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Ego effectiveness: A novel individual difference approach to health behavior and coping

Michael D Robinson[1] (iD), Roberta L Irvin[1] and Michelle R Persich[2]

Abstract

Taking care of one's health can require trading current feelings for longer-term considerations of health and well-being. The present research (total $N = 366$) sought to assess ego operations of this type in terms of the extent to which the self would be capable of responding to health-challenging situations in ways deemed to be effective. Ego effective individuals engaged in a greater frequency of health-protective behaviors as well as a lesser frequency of risky behaviors, both with respect to a peer protocol (Study 1) and a daily life protocol (Study 2). Findings are informative concerning multiple self-regulation perspectives on health.

Keywords

effectiveness, ego, health behavior, self, self-regulation

Although early Freudian theory emphasized the primitive unconscious forces that seemed to underlie much of human behavior, Freud came to appreciate the executive components of the self to an increasing degree throughout the course of his career (Wallerstein, 2002). The idea that most human beings develop a functional ego, which is capable of rational, long-term decision-making, was increasingly emphasized by Anna Freud and then Heinz Hartmann, whose work shifted psychoanalytic thinking from a focus on unconscious forces to a greater interest in the ways in which these unconscious forces could be tamed or managed (Wallerstein, 2002). The ego can be thought of in terms of the agentic, rational components of the self that stabilize decision-making while guiding behavior toward long-term goals, even when there are temporary hedonic costs (Baumeister et al., 2000).

Although psychoanalytic theorizing has more recently moved into a complicated post-modern phase (Wallerstein, 2002), the idea of an ego or agentic component of self is central to most social-personality theories of self-control and self-regulation (De Ridder and De Wit, 2006). Baumeister and colleagues have contended, for example, that many failures of self-regulation can be attributed to the temporary depletion of the ego's resources (which are limited) or to an ego that is simply not strong enough to resist temptations and distractions (Baumeister et al., 2007). Similarly, Jack and Jeanne Block made the ego central to their dynamic theory of personality and development, specifically in the

[1]North Dakota State University, USA
[2]University of Arizona, USA

Corresponding author:
Michael D Robinson, Psychology, North Dakota State University, NDSU Dept. 2765, PO Box 6050, Fargo, ND 58108-6050, USA.
Email: Michael.D.Robinson@ndsu.edu

form of the constructs of ego-control and ego-resiliency (Block and Block, 2006). Ego-control involves the control of affect and ego-resiliency relates to the manner in which the self is able to modulate its functioning to match situational characteristics (Block and Block, 2006). In more recent work, Carver and colleagues have contrasted impulsive (id-like) influences on decision-making with reflective (ego-like) influences (Carver et al., 2017). The latter influences can be traced back to Freud and are thought to be broadly protective against psychopathology and dysfunction (Carver et al., 2017).

Within personality psychology, the functions ascribed to the ego would seem to overlap with the personality trait of conscientiousness, which is also a robust predictor of health behavior (Bogg and Roberts, 2013) and—to some extent—health (Murray and Booth, 2015). For example, conscientiousness has been described in terms of impulse control (Bogg and Roberts, 2013) or maturity (Soto et al., 2011) and this trait dimension has also been linked to lifespan longevity in several studies (Murray and Booth, 2015). There are criticisms of the trait approach to personality, however, and prominent theorists have called for alternative approaches (Baumert et al., 2017). In particular, conscientiousness is assessed by asking people to characterize their tendencies toward planfulness and self-control in the absence of specific situational input (Lievens, 2017). What people say under such circumstances could primarily reflect the global self-concept (Robinson and Sedikides, 2020) rather than the mechanisms that give rise to behavior, which are both situation-specific and dynamic in nature (Baumert et al., 2017). In this context, there are likely to be benefits to "bottom-up" approaches to assessment (Cervone, 1997) that seek to model the social cognitive processes that govern person-situation responding (Lievens, 2017; Shoda and Mischel, 2000). In the present research, we apply thinking of this type to an assessment of ego operations in the health and health behavior domains.

Although it is customary to think of the ego as a singular entity, it must actually consist of a system with multiple parts or functions (Wallerstein, 2002). This may be most clearly seen in cybernetic theories of self-regulation, which posit one component that monitors current functioning, another component that consists of standards for behavior (goals, idealized visions of the self), and a third component that operates to reduce discrepancies between current functioning and idealized functioning (Carver and Scheier, 1998). From this perspective, self-control happens when the person aligns the actual self (i.e. what the actual self is doing) with ideas about what it should be doing or what makes the most sense for one's long-term goals (Duckworth and Steinberg, 2015). While it is reasonable to infer self-regulation failure in the case of some behaviors or non-behaviors (e.g. procrastination, alcoholism), in other cases an outside perspective could be mistaken because people have different goals and standards (Carver and Scheier, 1998). For this reason, a model of the self-regulation process or of the ego's effectiveness should probably consider the person's own ideas about what they (ideally) should be doing, form the self's own perspective. Such thinking has led to fairly complex and philosophical theorizing about the "ideal self" and the role that it might play in both energizing and evaluating a person's actions (Boyatzis and Akrivou, 2006). In the present research, we sought to contribute to such theories by developing a social cognitive (Cervone, 1997; Shoda and Mischel, 2000) method capable of quantifying degrees of alignment (Duckworth and Steinberg, 2015) in ways that are empirically tractable.

In this connection, we sought to build on the situational judgment test (SJT) method, which uses scenario descriptions to simulate forms of behavioral responding that are sensitive to the ecological features that guide behavior (Corstjens et al., 2017; Lievens, 2017). Although the method elicits ideas about responding rather than actual behavior, the method is capable of simulating responses to events that would be nearly impossible to instantiate in the laboratory (Persich and Robinson, 2020) and it is capable of doing so in

the context of fairly impressive validity coefficients (O'Connor et al., 2001; Robinson and Clore, 2001). In addition to the assessment-related advantages of the method (Lievens, 2017; Persich and Robinson, 2020), we were interested in applying SJT-influenced techniques for two additional reasons. As Lievens (2017) points out, the SJT is capable of modeling within-person variations in behavior, for example across different types of situations. Such within-person processes have often been emphasized in social cognitive approaches to behavior and self-regulation (Schwarzer, 2001) and the advantages of eliciting many simulated behavioral responses, from the same participants, will become apparent later in the paper.

In addition, the SJT literature has used at least two different sets of response instructions (Ployhart and Ehrhart, 2003). In some cases, individuals have been asked what they, personally, "would do" in the different situations that the test simulates. In other cases, by contrast, individuals have been asked what they or others "should do" when encountering the same sorts of circumstances. The first sort of instruction attempts to place the self, as an actor, into the simulated context (Persich and Robinson, 2020), while the second sort of instruction probes for more idealized ideas about how a person (including the self) should respond (Ployhart and Ehrhart, 2003). Both sorts of tests have been shown to predict behavior and job performance, but it is also clear that the two sorts of tests are pulling for different sources of knowledge (MacDaniel et al., 2007). Relevant to the current context, "should do" instructions would seem to capture the person's ideas of ideal ways in which they might respond (to a variety of challenges and circumstances). By contrast, "would do" instructions seem suited in capturing the actual ways in which the person tends to respond (to the same challenges and circumstances). By correlating the two sets of ratings with each other, we could quantify degrees of alignment between the actual self and the ideal self (with degree of alignment also termed ego effectiveness), separately so for each individual. It should then be possible to compare different individuals to each other. Some individuals are likely to exhibit low levels of ego effectiveness (i.e. self-ratings that do not align with effectiveness ratings: $r=0$) and others are likely to exhibit high levels (e.g. $r=0.90$), with many also in between (e.g. $r=0.60$). In the present research, we develop this approach and consider its promise as a way of aligning individuals along an ego effectiveness dimension.

We then apply this analysis to the domain of health behavior because, in this domain, people often act in non-optimal ways (De Ridder and De Wit, 2006). Individuals would like to eat healthily, get enough sleep, and exercise, but they do not engage in these behaviors as often as they might wish (Schwarzer, 2001). Conversely, individuals also engage in risky behaviors such as drinking too much, unprotected sex, and the like, that can compromise health, either acutely or over the long-term (Hofmann et al., 2008). According to Hall and Fong (2007), issues of this type often result from failures to transcend the moment in the service of long-term goals. Similarly, Hofmann et al. (2008) argue that the impulsive system can favor behaviors, such as eating fatty food, that provide immediate pleasures, but can be problematic if repeated. Something like an ego, then, is needed to represent long-term considerations while aligning current behaviors with courses of action that tend to be health-promoting (De Ridder and De Wit, 2006).

The ego is conceptualized as an active rather than passive or avoidant entity (Baumeister et al., 2000). Following this line of thinking, an ego effectiveness index (actual-ideal alignment) was expected to correlate positively with approach-related forms of coping (e.g. active coping) and negatively with avoidance-related forms of coping (e.g. denial). Furthermore, ego effective individuals should be less prone to both "omission" and "commission" errors in the health behavior realm. That is, they should exhibit a greater frequency of health-protective behaviors, which are behaviors that people perform to protect and preserve their health, such as eating sensibly, getting enough sleep, and

exercising. Conversely, ego effective individuals should be less prone to risky behaviors, including those related to alcohol and drug use as well as unplanned sexual activity. We examined these and other hypotheses in two studies that included ambitious elements related to peer (Study 1) and daily diary (Study 2) reports of health behavior.

Before commencing with the primary studies, we conducted a pilot test ($n=103$) to examine relationships between health-related ego effectiveness (see below for assessment details) and the Big five personality traits. Ego effectiveness was positively correlated with the personality trait of conscientiousness, but the magnitude of this correlation was modest, $r=0.25$, $p=0.038$. Ego effectiveness did not display significant correlations with extraversion, $r=0.02$, $p=0.844$, agreeableness, $r=0.07$, $p=0.562$, neuroticism, $r=-0.23$, $p=0.060$, or openness to experience, $r=0.10$, $p=0.405$. Overall, we conclude that ego effectiveness captures dynamic self-regulatory processes that cannot be equated with personality traits, as they are typically assessed.

In summary, we conducted two studies with aims and hypotheses that included the following:

Aim 1: Develop a model of health-related ego effectiveness.

Aim 2: Examine whether ego effectiveness matters for health behaviors and associated outcomes.

Hypothesis 1: Ego effective individuals will cope with stressors and problems in approach-oriented ways. Ego ineffective individuals will be prone to avoidance-oriented coping.

Hypothesis 2: Ego effectiveness will positively predict the frequency of health-protective behaviors (e.g. eating sensibly, taking vitamins).

Hypothesis 3: Ego effectiveness will negatively predict the frequency of risky behaviors (e.g. binge drinking).

Hypothesis 4: Ego effectiveness will correlate positively with healthy behaviors (e.g. exercise) and negatively with unhealthy behaviors (e.g. drug use).

Study 1

Method

Participants and general procedures. Both studies were approved by the University's Institutional Review Board. Based on previous results involving scenario assessment methods and their correlates, we wanted to give ourselves 0.80 power to detect significant correlations in the 0.25 range. G*Power software recommended a sample size of 120, but we sought to exceed this number in anticipation of attrition with respect to peer reports. A sample of 183 undergraduate students (62.30% female; 90.71% Caucasian; $M_{age}=19.02$) from a north Midwestern university signed up for the "Peer Health Study" and arrived to the laboratory in groups of six or fewer. After written informed consent, participants were assigned to individual computer rooms with personal computers. Laboratory assessments were made using MediaLab software and the health scenario measure was administered prior to the outcome-based measures.

As part of the study, participants had been instructed to arrive to the laboratory with the names and email addresses of three peers who knew them reasonably well who would be able to complete a short survey about them. Irrespective of this instruction, 33 of the 183 participants managed to skip the peer-based component of the MediaLab questionnaire and/ or they provided less than three usable email addresses. Accordingly, peer reports were sought for 150 of the participants and we obtained at least two peer reports (an a priori criterion) for 123 participants, which met sample size goals.

Health-related ego effectiveness. Robinson et al. (2020) wrote and selected health-related scenarios as a way of studying health competence, which was defined in terms of possessing

knowledge concerning health behaviors that corresponded with expert opinion (e.g. from nutritionists or nurse practitioners). For the present project, we sought to use these scenarios to study crucial processes involved in self-regulation. Because the creation and development of the scenarios was described elsewhere (Robinson et al., 2020), briefer statements will be made here. Originally, the pool consisted of a fairly large number of scenarios involving "health challenges," which are everyday sorts of situations in which individuals have to make decisions that could affect their health (e.g. related to disease risk, sexual practices, matters of diet and exercise, safety concerns). These brief but evocative scenarios were then paired with four ways that a person could respond to the situation. All ways of responding are realistic, but not all would likely be effective (e.g. one could go to a party, despite problems with alcohol). After several stages of evaluation (involving expert ratings and selection based on item-total correlations in an undergraduate sample), 10 scenarios, which corresponds with 40 ways of responding, were ultimately chosen.

In the situational judgment test (SJT) literature, materials of the present type are often paired with two different sorts of response instructions: Individuals might be asked what they "would do" in the relevant situations or they might be asked what they "should do." The former type of instruction is thought to assess the behavioral tendencies of the self and the latter sort of instruction is thought to tap one's knowledge concerning appropriate ways of responding. Both sorts of instructions have been shown to produce valid tests (Corstjens et al., 2017; MacDaniel et al., 2007). In the present case, we used both instruction frames as a way of studying a crucial (and novel) question concerning self-regulation—namely, whether the individual can straightforwardly do what they, themselves, deem to be effective. Individuals should differ in this regard and the relevant differences are likely to have major implications for understanding variability in health behavior and well-being (e.g. Rogers, 1961).

The materials are relevant to everyday health decision-making (Robinson et al., 2020) and describe situations involving a flu shot, an injury, practical difficulties in healthy eating, a desire for skin tanning, binge drinking, risky sports, seat belt usage, binge eating, boredom while exercising, and a warning from the doctor. During one presentation of the materials, participants rated the "health-related effectiveness" of the different ways of responding (1 = not at all effective; 5 = very effective). During a later presentation of the same materials, participants indicated how likely it is (1 = not at all likely; 5 = very likely) that they would respond to each situation in each of the four indicated ways, presumably drawing from past personal experience (or knowledge about the self: Cervone, 1997) in making these ratings.

On the basis of the two sets of responses, we designed a new method for assessing ego effectiveness, which we defined in terms of a capacity for the self to straightforwardly do what it deems to be effective, without complications or problems (Block and Block, 2006; Gillebaart and De Ridder, 2015). To assess these agentic components of the self, we computed a within-subject correlation between what the self would do (self-likelihood ratings) and what the self deems to be effective (effectiveness ratings), with the 40 ways of responding as the relevant data set. The average correlation was 0.61, indicating that the average self tends to do what it deems to be effective. These coefficients, though, ranged from −0.25 to 0.94, suggesting the presence of fairly pronounced individual differences.

To determine the reliability of the assessment system, we then computed one correlation for odd-numbered responses and a second correlation for even-numbered responses. These independent estimates correlated with each other strongly (0.75) and yielded a 0.86 reliability estimate by the Spearman-Brown correction formula (Kremen and Block, 1998). Hence, individuals were consistent in their tendencies to pursue (simulated) courses of action that they deemed to be effective and/or they exhibited difficulties in doing so.

As another way of examining the relevant dynamics, we computed self and effectiveness means for each of the 40 ways of responding and then computed difference scores as a way of understanding discrepancies. Omission errors, which are defined in terms of self-ratings that are lower than effectiveness ratings, tended to involve non-enjoyable courses of action that should nevertheless benefit the self in the long-term (e.g. cutting down on binge-drinking on advice from friends). Commission errors, which are defined in terms of self-ratings that are higher than effectiveness ratings, by contrast, tended to involve wishful thinking or actions done for their potential hedonic benefits (e.g. overeating as a way of dealing with depressed feelings). In general, then, both types of errors seemed to involve conflicts between hedonic considerations and long-term impact (Hall and Fong, 2007), but there were many subtle ways in which such dynamics played out. The average participant exhibited an omission rate of 24.98% and a commission rate of 30.13% and these percentages will be revisited in the results section.

Outcomes related to coping and behavior. Ego effectiveness, we reasoned, should correlate positively with forms of coping that are proactive and action-oriented. By contrast, it should correlate negatively with forms of coping that are passive or avoidant. To examine such predictions, we administered the four scales of the COPE (Carver et al., 1989) that load on approach and avoidance factors to the greatest extent (Litman, 2006). Participants were asked to indicate the frequency ($1 =$ I usually don't do this at all; $4 =$ I usually do this a lot) with which they cope with stressors in their lives in particular ways and there were four items each for active coping ($M = 2.94$; $SD = 0.57$; $\alpha = 0.68$), planning ($M = 3.24$; $SD = 0.59$; $\alpha = .76$), denial ($M = 1.62$; $SD = 0.58$; $\alpha = 0.74$), and disengagement ($M = 1.69$; $SD = 0.56$; $\alpha = 0.71$).

To preserve and maintain health, individuals need to engage in behaviors that are both sensible and health-protective, such as wearing seatbelts, getting enough sleep, and eating fruits and vegetables. Such behaviors should be more likely at higher relative to lower levels of ego effectiveness, in part because enacting these behaviors often requires strategic, long-term thinking (Hall and Fong, 2007). To investigate relations of this type, we asked participants to complete the 30-item Harris and Guten (1979) measure, which asks about the frequency ($1 =$ never; $7 =$ often) with which individuals take care of their health by eating healthily, getting enough sleep, fixing safety hazards around the house, etc. ($M = 4.46$; $SD = 0.64$; $\alpha = 0.79$). We also quantified safety (e.g. "wear a seat belt": $M = 4.63$; $SD = 0.91$; $\alpha = .65$) and weight management (e.g. "get enough exercise": $M = 4.71$; $SD = 1.19$; $\alpha = 0.66$) subscale scores on the basis of the factor analysis results of Salovey et al. (1987).

Conversely, we hypothesized that individuals with low ego effectiveness scores would be more prone to risky health behaviors, which are often motivated by immediate visceral urges (Hofmann et al., 2008). To examine hypotheses of this type, we administered key items from the Youth Risk Behavior Survey (YRBS), which the CDC has used to track epidemiological health risks in community-wide and national terms (Brener et al., 2002). The items involve specific, objective behaviors (e.g. using alcohol or drugs prior to sexual intercourse) in combination with different types of response scales, some of which are dichotomous (e.g. yes or no). However, they can be grouped to form indexes with enough attention to detail (Brener et al., 2002; Voigt et al., 2009). All items were first rescored so that higher numbers indicated greater risk. All items were then z-scored, which deals with the problem of heterogeneous response scales, and then averaged for a particular domain such as smoking (Voigt et al., 2009). Finally, the scales were log-transformed to reduce positive skew. As pointed out by Voigt et al. (2009), items in these measures are causal indicators rather than effect indicators (Bollen and Lennox, 1991) and internal reliability coefficients are misleading in evaluating their nature (Fayers, 2004). Instead, Brener et al. (2002) report that test-retest stability for the items tends to be very good, which indicates reliable measurement

(Fayers, 2004). In addition to computing indexes for smoking behavior, alcohol use, drug use, and risky sex, we computed a risky behavior total score. Means and standard deviations are not reported given the standardization procedures that were used (Voigt et al., 2009).

Finally, through their behavioral successes, individuals with higher levels of ego effectiveness are likely to develop a greater sense of self-efficacy in the health realm (Bandura, 1994). To examine this possibility, we administered the Perceived Health Competence Scale (Smith et al., 1995), which has eight items tapping general perceptions of one's abilities with respect to health behavior management ($M = 3.80$; SD $= 0.72$; $\alpha = 0.84$).

Peer-based protocol. At the end of the laboratory-based portion of the study, emails were sent to 450 peers, who were told that the participant was in a psychology study and that responses to a short survey would contribute to the participant's research requirement. Consenting peers opened a link to a brief Qualtrics-programmed survey and completed the survey online, in a location of their choosing. After typing in the name of the target and their own email address (for matching purposes), peers reported on their knowledge of the target as well as their perceptions of target behavior. Usable responses were obtained from 362 peers in relation to 147 targets. However, peer data were dropped if the target had only one peer report, which was an a priori criterion. Among the 123 targets that could be included, the average had 2.72 peer observations. Of note, the average peer had known the participant for longer than a year, knew the target fairly well ($M = 4.41$ on a 5-point scale), and liked the target ($M = 6.62$ on a 7-point scale). Most peers characterized themselves as friends (65.78%) or family (27.16%).

We were primarily interested in peer-based observations of target behavior. First, we chose 12 health-protective behavior items from Harris and Guten (1979) that seemed common enough and observable. Peers reported on how often (1 = never; 7 = often) the target gets enough exercise, wears a seatbelt, gets enough sleep, etc. (across participants, $M = 5.09$; SD $= 0.73$; $\alpha = 0.85$). Peer agreement was quantified by the r_{wg} statistic, which assesses the extent to which peers agree with each other sufficiently that their scores can be considered interchangeable (Lanz et al., 2018). This coefficient was 0.80 in the present study, which is consistent with "strong" agreement (Lanz et al., 2018).

In addition, peers reported on how frequently (1 = the target never does this; 5 = the target often does this) the target engages in risky behavior, with two items per scale. This procedure resulted in peer-based estimates for risky sex (e.g. "has sex with strangers": $M = 1.38$; SD $= 0.61$; $\alpha = 0.56$; $r_{wg} = 0.81$), alcohol abuse (e.g. "drinks too much alcohol": $M = 1.74$; SD $= 0.82$; $\alpha = 0.92$; $r_{wg} = 0.62$), drugs (e.g. "uses drugs other than alcohol": $M = 1.29$; SD $= 0.70$; $\alpha = .97$; $r_{wg} = .82$), and risky behavior, generally considered (e.g. "engages in impulsive behavior": $M = 1.57$; SD $= 0.68$; $\alpha = 0.82$; $r_{wg} = 0.73$). In addition, we computed a total score that averaged across all administered items ($M = 1.50$; SD $= 0.60$; $\alpha = 0.89$; $r_{wg} = 0.84$).

We were primarily interested in the behaviorally-anchored scales mentioned above. However, we also created a face valid 5-item measure of perceived health (e.g. "this person is healthy"). Peers were asked whether they agreed or disagreed with each of the statements (1 = strongly disagree; 5 = strongly agree) and a total score was computed by averaging across items ($M = 4.33$; SD $= 0.62$; $\alpha = 0.91$; $r_{wg} = 0.75$).

Results

Initial analyzes

Ego effectiveness scores correlated somewhat equally with subject-based percentages for commission errors (doing ineffective things), $r = -0.55$, $p < 0.001$, and omission errors (not doing effective things), $r = -0.57$, $p < 0.001$. Interestingly, these two types of discrepancies were independent of each other, $r = 0.11$, $p = 0.130$, and the ego effectiveness index can therefore be thought of in terms of adaptive

forms of action *as well as* restraint (De Ridder et al., 2011). Descriptively, women ($M = 0.6336$) obtained slightly higher ego effectiveness scores than men ($M = 0.5737$), but this difference was not significant, $F(1, 181) = 3.14$, $p = 0.078$, $\eta_p^2 = 0.02$.

Outcomes related to coping and behavior

Ego effectiveness should be linked to a more proactive, less avoidant mode of dealing with stressors. To examine such predictions, we performed four simple regressions, the results of which are shown in Table 1. As indicated in the table, individuals with high ego effectiveness scores reported a greater use of active coping and planning. By contrast, they were less likely to cope with stressors through denial and disengagement.

An important way in which individuals can take care of their health is through health-protective behaviors, including within the realms of sleep, safety, and weight management (Bermúdez, 1999). As shown in Table 1, ego effective individuals engaged in these behaviors more frequently and the relevant relationships tended toward a large effect size. Health behaviors may therefore be a primary route through which ego effectiveness operates.

Ego effective individuals are also less inclined toward actions that could be health-damaging. This idea was supported by relationships between the ego effectiveness dimension and categories of risk behavior, as shown in Table 1. Although there was no relationship between ego effectiveness and smoking behavior (possibly because smoking behavior was not very common in this sample), ego effectiveness was inversely related to frequencies or likelihoods related to alcohol use, drug use, and risky behaviors generally considered.

Peer-reported outcomes

Links between ego effectiveness and behavior were impressively supported in the peer outcome data, as shown in Table 2. Participants who obtained higher ego effectiveness scores engaged in health-protective behavior more regularly, as reported by peers. Conversely, participants obtaining low ego effectiveness scores were seen to be more prone to risky behavior in the areas of drugs, alcohol, sexual activity, and general risk. These data convincingly establish that behaviors linked to ego effectiveness are apparent to others (who know their targets reasonably well). Somewhat surprisingly, ego effectiveness did not predict subjective impressions of target health, possibly because the targets were generally healthy.

Perceived health competence

Ego effectiveness was a significant predictor of perceived health competence, $t = 3.38$, $p < .001$, $\beta = 0.24$. Nonetheless, ego effectiveness continued to predict self-reported protective behavior, self-reported risky behavior (total score), peer-reported protective behavior, and peer-reported risky behavior (total score) when controlling for perceived health competence (Table 3). In fact, health-protective behavior (self-reported) mediated the relationship between ego effectiveness and perceived health competence (*ab M* = 0.11, 95% BCCI = 0.05 to 0.21), suggesting that perceptions of health competence are based on behavior, which in turn shares a close relationship with ego effectiveness.

Discussion

In the health realm, people often fail to do what they know to be good for them (De Ridder & De Wit, 2006). In Study 1, we entertained the idea that the relevant failures constitute an important individual difference, which can be assessed in social cognitive (Schwarzer, 2001; Shoda and Mischel, 2000) terms. Consistent with this idea, there were large individual differences in the extent to which the actions of the (simulated) self were consistent with ideas concerning effective action. Moreover, the relevant individual differences were broadly informative concerning the manner in which participants typically handle stressors and behave. Of particular importance,

Table 1. Ego effectiveness as a predictor of coping and behavior outcomes, study 1.

Category and measure	t	p	β
Coping			
Active coping	3.82	<0.001	0.27
Planning	2.81	0.005	0.20
Denial	−2.54	0.012	−0.19
Disengagement	−4.34	<0.001	−0.31
Health-protective behavior			
Total score	6.81	<0.001	0.45
Safety	6.17	<0.001	0.42
Weight management	3.14	<0.001	0.25
Risky behavior			
Smoking	−0.98	0.330	−0.07
Alcohol	−2.82	0.005	−0.21
Drug use	−3.28	0.001	−0.24
Sexual activity	−1.83	0.069	−0.14
Dangerous behavior	−1.88	0.061	−0.14
All risky behavior	−2.95	0.004	−0.22

Table 2. Ego effectiveness as a predictor of peer-reported outcomes, study 1.

Outcome	t	p	β
Health-protective behavior	3.48	<0.001	0.31
Risky behavior			
Sexual activity	−3.50	<0.001	−0.31
Alcohol	−3.52	<0.001	−0.31
Drugs	−3.53	<0.001	−0.31
General risk	−3.42	<0.001	−0.30
Total score	−4.14	<0.001	−0.36
Peer health estimate	1.63	0.105	0.15

peers of individuals receiving high ego effectiveness scores reported that their targets frequently engage in protective health behaviors while refraining from engaging in risky health behaviors. Although such behavioral reports did not correspond with peer-related impressions of health, the data nonetheless establish that an ego effectiveness dimension has broad relevance in understanding health behavior. In Study 2, we sought to extend this analysis.

Study 2

In Study 2, we sought to replicate key findings concerning coping patterns and health-protective

behavior. Beyond such replication efforts, we asked Study 2 participants to complete a daily diary protocol that had a central interest in daily patterns of behavior and coping, which can often be conceptualized in terms of habits (Wood, 2017). In their daily lives, we expected ego effective individuals to be more prone toward healthy behavior as well as less prone to multiple types of unhealthy behavior. In addition to such hypotheses, we focused on the hedonic correlates of ego effectiveness. Although less habitual instances of resisting temptation or pursuing health can occasion hedonic costs (Hall and Fong, 2007), habitual patterns of healthy living can, ultimately, contribute to greater well-being

Table 3. Multiple regressions involving ego effectiveness and perceived health competence, study 1.

Category, outcome, and predictor	t	p	β
Self-reported behaviors			
Health-protective behavior			
EE	5.99	<0.001	0.40
PHC	3.22	0.002	0.21
Risky behavior total score			
EE	−2.43	0.016	−0.18
PHC	−1.99	0.048	−0.15
Peer-reported behaviors			
Health-protective behavior			
EE	2.89	0.005	0.26
PHC	2.03	0.045	0.18
Risky Behavior Total Score			
EE	−3.77	<0.001	−0.34
PHC	−0.91	0.363	−0.08

Analyzes were performed on total scores (e.g. averaging across risk categories).
EE: ego effectiveness; PHC: perceived health competence.

(Deci and Ryan, 2008). Because we think that ego effective individuals have essentially transformed their motivational systems to favor healthy living, we hypothesized that ego effective individuals would experience higher levels of reward and positive affect in their lives, even in the context of a regimen that included activities (such as exercise) that can be a chore to engage in.

Method

Participants and laboratory procedures

Based on Study 1 results, we wanted to give ourselves 0.80 power to detect correlations in the 0.25 range. G*Power suggested a sample size of 120, but we sought to exceed this number by roughly 50%. With respect to the daily diary portion of the study, we wanted a sample size that would yield more than 900 daily reports (Scherbaum and Ferreter, 2009). Ultimately, we obtained 2241 daily reports from 174 individuals who completed at least nine of them, which was an a priori criterion.

Initially, 183 undergraduate students (59.02% female; 87.98% Caucasian; M age = 19.03) signed up for a "daily diary study" and arrived to the lab

in groups of six or fewer. After written informed consent, participants were assigned to private rooms with personal computers. During the lab session, participants reported on demographics, completed the ego effectiveness measure, and also reported on coping and health-protective behavioral tendencies.

Health-related ego effectiveness

Study 2 participants responded to the same health-related scenarios used in Study 1. During a first presentation of these materials, participants were asked to rate the "health-related effectiveness" (1 = not at all effective; 5 = very effective) of each of the 40 ways of responding, irrespective of what the self would do. During a second presentation of the materials, participants were asked to place themselves in each situation and then rate the likelihood (1 = not at all likely; 5 = very likely) that they would respond in each indicated way (e.g. by ceasing to exercise because they found it aversive).

Because participants provided two sets of ratings, we were able to examine their relationship to each other by correlating self-likelihood ratings with effectiveness ratings, separately so for each participant. A higher such correlation would indicate that the self is capable of

regulating its behavior in ways that the self deems to be effective. A lower correlation would indicate problems in aligning the self in this manner. The average within-subject correlation was 0.56, indicating that the average participant demonstrated some tendency toward ego effectiveness. However, these correlations varied widely (from −0.35 to 0.96) and the scoring procedures tapped a reliable individual difference dimension (split-half correlation=0.68, which was linked to a 0.81 figure when applying the Spearman-Brown correction formula).

As in Study 1, commission errors (self-ratings exceeding effectiveness ratings: 29.58% of rating pairs) were roughly as common as omission errors (effectiveness ratings exceeding self ratings: 25.33% of rating pairs). Participants who obtained higher ego effectiveness scores were less prone to both commission, $r=−0.59$, $p<.001$, and omission, $r=−0.57$, $p<.001$, errors to a somewhat equal extent, despite the fact that the two types of error were largely independent of one another, $r=0.13$, $p=0.089$.

Laboratory outcomes

We sought to replicate Study 1 findings with respect to coping and self-protective behavior. The coping measure (from Carver et al., 1989) was contextualized, however, by asking participants how they cope with challenges to their health (1=I usually don't do this at all; 4=I usually do this a lot), with four items each for active coping ($M=3.05$; SD=0.63; $\alpha=.76$), planning ($M=3.18$; SD=0.67; $\alpha=0.83$), denial ($M=1.50$; SD=0.57; $\alpha=0.79$), and disengagement ($M=1.43$; SD=0.53; $\alpha=0.74$).

Participants were also presented with the 30-item scale of Harris and Guten (1979), which asks individuals how frequently (1=never; 7=often) they engage in a large number of health-protective behaviors. We computed an HPB total score (Harris and Guten, 1979) as well as separable subscale scores for safety (nine items) and weight management (four items), in the latter case following the factor analytic results of Salovey et al. (1987).

Daily dairy protocol and its assessments

Following the laboratory data collection effort, we emailed participants every day, for 14 days in a row, to probe their daily behaviors and affective experiences. Participants were given subject number information as well as a link to a Qualtrics-programmed website. They had to complete each report subsequent to 7 p.m. and prior to 9 a.m. the next morning. A total of 174 individuals provided at least nine daily reports, which rendered them eligible for inclusion.

We anticipated possible differences in daily appraisal, in part because acting healthily is likely to create its own rewards over time (Deci and Ryan, 2008). To investigate possible links of this type, we asked participants to indicate whether they viewed daily events as "threatening" (1–5 agreement scale: $M=1.51$; SD=0.89, with day as the unit of analysis) and "rewarding" ($M=3.50$; SD=1.08), with items modeled on the work of Lazarus and Folkman (1984).

In keeping with an approach-avoidance analysis of ego effectiveness, the daily protocol included 2-item measures of approach ($M=3.14$; SD=1.11; $\alpha=0.89$) and avoidance ($M=2.17$; SD=0.90; $\alpha=0.61$) coping that consisted of modified items from the COPE (Carver et al., 1989). The items were modified such that they were relevant to health as well as daily life (e.g. "I concentrated my efforts on doing something about my health today," rated on a 5-point agreement scale).

Another central purpose of Study 1 was to obtain detailed information concerning daily behaviors and habits. A first set of author-created scales somewhat holistically or generally probed for healthy behaviors (exercise, eating healthy, taking care of the self: $M=1.94$; SD=0.61; $\alpha=0.72$), unhealthy behaviors (unhealthy eating, substance use, risky behavior: $M=1.40$; SD=0.38; $\alpha=0.52$), and responsible behaviors (studying, chores, going to class: $M=2.09$; SD=0.65; $\alpha=0.61$). In all cases, participants were asked the extent to which (1=I did not do this; 3=I did this) they performed the relevant behaviors on a given day.

A second set of scales—which were modeled on the Brener et al. (2002) survey—sought greater specificity concerning two classes of unhealthy behavior. Participants used a frequency-based scale ($1 =$ not a single time; $4 =$ more than five times) to indicate their use of three types of substances (alcohol, tobacco, marijuana, or some other drug) and we averaged across these items ($M = 1.11$; SD $= 0.32$; $\alpha = 0.65$). Participants also used this same frequency-based scale to indicate their tendencies toward unhealthy eating (sugary soda, fatty, or sugary food, unhealthy fast food: $M = 1.43$; SD $= 0.44$; $\alpha = 0.61$).

The third set of behavioral scales were even more specific and objective. One of these checklists asked individuals whether they consumed 31 particular fruits or vegetables (e.g. carrots, lettuce), with the specific items based on US consumption patterns, as indicated by an Internet resource. Participants were asked to check a fruit or vegetable if they consumed it on a particular day and these endorsements were summed ($M = 2.71$; SD $= 2.57$; the alpha statistic is not particularly meaningful in the context of checklists). Another checklist applied the same approach to 11 forms of exercise that an Internet resource indicated were somewhat common (e.g. running or jogging, weight lifting, organized sports: $M = 0.70$; SD $= 0.89$). A third checklist compiled seven forms of safety behavior (e.g. washing hands, wearing a seatbelt, checking the weather and dressing appropriately: $M = 4.36$; SD $= 1.99$) drawn from Harris and Guten (1979). And a fourth checklist applied the same techniques to seven risky behaviors that targeted the Fromme et al. (1997) risky behavior categories (e.g. getting drunk or high, having casual or unplanned sex, impulsive spending: $M = 0.17$; SD $= 0.55$).

It seemed to us that ego effectiveness would promote not only healthier habits, but also well-being (Deci and Ryan, 2008). To investigate processes of this type, we asked individuals to rate their levels ($1 =$ not at all; $5 =$ extremely) of three broad (Diener et al., 2010) markers of positive affect (happy, positive, excited: $M = 3.63$; SD $= 0.94$; $\alpha = 0.92$) as well as three broad markers of negative affect (sad, negative, distressed: $M = 1.86$; SD $= 0.87$; $\alpha = 0.86$). We also asked individuals to characterize their levels of satisfaction with health and the self ($M = 3.34$; SD $= 0.97$; $\alpha = 0.83$) using the same five-point scale. The latter is a "domain satisfaction" measure, following precedent (Roberts and Clement, 2007).

Finally, we assessed ego operations, which we define in terms of acting in a way that considers the long-term consequences of one's behavior (Baumeister et al., 2000). Participants were asked whether they considered the long-term consequences of their behavior on a particular day and whether they sought to act in a mature and responsible manner, both in relation to a seven-point rating scale ($1 =$ not at all; $7 =$ extremely), using wording developed by Robinson et al. (2020). The two items were averaged to quantify daily ego operations ($M = 4.71$; SD $= 1.27$; $\alpha = 0.55$).

Given the extensive nature of the daily protocol, and to ensure compliance with it (Bolger et al., 2003), the scales needed to be shorter than 10 items each, which will affect internal reliability estimates when items are the units of analysis (Cronbach, 1951). We therefore supplemented an item-based analysis of measure reliability with a day-based analysis. For each daily measure, that is, we computed a reliability estimate across days, with rows reflecting particular participants. All alphas were greater than 0.80. Accordingly, all scales resulted in reliable estimates of the individual differences of interest.

Results

Laboratory outcomes

Preliminary analyzes revealed that there were no gender differences in ego effectiveness scores, $F(1, 179) = 1.81$, $p = 0.181$, $\eta_p^2 = 0.01$. Simple regressions were then performed on the laboratory outcome measures. The ego effectiveness continuum was a positive predictor of active coping, $t = 2.90$, $p = 0.004$, $\beta = 0.21$, and planning, $t = 3.16$, $p = 0.002$, $\beta = 0.23$. Conversely, ego effective individuals were less prone toward

Table 4. Ego effectiveness as a predictor of daily life outcomes, study 2.

Category and measure	b	t	p
Appraisals			
Threat	−0.092	−2.01	0.046
Reward	0.199	3.83	<0.001
Coping			
Approach	0.178	3.04	0.003
Avoidance	−0.094	−1.95	0.053
Broad behavior scales			
Healthy	0.108	3.28	0.001
Unhealthy	−0.050	−2.69	0.008
Responsible	0.117	4.63	<0.001
Types of unhealthy behavior			
Substance use	−0.040	−2.21	0.028
Unhealthy eating	−0.078	−3.58	<0.001
Checklists			
Vegetables/fruits	0.351	2.35	0.020
Exercise	0.136	3.06	0.003
Safety	0.147	1.16	0.248
Risky	−0.067	−2.66	0.009
Well-being			
Positive affect	0.156	3.21	0.002
Negative affect	−0.074	−1.72	0.088
Daily satisfaction	0.120	2.15	0.033
Ego operations	0.246	3.37	0.001

See text for details on the measures.

denial, $t=-2.87$, $p=0.005$, $\beta=-0.21$, and disengagement, $t=-2.08$, $p=.039$, $\beta=-0.15$, when dealing with health challenges.

Ego effective individuals should also engage in a higher frequency of health-protective behaviors. This hypothesis was replicated with respect to the Harris and Guten (1979) total score, $t=4.40$, $p<.001$, $\beta=0.32$. It was also replicated with respect to the safety, $t=4.23$, $p<.001$, $\beta=0.31$, and weight management, $t=3.70$, $p<.001$, $\beta=.27$, subscales identified by Salovey et al. (1987).

Daily outcomes

To examine whether and how ego effectiveness manifests itself in daily life, we performed a series of MLM analyzes, with days nested within individuals (Nezlek, 2007). The ego effectiveness predictor was z-scored, but the outcomes retained their original units. As shown in Table 4, individual differences in ego effectiveness were linked to appraisals: Ego effective individuals perceived their daily environments to be more rewarding and less threatening.

Ego effectiveness was also predictive of greater approach-related coping in dealing with health (Table 4). The inverse relationship involving avoidance strategies was not significant, though it was marginally significant.

The broad-based behavior scales were associated with highly informative results. Ego effectiveness was a positive predictor of healthy daily behaviors and it was a negative predictor of unhealthy daily behaviors. Such results emphasize both what people do and what people do not do to preserve and maintain their health. In addition, ego effective individuals

were more consistent in the performance of responsible behaviors such as chores and studying (see Table 4).

We then sought to probe two classes of unhealthy behavior in a more specific way. Ego effective individuals were less likely, on the average day, to be consuming substances (e.g. tobacco or alcohol). They were also less likely to be consuming unhealthy or fatty foods. Such results suggest greater care concerning the body.

The final behavioral scales were highly specific in that individuals needed to indicate very specific things about their behavior such as whether they ate carrots on a particular day. Ego effectiveness was a positive predictor of engaging in specific forms of exercise and it was a positive predictor of eating fruits and vegetables. In addition, there was an inverse relationship between ego effectiveness and risky behaviors such as unplanned sex or getting drunk or high. There was no relationship between ego effectiveness and safety behaviors, perhaps because the safety behaviors were so common (e.g. washing one's hands, which almost everybody does at least once a day).

Taking care of oneself should contribute to happier, more satisfying lives (Deci and Ryan, 2008). In support of this point, there was a positive relationship between ego effectiveness and average levels of positive affect. There was also a positive relationship between ego effectiveness and average levels of daily satisfaction. The relationship involving negative affect was not significant. Hence, it is possible that the sorts of processes captured by ego effectiveness generate positive affect more than they mitigate negative affect.

Finally, we hypothesized a positive relationship between ego effectiveness and what we are calling ego operations (e.g. thinking about the long-term consequences of one's behavior). This hypothesis received support in the daily diary protocol, as shown in Table 4. Hence, viewing behavioral choices in a longer-term manner may underlie some of the behavioral consequences of the individual differences of interest.

Discussion

The exercise of self-control is sometimes linked with negative affect, for example because of its association with anterior cingulate functioning (Lieberman, 2003). As people practice self-control, however, such relationships can be reversed, particularly when the self "wants to" do what is in fact healthy and mature (Werner and Milyavskaya, 2019). We contend that ego effective individuals have completed this transformation. That is, they have altered themselves in such a way that what they want to do is in fact consistent with what they should do, in the pursuit of sustained health. Consistent with this idea, the daily diary protocol of Study 2 revealed that ego effective individuals enjoyed their daily lives *while* engaging in behaviors like studying, chores, and exercise. As will be indicated below, these data have important implications for the health and self-regulation literatures.

General discussion

The ego, or the executive component of the self, must be capable of aligning behavior with courses of action that are mature and responsible rather than short-sighted and reactive (Baumeister et al., 2000). In the present studies, we sought to develop a model of such operations that might be particularly suited in examining individual differences. Participants were asked to rate the effectiveness of various ways of responding to health-challenging situations, quite irrespective of what the self would do. These ratings would capture ideas concerning ideal ways of responding (Corstjens et al., 2017). Participants were then re-presented the same materials and asked what they, themselves, would do in the same situations. By correlating the two sets of ratings, we were essentially able to determine how effective the ego is—that is, whether the self can straightforwardly do what it deems to be effective.

The average person displayed moderate levels of ego effectiveness, but these scores varied greatly—e.g. from −0.25 to 0.94 in Study 1. At the high level of this continuum,

the person has essentially mastered the self's actions, such that they are almost perfectly aligned with ideas about what should be done. Others, by contrast, displayed almost no alignment between the self and its ideas about effective courses of action. A further analysis of such dynamics revealed that the latter individuals were prone to both commission errors and omission errors. The former included cases in which the person would feel compelled to do something (such as overeat or drink too much) that might bring temporary pleasure, but long-term costs, if they were done repeatedly (Hofmann et al., 2008). The latter included cases in which enacting the behavior might require unwanted displeasure or stamina (e.g. changing one's diet). Although such mismatches occurred in subtle and situation-specific ways, the same individuals were prone to multiple issues of this type and the ego effectiveness dimension was a very reliable one.

Moreover, these individual differences were consequential. Whereas ego effective individuals coped with challenges in active and engaged manners, those with low ego effectiveness scores were more prone toward denial and disengagement. In addition, the ego effectiveness dimension proved to be a robust predictor of behaviors that are health-protective and this was true both with respect to self-reported and peer-reported behavioral frequencies. Ego effective individuals also engaged in a variety of daily life behaviors that are health-promoting and they were less prone to unhealthy eating and substance use. Conversely, ego-ineffective individuals were more prone toward risky behaviors, both with respect to an epidemiological survey (Brener et al., 2002) and with respect to their daily behaviors. Finally, the daily survey of Study 2 suggested that ego effective individuals were happier and more satisfied, even while engaging in a greater frequency of responsible behaviors such as chores and studying. These results establish a dimension of functioning that has diverse manifestations pertinent to healthy living.

Implications and analysis

The ego effectiveness approach is a new one. Relative to trait self-control assessments, the approach is more implicit and it is more contextualized in terms of concrete situational materials and concrete ways in which the person might respond to them (Bermúdez, 1999; Shoda and Mischel, 2000). What is deemed to be effective was also determined by the participant him or herself rather than on the basis of an external evaluation of the actions. That is, participants succeed or fail to control themselves on the basis of their own ideas of what they should do in the relevant situations. Yet, they do not ascribe general capacities to themselves. Rather, those capacities are determined inferentially, on the basis of correlations between the self's actions and another vector representing the effectiveness of those actions, from the self's perspective.

Ego effectiveness, though, should predict generalized perceptions of the self, to some extent. Through their abilities (or inabilities) to influence their behaviors in desired ways, participants are likely to gain some general impressions of their capacities to "take care of themselves," both in the health domain and perhaps more generally (Bandura, 1994; Smith et al., 1995). This point was established on the basis of a correlation between the ego effectiveness dimension and global impressions of health competence. Even when controlling for perceived health competence, though, the ego effectiveness dimension still predicted frequencies for health-protective and risky behaviors, whether on the basis of self-reports of these behaviors or peer reports. Similarly, pilot test results, reported in the introduction section, established that ego effectiveness cannot be equated with any of the Big 5 personality traits.

With respect to the central constructs of the Block and Block (2006) model, ego effectiveness probably reflects some combination of ego-control and ego-resilience. Ego effective individuals are controlled in that they are less prone to risky health behaviors and they are more likely to engage in socially responsible behaviors like studying and going to class. Ego

effective individuals are presumably resilient too, however, in that the actions they endorsed were based on an analysis of particular situational circumstances (or particular health challenges). Consistent with such suggestions, ego effective individuals consistently displayed a problem-solving orientation to their difficulties and they experienced higher levels of positive affect and satisfaction in their daily lives. Such correlates are consistent with a resilient, rather than brittle or guarded, approach to daily living (Block and Block, 2006).

It should be recognized that ego effectiveness was assessed in the context of hypothetical actions rather than real actions. Nonetheless, what people intend to do is often a very strong predictor of what they actually do (Ajzen and Madden, 1986) and the behavioral consequences of ego effectiveness were consistently demonstrated in the present studies, including with respect to peer reports. In this connection, ego effective individuals seem to follow idealized perceptions of responding in deciding how to act. Ego ineffective individuals are likely to be more reactive or short-sighted in responding to the events of their lives. These two modes of responding can be described as impulsive versus reflective (Hofmann et al., 2008) or in terms of low-level versus high-level self-regulatory systems (Carver et al., 2009).

Extensions of the present work seem necessary, though. Diversity was limited in the present samples and additional research would be useful in the context of other populations, particularly if comparative statements could be made. For example, August and Sorkin (2011) have suggested that racial and ethnic differences in health status could be due to racial or ethnic differences in health behavior and ego effectiveness assessments might prove valuable in tracking relevant mechanisms. Relatedly, a consideration of how environmental factors (e.g. related to socioeconomic status) do or do not support ego effectiveness operations would have merit. Finally, older, relative to younger, individuals seem to value their health to a greater extent (Walker et al., 1988) and the ego effectiveness approach could be used to track

age-related trends of this type. In short, the ego effectiveness approach would seem capable of comparing groups as well as individuals, but research of this type has yet to be performed.

Conclusions

The health behavior realm is a paradoxical one in which people often act in ways that they know to be problematic (De Ridder and De Wit, 2006). The present findings suggest that dissociations of this type should be far more prevalent among some individuals than others, as captured by the ego effectiveness construct and dimension. The present research established that the relevant individual differences can be reliably assessed and that they have numerous implications for health behaviors and coping. Future work can extend this analysis.

ORCID iD

Michael D Robinson https://orcid.org/0000-0003-1429-9069

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