Means

Variable	t	p	b	+1 *SD*	-1 *SD*
HC-K					
Somatic Symptoms	-1.80	.075	-.09	1.51	1.69
Coping					
Active	2.18	.032	.14	3.85	3.85
Denial	-2.22	.029	-.16	1.83	2.14
Behaviors					
Substance Use	-1.81	.074	-.05	1.07	1.18
Healthy Eating	-1.10	.277	-.08	…	…
Unhealthy Eating	-0.05	.964	-.00	…	…
Exercise	-2.95	.004	-.14	1.40	1.68
Impulsive	0.27	.789	.01	…	…
HC-BT					
Somatic Symptoms	-0.45	.656	-.02	…	…
Coping					
Active	3.62	<.001	.22	3.70	3.48
Denial	-1.72	.090	-.12	1.87	2.11
Behaviors					
Substance Use	-3.03	.003	-.08	1.04	1.22
Healthy Eating	1.87	.065	.15	3.18	2.89
Unhealthy Eating	-1.57	.121	-.05	…	…
Exercise	.081	.418	.04	…	…
Impulsive	-2.23	.029	-.09	1.40	1.58

Note: Estimated means are listed for significant and marginally significant effects.

Cross-Level Interactions

The level 2 main effects showed that health competence was somewhat predictive of daily healthy behaviors, in general. However, we also wanted to know whether health competence (level 2 predictors) would moderate the relationship between daily health behaviors (level 1 outcomes) and daily events such as health challenges and stress (level 1 predictors). To examine these cross-level interactions, we once again used MLMs through the PROC MIXED command in SAS (Singer, 1998). Following recommendations from Enders & Tofighi (2007), we removed the between-person variance by group-mean centering daily health challenges and stress in order to aid in the interpretability of the interactions. Levels of health challenges and stress were both hypothesized to vary from day-to-day, so we allowed both the intercept and centered level 1 predictor variables to be random (Hayes, 2006).

Health Challenges. Of the cross level models that we ran with daily health challenges, only one was significant: HCBT interacted with daily health challenges to predict substance use. We ran both an empty null model and a cross-level model. The cross level model significantly outperformed the null model, $\chi^2 = 39.40$, $p <.001$. We found a significant level 1 main effect, such that the average person tended to report higher substance use on days in which they faced health challenges, $t(860) = 3.93$, $p<.001$. We also found a significant level 2 main effect showing that people high in HCBT were less likely to report experiencing health challenges, $t(76) = -2.90$, $p = .005$. Finally, as hypothesized, we found a cross-level interaction, $t(860) = -2.40$, $p = .017$. This interaction suggested that the relationship between daily health challenges and substance use varied as a function of differing levels of health competence. The top panel of figure 4 displays estimated means at low (-1 *SD*) versus high (+1 *SD*) levels of the two predictors.

Stress. Similar to the cross level interactions with health challenges, we did not find many significant cross level interactions with stress. In fact, we only found one: HC-K interacting with daily stress to predict daily exercise behavior. This cross level model outperformed the empty null model, $\chi^2(4) = 25.35$, $p < .001$. We did not find a significant level 1 main effect between stress and exercise. However, we did find a significant level 2 main effect with those higher in HC-K reporting fewer exercise behaviors, $t(83) = -2.94$, $p = .004$. We also found a significant cross-level interaction, $t(944) = -2.10$, $p = .036$. The estimated means for this interaction are displayed in the bottom panel of figure 4. The estimated means showed that people with low HC-K were the most likely to exercise when stressed, and people high in HC-K were the least. This was contrary to what was hypothesized and mirrored the results found in study 1.

Discussion

In Study 2, we examined health competence in day-to-day life. Contrary to what was hypothesized, the relationship between daily stress and health, and daily health challenges and health did not appear vary as a function of health competence. Although we did find two significant cross-level interactions, the large majority of the interaction models failed to be significant. Instead, we found level 2 main effects with HC-K and HC-BT predicting a variety of health-related variables. This may suggest that health competence is a fairly stable ability that is not easily influenced by daily events and forces.
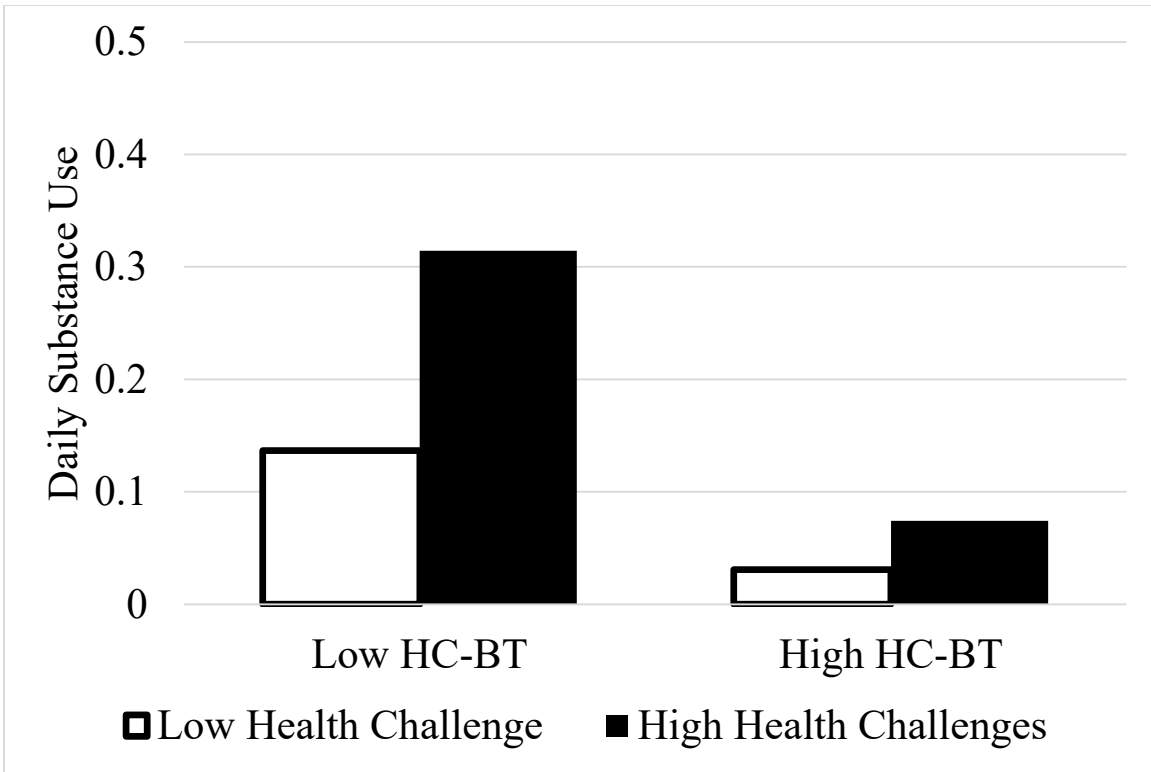
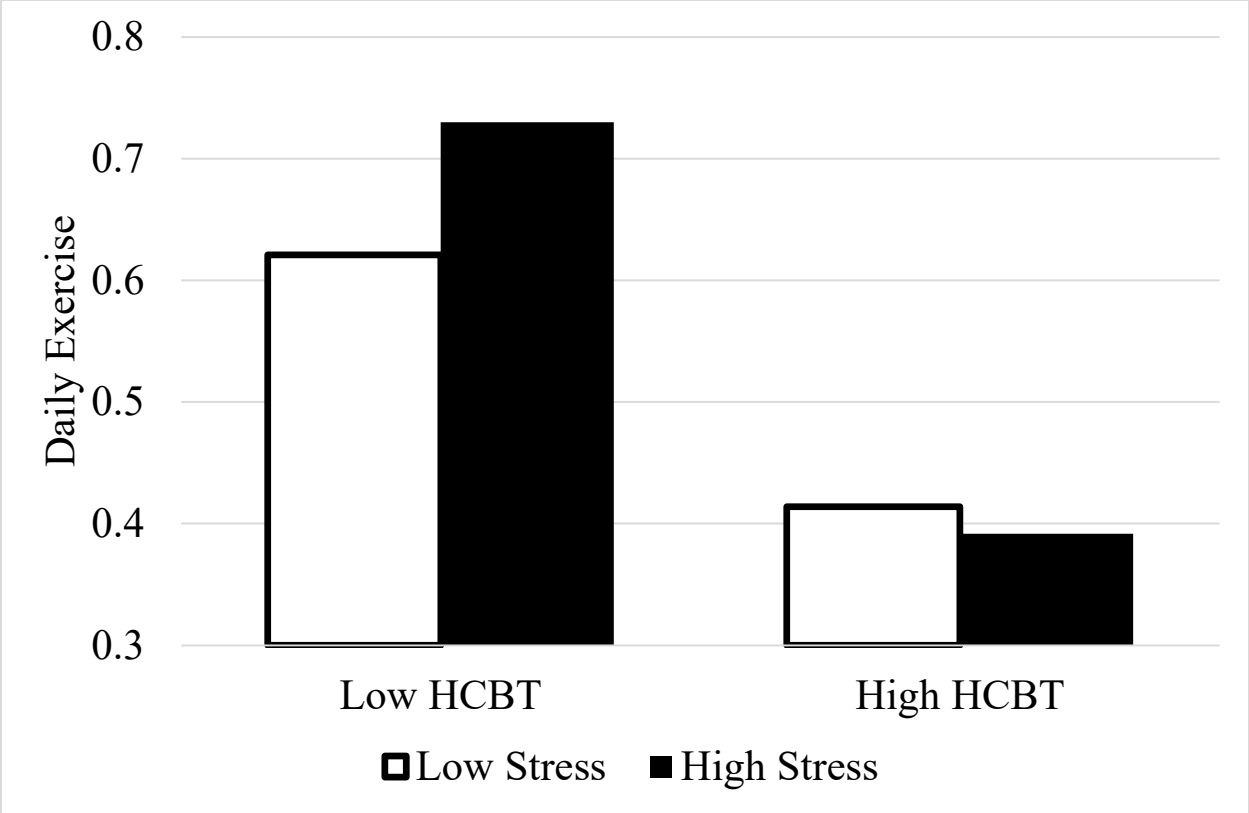*Figure 3.* Daily Substance Use as a Function of Daily Health Challenges and HC-BT

Figure 4. Daily Exercise as a Function of Daily Stress and HC-K

GENERAL DISCUSSION

People are often confronted with challenges to their health, but some are clearly more successful in handling these challenges than others. This is an important individual difference to understand, because an accumulation of poor health decisions can ultimately lead to poorer health (Colditz et al., 1997; Kvaavik et al., 2010). Take, for example, someone who consistently feels too tired to exercise after work. If he were to resolve this issue by simply skipping his workout, he may eventually become more at risk for weight-related health issues than if he had tried to resolve the issue in a more effective way (e.g. try to exercise before work, do a lighter workout later at home). Unfortunately, though, there were no existing measures that appropriately modelled the type of problem solving ability needed to effectively manage health.

In the reported studies, we developed a measure that would allow us to assess health competence, or a person's ability to effectively resolve their health related problems. We tested this measure both in the laboratory (study 1) and in daily life (study 2) and found some evidence for the predictive validity of our measure. In particular, health competence did a fairly good job of predicting engagement in both protective (e.g. healthy eating, safety behaviors) and risky (e.g. substance use, risky sex) health behaviors. Although the study was not overwhelmingly conclusive, and there were many predicted relationships that we did not find, we interpreted this relationship with behaviors quite positively. What is also interesting about these findings is that the health competence measures were able to predict health behaviors that were not specifically addressed in the scale. For instance, there were no scenarios concerning sleep or risky sex, yet we still were able to find correlations with the rest subscale of the PHM and the sex subscale of the CARE.

We also attempted to understand some of the nuances of the scale by looking at moderation and mediation. In both study 1 and study 2, we found some evidence to suggest that stress leads to the worst health outcomes in those who are high in health competence. The was contrary to what was hypothesized. A possible explanation for this finding is that perhaps those high in health competence rely heavily on their problem solving ability when faced with health challenges. If stress interferes with problem solving ability (Cowen, 1952; Heppner & Krauskopf, 1987), these people would lose a vital system for managing their health. Problem solving ability might not be as integral for those low in health competence, and so stress may not affect their decision making process as much. However, because the large majority of the interactions we examined were non-significant, it is hard to say whether the interactions that we did find would consistently replicate. In fact, study 2 seemed to point towards a main effect of health competence rather than a moderating effect. Still, the question of what can and cannot interrupt people's health related problem solving abilities may be an interesting one, and a possible avenue for future research.

<div align="center">Knowledge and Behavioral Tendency in SJTs</div>

Although this thesis primarily focused on the prediction of health-related outcomes, it also contained some significance to the SJT literature. Situational judgment tests typically use one of two different types of instructions. Some ask people to rate the effectiveness of a response (also called "knowledge" or "should do" ratings) (Chan & Schmitt, 1997) whereas other use behavioral tendency (also called "would do" ratings) (Ployhart & Ehrhart, 2003). There is some debate within the literature as to which instruction is the best, with some arguing for behavioral tendency (Ployhart & Ehrhart, 2003) and others favoring effectiveness (Nguyen, Biderman, & McDaniel, 2003). A meta-analysis of 118 studies that used the SJT method (McDaniel et al.,

2007) was inconclusive on this matter, finding that both sets of instructions produced the same criterion-related validity ($r = .26$). Unfortunately, not many studies include both sets of instructions to allow for a direct comparison, which limits the theoretical understanding of the strengths and weakness of the different instructions.

In our studies, we found that behavioral tendency was the stronger predictor of health outcomes (health behavior in particular; see table 3). Given behavioral consistency theory and other models of decision making (e.g. the Reasoned Action Approach: Fishbein & Ajzen, 2010), this makes sense. Although the knowledge ratings are also hypothesized to function through behavioral consistency (Motowidlo, et al, 1990), statements about likelihood of doing a behavior may be a step closer to actual behavior than knowledge. This may also be particularly true in the health domain. People typically tend to do the things that they believe will be effective (Rogers & Mewborn, 1976), but health related issues may contain unique challenges that push actual behavior and knowledge further apart. For example, doing a good behavior in the workplace may result in quick positive reinforcement, whereas doing a healthy behavior might take repeated effort over a long period of time to produce any results (Curioni & Lourenco, 2005), and may be thoroughly unenjoyable in the process (Myers & Roth, 1997). So, despite having knowledge of what does and does not constitute a healthy behavior, people may just not do it. We found support for this as the majority of people's HC-BT scores were lower than their HC-K scores.

These studies also help to fill the gap in the literature concerning the differences between instruction type. Thus far, the one difference shown in the literature is that knowledge is more highly related to cognitive ability whereas behavioral tendency is more highly related to personality (McDaniel, et al. 2007). In multiple investigations (study 1, study 2 replication study, study 2 daily study), we found that the behavioral tendency instruction was more highly linked to

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the use of approach-oriented coping strategies whereas the knowledge instruction was more highly related to not using avoidance-oriented coping strategies. We would have expected both types of instructions to be positively related to approach-oriented coping and negatively related to avoidance-oriented coping, so it was interesting that we found the pattern that we did. Based on this finding, it is possible that the two instructional types may be tied to different aspects of decision making. This may be especially important given that we found that active coping partially mediated the relationship between behavioral tendency and actual behaviors. More research will be needed in this area.

<div align="center">Limitations</div>

These studies were not without their limitations. The largest limitation was the sample of relatively healthy undergraduates that we used. The health-related scales used in this paper have been validated using generally healthy samples and have been shown to be sensitive to the health issues experienced by the generally healthy (Jenkinson, Coulter, & Wright, 1994; Perneger, Leplege, Etter, & Rougemont, 1995; Watson & Pennebaker, 1989). However, we wanted to examine health as the product of an accumulation of poor health decisions. Although some health behaviors have immediate consequences, many others take some time to produce an impact. To illustrate, a single instance of drunk driving can have catastrophic implications for health, but it can take up to 25 years of daily drinking to produce serious liver damage (O'Shea, Dasarathy, & McCullough, 2009). With an average age of 19.53 for both studies, even the participants who consistently performed unhealthy behaviors would have been unlikely to have experienced many long-term consequences yet.

This may explain, in part, why we did not see any significant relationships between the two HC scales and health outcomes. In order to combat this limitation, we could have either

focused on more proximal health outcomes (e.g. STIs, alcohol poisoning, drug overdose) or recruited an older, more healthily diverse sample. Still, despite this limitation, we were encouraged by the fact that the HC scales (HC-BT in particular) predicted health behaviors. This suggests that we might be able to predict long-term health outcomes if we were to recruit a sample old enough for the cumulative effects of their behaviors to show.

A secondary limitation was use of sample norms in the scoring system. In the literature our scoring system was adapted from, the difference between scoring with expert norms and scoring with sample norms is seen to be negligible. For instance, when Mayer et al. (2003) scored their emotional intelligence test (the MSCEIT) using both expert and sample norms, they found correlations between the two scores that ranged from $r = .96$ to $r = .98$ across the different branches. However, some may argue that health is a much more specialized form of knowledge than emotional intelligence, and therefore not as suited to sample norm-based scoring procedures. In the particular domain of health, non-experts simply may not have the knowledge needed to identify effective ways of responding to health challenges. We would argue that the knowledge assessed in the HC measures is somewhat general in nature, such that the average non-expert should be reasonably able to identify correct responses. This is because it does not tap explicit health knowledge (e.g. "what kind of doctor would you see if you had a kidney problem?": Ownby, et al. 2013), but rather requires tacit knowledge that can be learned through experience (Cianciolo, Matthew, Sternberg, & Wagner, 2005; Wagner & Sternberg, 1985). Still, the difference between expert and sample norm scoring in the health domain is a theoretically interesting question. It would be useful to collect expert norms in the future to see if employing experts' specialized knowledge aids in the prediction of health outcomes.

Conclusion

In these studies, we sought to create and validate an ability based test of health competence. We did so by creating a scenario based measure that assessed knowledge of what is good for health (HC-K) and behavioral tendency for doing what is good for health (HC-BT). Although we did not find all hypothesized relationships, we found enough evidence to be encouraged by our measures. In particular, people high in health competence (behavioral tendency especially) tended to engage in a greater number of healthy behaviors and fewer risky health behaviors. Future work may want to look at extending the measures to more diverse populations and trying to figure out exactly what they do and do not predict.

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APPENDIX A. DEMOGRAPHICS

Demographics

1. What is your age? _____

2. Please indicate your gender: **Male**   **Female**

3. Please indicate your race by selecting one of the following:

    African American   **Asian or Pacific Islander**   **Hispanic**   **Native American**

    White/Caucasian   **Other (Please Specify: _____)**

4. Did you take the ACT or the SAT?   **ACT**   **SAT**   **N/A**

    4a. What was your ACT score for combined Math and Reading? (range = 0-36) _____

    4b. What was you SAT score for combined Math and Reading? (range = 0-1600) _____

5. What is your height in inches? _____

6. What is your weight in pounds? _____

(For Study 2 only)

7. What is your name? _____

8. What is your primary email address (the one that you check most often)?

_____

APPENDIX B. SITUATIONAL JUDGMENT TEST – HEALTH COMPETENCE-

EFFECTIVENESS

Instructions: We will describe a situation involving a named character - i.e., protagonist. You should read the situation, think about how the protagonist should deal with the situation, and then rate the effectiveness of ways that the protagonist could deal with the described situation. Each situation will be paired with 4 consecutive ways that the protagonist could deal with it.

*Note: These instructions are for the HC-E. For the HC-K and the HC-BT, please make the following changes to the instructions, scenarios, and endpoints.

HC-K
Instructions: "…and then rate how healthy each way of responding to the situation is in terms of physical health."
Scenario: "***If (character) did the following, how good or bad would it be for his/her physical health."
Endpoints: 1 = Very bad for physical health, 5 = Very good for physical health

HC-BT
Instructions: "…and then rate how likely you would be to do each response if you were the protagonist."
Scenarios: "***If you were (character) and you were in this situation, how likely would it be that you would do the following?:"
Endpoints: 1 = Not at all likely, 5 = Very likely

Scenario 1
Fred is a recovering alcoholic and a close friend has invited Fred to a wedding where Fred knows he will be tempted to drink. ***Rate the effectiveness of the following way that Fred could deal with the situation:

	Not at all effective			**Very effective**	
a. Don't go to the wedding	1	2	3	4	5
b. Bring a trusted friend to help him through the night	1	2	3	4	5
c. Go but leave if he feels tempted to drink	1	2	3	4	5
d. Decide it's ok to drink for the special occasion	1	2	3	4	5

Scenario 2
Emily has lost a number of relatives to cancer. ***Rate the effectiveness of the following way that Emily could deal with the situation:

	Not at all effective			Very effective	
a. Get regular screenings for cancer	1	2	3	4	5
b. Go on as normal	1	2	3	4	5
c. Read up about cancer	1	2	3	4	5
d. Make radical lifestyle changes	1	2	3	4	5

Scenario 3
Karen read an article about how important it is for college students to get flu shots. However, the nearest clinic offering free flu shots is 20 minutes away. ***Rate the effectiveness of the following way that Karen could deal with the situation:

	Not at all effective			Very effective	
a. Wait to see if lots of people are getting sick before taking time to get one	1	2	3	4	5
b. Pay $40 for a more local shot	1	2	3	4	5
c. Make a commitment to get a shot next year	1	2	3	4	5
d. Assume that her immune system is strong enough to fight off the virus without a shot	1	2	3	4	5

Scenario 4
Kaitlyn has had a couple drinks at a party. It's getting very late and she needs to get home. She thinks she might be OK to drive but is not sure. ***Rate the effectiveness of the following way that Kaitlyn could deal with the situation:

	Not at all effective			Very effective	
a. Drive around the block to see how she feels	1	2	3	4	5
b. Ask a stranger for a ride if necessary	1	2	3	4	5

| c. Drive slowly | 1 | 2 | 3 | 4 | 5 |

| d. Calculate her blood alcohol level based on the number of drinks | 1 | 2 | 3 | 4 | 5 |

Scenario 5

John has been having suicidal thoughts. ***Rate the effectiveness of the following way that John could deal with the situation:

	Not at all effective			**Very effective**	
a. Try to push the thoughts out of his mind	1	2	3	4	5
b. Make significant life changes	1	2	3	4	5
c. Try to keep busy	1	2	3	4	5
d. Tell a close friend	1	2	3	4	

Scenario 6

Natalie keeps missing lunch due to being so busy. ***Rate the effectiveness of the following way that Natalie could deal with the situation:

	Not at all effective			**Very effective**	
a. Have a drawer of snacks at her desk	1	2	3	4	5
b. Cut back on activities	1	2	3	4	5
c. Eat a bigger breakfast to make up for it	1	2	3	4	5
d. Look into fast food options	1	2	3	4	5

Scenario 7

Aiden is deciding whether to live in a neighborhood where crimes are fairly common. ***Rate the effectiveness of the following way that Aiden could deal with the situation:

	Not at all effective			**Very effective**	
a. Research crime statistics	1	2	3	4	5
b. Take precautions like a security system and carrying pepper spray	1	2	3	4	5
c. Move in but continue to survey the situation	1	2	3	4	5

d. Ask the neighbors for their opinions on the crimes	1	2	3	4	5

Scenario 8
Noah has a heater that appears incapable of heating the apartment above 50 degrees Fahrenheit. ***Rate the effectiveness of the following way that Noah could deal with the situation:

	Not at all effective			Very effective	
a. Call someone to repair it	1	2	3	4	5
b. Wear extra clothes to stay warm	1	2	3	4	5
c. Buy a space heater	1	2	3	4	5
d. Spend more time in public buildings	1	2	3	4	5

Scenario 9
Dominic slipped on some ice and hit his head fairly hard. He feels dizzy, but needs to drive 4 hours to get to a family reunion. ***Rate the effectiveness of the following way that Dominic could deal with the situation:

	Not at all effective			Very effective	
a. Shake it off	1	2	3	4	5
b. Resolve to pull over if symptoms get bad	1	2	3	4	5
c. Don't go to the reunion	1	2	3	4	5
d. Ask someone else to drive him to the reunion	1	2	3	4	5

Scenario 10
Tom wants to start eating healthy. He does not have a car and the only store that sells fresh fruits and vegetables is 8 miles away. ***Rate the effectiveness of the following way that Tom could deal with the situation:

	Not at all effective			Very effective	
a. Stick with eating the nearby fast foo	1	2	3	4	5
b. Wait to eat healthy until he can afford a car	1	2	3	4	5

	Not at all effective			Very effective	
c. Take the bus and stock up	1	2	3	4	5
d. Buy vitamins	1	2	3	4	5

Scenario 11
Sarah wants to go tanning for swimsuit season, but knows that skin cancer runs in her family.
***Rate the effectiveness of the following way that Sarah could deal with the situation:

	Not at all effective			Very effective	
a. Decide being tan is worth the risk	1	2	3	4	5
b. Get a spray tan instead	1	2	3	4	5
c. Go tanning but monitor for skin damage	1	2	3	4	5
d. Go tanning but resolve to quit next year	1	2	3	4	5

Scenario 12
Samantha really enjoys going downtown and getting blackout drunk every Friday and Saturday.
Her friends have become worried about her and have told her that she needs to stop. ***Rate the
effectiveness of the following way that Samantha could deal with the situation:

	Not at all effective			Very effective	
a. Take their advice and stop	1	2	3	4	5
b. Explain why getting drunk is not a problem	1	2	3	4	5
c. Hang out with people that don't mind partying	1	2	3	4	5
d Only go downtown on Fridays	1	2	3	4	5

Scenario 13
Jeremy wants to go out on his family's jet ski, but cannot find a lifejacket that fits him
properly.***Rate the effectiveness of the following way that Jeremy could deal with the
situation:

	Not at all effective			Very effective	
a. Wear a larger size even if it is too large	1	2	3	4	5
b. Go out on the jet ski, but keep	1	2	3	4	5

at a slower speed

c. Don't go out on the jet ski	1	2	3	4	5
d. Wait to go on the jet ski until he can find a proper life jacket	1	2	3	4	5

Scenario 14
Kirstin wants to sit in the front seat next to her friend but there is no seat belt. ***Rate the effectiveness of the following way that Kirstin could deal with the situation:

	Not at all effective			**Very effective**	
a. Sit up front without a seatbelt	1	2	3	4	5
b. Ask the friend to drive cautiously	1	2	3	4	5
c. Refuse to sit in a seat without a seatbelt	1	2	3	4	5
d. Ask about other safety features of the car	1	2	3	4	5

Scenario 15
Zoe is driving a car that is prone to skidding when it is snowy and icy. ***Rate the effectiveness of the following way that Zoe could deal with the situation:

	Not at all effective			**Very effective**	
a. Don't drive when it is icy and snowy	1	2	3	4	5
b. Drive slower when it is snowy and icy	1	2	3	4	5
c. Pump the brakes more often	1	2	3	4	5
d. Invest in better tires	1	2	3	4	5

Scenario 16
Gavin eats a very large amount of food when depressed. ***Rate the effectiveness of the following way that Gavin could deal with the situation:

	Not at all effective			**Very effective**	
a. Stop getting depressed	1	2	3	4	5
b. Ask a friend to help him cut back	1	2	3	4	5
c. Purge the food if necessary	1	2	3	4	5

d. Keep eating as long as it helps   1   2   3   4   5
   him feel better

Scenario 17
Charles likes working when there are deadlines and there is a lot of time pressure. ***Rate the effectiveness of the following way that Charles could deal with the situation:

	Not at all effective			**Very effective**	
a. Keep using this strategy if it is what works best for him	1	2	3	4	5
b. Work ahead and try not to procrastinate	1	2	3	4	5
c. Work hard but eat more	1	2	3	4	5
d. Set smaller personal deadlines throughout the project	1	2	3	4	5

Scenario 18
Kaylee has not eaten all day and is feeling faint. ***Rate the effectiveness of the following way that Kaylee could deal with the situation:

	Not at all effective			**Very effective**	
a. Stop what she is doing and find something to eat	1	2	3	4	5
b. Lay down	1	2	3	4	5
c. Buy a couple of candy bars	1	2	3	4	5
d. Tell herself that she can wait a little while longer to eat	1	2	3	4	5

Scenario 19
Scott wants to get in shape but realizes that he hates exercising. ***Rate the effectiveness of the following way that Scott could deal with the situation:

	Not at all effective			**Very effective**	
a. Try out a few different types of exercise to see what works	1	2	3	4	5
b. Work out very hard for a short period of time	1	2	3	4	5
c. Try dieting instead	1	2	3	4	5

d. Stop exercising   1   2   3   4   5

Scenario 20

Melissa's doctor told her that if she does not make several major lifestyle changes, she will be at major risk for a heart attack. ***Rate the effectiveness of the following way that Melissa could deal with the situation:

	Not at all effective			**Very effective**	
a. Don't make the changes so she can keep doing what she enjoys	1	2	3	4	5
b. Make a dramatic shift in diet and exercise	1	2	3	4	5
c. Make one change at a time	1	2	3	4	5
d. Get an opinion from a second doctor	1	2	3	4	5

APPENDIX C. SHORT FORM – 36

Please read each of the following statements and indicate your response using the options provided.

Question 1

In general, would you say your health is:	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5

Question 3

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

3a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3c. Lifting or carrying groceries	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3d. Climbing several flights of stairs	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3e. Climbing one flight of stairs	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3f. Bending, kneeling, or stooping	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3g. Walking more than a mile	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3h. Walking several blocks	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3i. Walking one block	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

3j. Bathing or dressing yourself	Yes, limited a lot	Yes, limited a little	No, not limited at all
	1	2	3

Questions 11

How True or False is each of the following statements for you?

11a. I seem to get sick a little easier than other people	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	1	2	3	4	5

11b. I am as healthy as anybody I know	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	1	2	3	4	5

11c. I expect my health to get worse	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	1	2	3	4	5

11d. My health is excellent	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	1	2	3	4	5

APPENDIX D. SOUTHERN METHODIST UNIVERSITY HEALTH QUESTIONNAIRE

Please select every health problem you have had during the last year. Be sure to select every health problem you used to have but now control with medication or treatment.

____cold or flu   ____significant weight gain
____diabetes   ____significant weight loss
____anemia   ____headache (not migraine)
____fainting   ____low blood pressure
____hernia   ____high blood pressure (hypertension)
____diarrhea   ____arthritis or rheumatism
____hemorrhoids   ____abdominal or stomach pain
____rash   ____gall bladder problems
____appendicitis   ____lung or respiratory problems
____paralysis   ____heartbeat irregularity
____ulcer   ____high cholesterol
____skin cancer   ____chronic back problem
____sore throat   ____kidney or urinary tract problems
____constipation   ____eye problem (sty, cataract)
____ear ache   ____thrombosis (blood clots)
____vomiting   ____water retention (bloating)
____asthma   ____serious dental problems (incl. gums)
____emphysema   ____angina or chest pain
____colitis   ____migraine headache
____seizures   ____thyroid problem
____bulimia   ____anorexia nervosa
____allergies   ____grinding of teeth or TMJ
____blackouts   ____multiple sclerosis
____depression   ____breast cancer
____indigestion   ____other cancer
____severe acne   ____benign tumor
____mononucleosis   ____liver problem
____broken bones   ____sexual problems (impotency,frigidity)
____pregnancy   ____venereal disease (incl. herpes)
____endometriosis (cramps)   ____pre-menstrual syndrome
____obesity   ____other reproductive (cysts, prostate)
____other health problems; Specify:

APPENDIX E. COGNITIVE APPRAISAL OF RISKY EVENTS – REVISED

Please complete the following sentence:

A. A regular partner is someone that I have dated for at least _____ **(specify number)** weeks. When asked about a regular partner below, please use this definition.

B. We would like to know how often you participated in the following activities during the past 6 months. Please indicate the number of times that you engaged in each behavior over the past 6 months. Please use the following scale:

0 = 0 times,
1 = 1-2 times
2 = 3-5 times
3 = 6-10 times
4 = 11-20 times
5 = 21-30 times
6 = 31 or more times

1. Had Sex with someone I just met or do not know well

2. Had sex without protection against pregnancy with someone I just met or do not know well

3. Had sex without protection against sexually transmitted diseases with someone I just met or do not know well

4. Used condoms for sexual intercourse with someone I just met or do not know well

5. Had sexual intercourse while under the influence of alcohol with someone I just met or do not know well

6. Had sexual intercourse while under the influence of drugs other than alcohol with someone I just met or do not know well

7. Had sex without a condom with someone I just met or do not know well

8. Had sex with someone other than my regular partner (as defined in A)

9. Had sex with a NEW partner

10. Left a social event with someone I just met or did not know well.

11. Chose to abstain from sexual activity due to concerns about pregnancy or sexually transmitted diseases.

12. Had sexual intercourse because partner used verbal pressure or threats (females only).

13. Had sexual intercourse because partner used physical violence. (females only)

14. Was drunk with someone I did not know well (females only)

15. Had sexual intercourse because partner was too aroused to stop. (females only)

16. Had sexual intercourse because of partner's continual pressure (e.g., threats to end relationship). (females only)

17. Convinced partner to have sexual intercourse through verbal pressure or threats. (males only)

18. Convinced partner to have sexual intercourse through use of physical force. (males only)

19. Made sexual advances towards a drunk date. (males only)

20. Convinced partner to have sexual intercourse because I was too aroused to stop. (males only)

21. Convinced partner to have sexual intercourse through continual pressure. (males only)

22. Tried/used drugs other than alcohol.

     a. Marijuana

     b. Cocaine

     c. Hallucinogens

     d. Amphetamines (speed)

     e. Inhalants

     f. Others (specify:_____)

23. Drove after drinking

     …1-2 alcoholic beverages

     …3-4 alcoholic beverages

     …5 or more alcoholic beverages

24. Drank more than 5 alcoholic beverages.

25. Drank alcohol too quickly.

26. Mixed drugs and alcohol.

27. Played drinking games.

28. Rode in a car with someone who had consumed alcohol.

APPENDIX F. PROTECTIVE HEALTH MEASURE

Please read the following behaviors and indicate how frequently you do each behavior.

1	2	3	4	5	6	7
Never			Sometimes			Often

1. Eat sensibly
2. Get enough sleep
3. Keep emergency phone numbers in your phone
4. Get enough relaxation
5. Have a first aid kit in your home
6. Destroy old or unused medications
7. See a doctor for a regular checkup
8. Pray of live by the principles of religion
9. Avoid getting chilled
10. Watch one's weight
11. Do things in moderation
12. Get enough exercise
13. Avoid parts of the city with a lot of crime
14. Don't smoke
15. Check the condition of electrical appliances (e.g. the car, etc.)
16. Don't let things "get me down"
17 Fix broken things around the home right away
18. See a dentist for a regular checkup
19. Avoid contact with doctors when feeling ok
20. Spend free time outdoors
21. Avoid overworking
22. Limit foods like sugar, coffee, fats, etc.
23. Avoid over-the-counter medicines
24. Ignore health advice from lay friends, neighbors, and relatives
25. Take vitamins
26. Don't drink alcohol
27. Wear a seat belt when in a car
28. Avoid parts of the city with a lot of pollution
29. Discuss health with lay friend, neighbors, and relatives
30. Use dental floss

APPENDIX G. PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. For each question choose from the following alternatives:

0= never   1 = almost never   2 = sometimes   3 = fairly often   4 = very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

2. In the last month, how often have you felt that you were unable to control the important things in your life?

3. In the last month, how often have you felt nervous and "stressed"?

4. In the last month, how often have you dealt successfully with irritating life hassles?

5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?

6. In the last month, how often have you felt confident about your ability to handle your personal problems?

7. In the last month, how often have you felt that things were going your way?

8. In the last month, how often have you found that you could not cope with all the things that you had to do?

9. In the last month, how often have you been able to control irritations in your life?

10. In the last month, how often have you felt that you were on top of things?

11. In the last month, how often have you been angered because of things that happened that were outside of your control?

12. In the last month, how often have you found yourself thinking about things that you have to accomplish?

13. In the last month, how often have you been able to control the way you spend your time?

14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

APPENDIX H. COPE

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

> **1 = I usually don't do this at all**
> **2 = I usually do this a little bit**
> **3 = I usually do this a medium amount**
> **4 = I usually do this a lot**

1. I concentrate my efforts on doing something about it

2. I say to myself "this isn't real"

3. I admit to myself that I can't deal with it and quit trying

4. I make a plan of action.

5. I just give up trying to reach my goal.

6. I take additional action to try to get rid of the problem.

7. I refuse to believe that is has happened.

8. I try to come up with a strategy about what to do.

9. I give up the attempt to get what I want.

10. I think about how I might best handle the problem

11. I pretend that it hasn't really happened.

12. I take direct action to get around the problem

13. I reduce the amount of effort I'm putting into solving the problem

14. I think hard about what steps to take

15. I act as though it hasn't really happened.

16. I do what has to be done, one step at a time.

APPENDIX I. BIG-FIVE FACTOR MARKERS

Please read each of the following statements and indicate how accurately each statement describes you.

1 = Very Inaccurate,
2 = Moderately Inaccurate,
3 = Neither accurate nor inaccurate,
4 = Moderately Accurate,
5 = Very Accurate

1. I am the life of the party.
2. I feel comfortable around people.

3. I start conversations.

4. I talk to a lot of different people at parties.

5. I don't mind being the center of attention.

6. I don't talk a lot.

7. I keep in the background

8. I have little to say

9. I don't like to draw attention to myself.

10. I am quiet around strangers.

11. I am interested in people.

12. I sympathize with other's feelings.

13. I have a soft heart.

14. I take time out for others.

15. I feel other's emotions.

16. I make people feel at ease.

17. I am not really interested in others.

18. I insult people.

19. I am not interested in other people's problems.

20. I feel little concern for others.

21. I am always prepared.

22. I pay attention to details.

23. I get chores done right away.

24. I like order.

25. I follow a schedule.

26. I am exacting in my work.

27. I leave my belongings around.

28. I make a mess of things.

29. I often forget to put things back in their proper place.

30. I shirk my duties.

31. I have a rich vocabulary.

32. I have a vivid imagination.

33. I have excellent ideas.

34. I am quick to understand things.

35. I use difficult words.

36. I spend time reflecting on things.

37. I am full of ideas.

38. I have difficulty understanding abstract ideas.

39. I am not interested in abstract ideas.

40. I do not have a good imagination.

41. I am relaxed most of the time.

42. I seldom feel blue.

43. I get stressed out easily.

44. I worry about things.

45. I am easily disturbed.

46. I get upset easily.

47. I change my mood a lot.

48. I have frequent mood swings.

49. I get irritated easily.

50. I often feel blue.

APPENDIX J. DAILY DIARY SURVEY

How many times did the following things happen to you today? Use the following scale:

0 = not a single time, 1 = one time, 2 = two times, 3 = more than two times

1. Had a deadline to worry about.

2. Had a lot of responsibilities.

3. Not enough time to meet obligations.

4. Too many things to do at once.

5. Was tempted to do something unhealthy.

6. Wanted to do what's fun, regardless of health considerations.

7. Thought about doing something unhealthy.

8. Felt pressure to engage in unhealthy behavior.

To what extent did you feel each of the following today? Use the following scale:

1 = Not at all, 2 = A little, 3 = Moderately, 4 = Quite a bit, 5 = Extremely

1. Headaches

2. Upset stomach

3. Sore muscles

4. Insomnia or difficulty sleeping

How much do you agree with each of the following statements about your day today? Use the following scale:

1 = Strongly Disagree, 5 = Strongly Agree

1. When something stressful happened today, I concentrated my efforts into doing something about it.
2. When something stressful happened today, I did what had to be done one step at a time.

3. When something stressful happened today, I refused to believe that it had happened.

4. When something stressful happened today, I acted as though it hadn't even happened.

How many times did you do the following behaviors today? Use the following scale:

0 = not a single time, 1 = 1-2 times, 2 = 3-5 times, 3 = more than 5 times (i.e., often)

1. Was self-indulgent

2. Gave into an urge

3. Resisted temptation

4. Exercised self-control

5. Had an alcoholic beverage

6. Had a cigarette or tobacco product

7. Had marijuana or some other drug

8. Ate fruits or vegetables

9. Had healthy carbs and whole grains

10. Drank water

11. Had a sugary soda

12. Ate fatty or sugary food

13. Ate unhealthy fast food

14. Exercised

15. Went to the gym

16. Did a cardiovascular exercise