A self-regulation resource model of self-compassion and health behavior intentions in emerging adults

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ABSTRACT

Objective. This study tested a self-regulation resource model (SRRM) of self-compassion and health-promoting behavior intentions in emerging adults. The SRRM posits that positive and negative affect in conjunction with health self-efficacy serve as valuable self-regulation resources to promote health behaviors.
Methods. An online survey was completed by 403 emerging adults recruited from the community and a Canadian University in late 2008. Multiple meditation analyses with bootstrapping controlling for demographics and current health behaviors tested the proposed explanatory role of the self-regulation resource variables (affect and self-efficacy) in linking self-compassion to health behavior intentions.
Results. Self-compassion was positively associated with intentions to engage in health-promoting behaviors. The multiple mediation model explained 23% of the variance in health behavior intentions, with significant indirect effects through health self-efficacy and low negative affect.
Conclusion. Interventions aimed at increasing self-compassion in emerging adults may help promote positive health behaviors, perhaps through increasing self-regulation resources.

Introduction

Understanding the factors and processes that promote the practice of health-promoting behaviors is an important goal given the rising rates of non-communicable or lifestyle-based diseases (World Health Organization, 2013). Healthy eating, regular physical activity, stress management, and good sleep hygiene are known precursors of health promotion and maintenance, whereas poor eating habits (Schulze and Hu, 2002), physical inactivity (Lee et al., 2012), chronic stress (Cohen et al., 2012), and inadequate sleep (Buxton and Marcelli, 2010), are contributors to the development of obesity and chronic disease. Common barriers to engaging in health-promoting behaviors include self-regulation difficulties such as resisting temptations and distractions, and recovering from failed attempts. Accordingly, self-regulation, the capacity to control and regulate one's actions (Forgas et al., 2009), is considered an important process to nurture for successful health behavior management and life-long health.

For certain populations, such as emerging adults (Arnett, 2000) who are still developing their self-regulatory capacity (Casey et al., 2008), engaging in positive health behaviors may be a particular challenge that requires the nurturing of self-regulation resources to reduce vulnerability for poor health behaviors. Arnett's (2000) developmental

theory proposes that emerging adulthood is a developmental period that is subjectively distinct from both adolescence and adulthood in that it is characterized by a common set of social, personal, identity-related, and neurological changes. For example, brain development research indicates that ongoing and differential development of the brain areas governing self-regulation in emerging young adults results in imbalances favoring emotion driven rather than rational behavior (Casey et al., 2008). Given these potential deficits in self-regulation capacity, research has mainly focused on health risky behaviors in emerging young adults rather than on problems in engaging in health-promoting behaviors (Steinberg, 2008). Emerging adulthood is therefore an important yet often overlooked developmental stage for health behavior change due to these self-regulation issues and to the identity development and shifting interpersonal influences that characterize this period of transition into adulthood (Nelson et al., 2008).

One quality that burgeoning research suggests may promote positive health behaviors through the bolstering of self-regulation resources is self-compassion. Defined as taking a kind, non-judgmental stance towards oneself during times of failure or challenge (Neff, 2003b), self-compassion is a quality that includes three dimensions which can help foster key self-regulatory processes such as attention to and evaluation of ongoing behavior, and emotional regulation (Terry and Leary, 2011). Each of these dimensions – self-kindness (versus self-judgment), common humanity (versus isolation), and mindfulness (versus over identification) – can help promote positive rather than negative affective responses to the inevitable challenges and setbacks encountered while

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trying to engage in health-promoting behaviors such as maintaining a healthy diet (Adams and Leary, 2007). Failure to meet personal health goals often triggers feelings of shame and guilt which can promote goal disengagement rather than persistence, and increase susceptibility to goal-derailing temptations (Sirois and Giguère, 2013). Self-compassionate responding involves seeing such failures as part of the human condition (e.g., Everyone gives into temptation sometimes) which should be therefore viewed kindly rather than self-judgmentally (e.g., I shouldn't beat myself up over this lapse), and without becoming embroiled in the negative feelings that can arise from such failures (e.g., I'm not going to ruminate about this; Neff, 2003b). From a self-regulation perspective, this frees up self-regulation resources which would otherwise be spent on ruminating over negative feelings about past and future challenges, and also generates the positive affect which can support healthy self-regulation (Sirois et al., 2014; Terry and Leary, 2011). This view is consistent with theory and research indicating that emotional distress is one of the key threats to effective self-regulation (Wagner and Heatherton, in press), and that positive emotions can facilitate self-regulation (Baumeister et al., 2007). Indeed, self-compassion has shown positive associations with six different components of self-regulation (Terry et al., 2013), and is negatively associated with chronic self-regulation failure (Sirois, 2014).

Supportive evidence for the proposed role of self-compassion in promoting positive health behaviors via healthy self-regulation comes from a recent meta-analysis. Across fifteen samples including 3252 participants, self-compassion was consistently and significantly associated with greater practice of a range of positive health behaviors including healthy eating, regular physical activity, stress management, and positive sleep habits (Sirois et al., 2014). Importantly, high positive and low negative affect were found to jointly and partially mediate these effects in eight of the samples, suggesting that the healthy emotions associated with self-compassion may promote positive health behaviors.

This paper proposes a new conceptual model (Fig. 1) that brings together theory and research on self-compassion and health behaviors (Sirois et al., 2014; Terry and Leary, 2011), self-regulation and emotions (Baumeister et al., 2007; Wagner and Heatherton, in press), and the Theory of Planned Behavior (TPB; Ajzen, 1991), to take a self-regulation resource view of understanding intentions to engage in health-promoting behaviors in emerging adults. According to this self-regulation resource model (SRRM), high levels of positive affect and low levels of negative affect are self-regulation resources that bolster the self-regulation needed to successfully engage in health-promoting behaviors. Here the term resource refers to factors which act as supports or tools that can be drawn upon in times of need to bolster self-regulation. Consistent with research demonstrating that affective variables explain variance in health behaviors beyond standard health behavior change model variables (Kiviniemi et al., 2007), these affective resources are proposed to work in conjunction with social cognitive factors such as perceived control over health (Ajzen, 1991) to predict future intentions to engage in health-promoting behaviors.

Several hypotheses regarding the health behavior intentions of emerging adults arise from this model. As a quality that is linked to positive health behaviors through a balance of healthy emotions (Sirois et al., 2014), self-compassion should be similarly linked to health behavior intentions, a precursor of health behaviors according to TPB (Ajzen, 1991). Although the link from self-compassion to perceived control over health has not been previously examined, theory on a related construct, self-efficacy, suggests that self-compassionate people who have engaged in health-promoting behaviors should have greater feelings of control and competence for continuing to engage in health-promoting behaviors in the future (Bandura, 1977). It is therefore expected that health self-efficacy, as a proxy for perceived control over health, will account for the proposed association between self-compassion and health behavior intentions. Given the differential development of the emotional relative to the rational areas of the brain in emerging adults (Casey et al., 2008), it is expected that affective resources associated with self-compassion will also be important for understanding health behavior intentions. These hypotheses were tested using multiple meditation analyses with bootstrapping which allows for simultaneous testing of mediators while accounting for the effects of all other mediators. Planned covariates in the model included sex, and body mass index (BMI) as overweight and obese adolescents are more likely to intend to engage in weight-reducing health behaviors (Bittner Fagan et al., 2008). Current health behaviors were included as covariates in the model as past and ongoing health behavior is a robust predictor of health behavior intentions (e.g., Conner et al., 2014).

Method

Participants and procedure

Following clearance from the university research ethics board, 403 emerging adults aged 18–25 from the community and from a mid-sized university in Southwestern Ontario, Canada participated in an online study on health perceptions and behaviors during November and December of 2008. Community participants were recruited via notices in the community, and on web pages advertising psychological research. Student participants were recruited from a university participant pool. The study notices provided a link to a dedicated web page for each sample which directed participants to the online survey housed on a secure university server. Community participants were given the option to enter a draw for a certificate to an online bookstore. Student participants were given course credit points to apply towards their course grade for participating. Only participants between the ages of 18 and 25 were included.

Measures

Demographic characteristics assessed included age, sex, and education level. Participants also self-reported their height and weight which were converted into Body Mass Indices (BMI).

Self-compassion

Participants completed the 26-item Self-Compassion Scale (SCS; Neff, 2003a) which assesses the three main components of self-compassion and their negative counterparts, self-kindness (self-judgment), common humanity (isolation), and mindfulness (over-identification). The SCS includes both positively ("I try to be loving towards myself when I'm feeling emotional pain") and negatively ("I'm disapproving and judgmental about my own flaws and inadequacies") worded items reflecting the six components of self-compassion. Items are prefaced with the statement "how I typically act towards myself
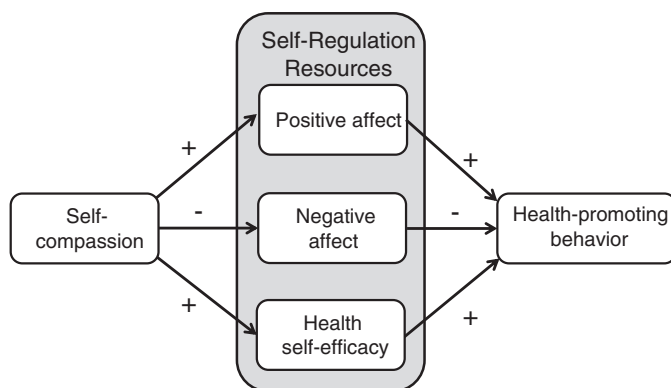
Fig. 1. Proposed self-regulation resource model linking self-compassion to health behavior intentions. The low levels of negative affect, high levels of positive affect, and high levels of self-efficacy associated with self-compassion are posited to serve as self-regulation resources that bolster self-regulation capacity and therefore the practice of health behavior.

during difficult times" and respondents indicate rate the frequency of behaving in the described way on a scale ranging from 1 (almost never) to 5 (almost always). A total self-compassion score is calculated by averaging the mean subscale scores after reverse coding the negative items. The SCS has demonstrated good internal consistency ($\alpha = .93$) in both student and community samples (Neff, 2003a; Neff and Pommier, 2013).

Health behavior intentions

Participants rated their intentions to engage in health enhancing behaviors, such as eating healthy, staying active, and managing stress in the next six months on a 9-point scale ranging from 1 (no intentions) to 9 (very strong intentions).

Health self-efficacy

Perceived control over health was measured with the 8-item health self-efficacy subscale from the Control Beliefs Inventory (CBI) (Sirois, 2002), a previously-validated self-report measure of perceived control over health (Sirois, 2004). This subscale assesses feelings of competence and confidence in being able to carry out actions important for maintaining and taking care of one's health. Items are rated on a six-point Likert-type scale with response options ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), and averaged with higher scores indicating greater health-related self-efficacy. Internal consistency of the scale has been good in previous research (Sirois, 2004) and in the current study (Cronbach's alpha = .84).

Positive and negative affect

State positive and negative affect were assessed with the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The PANAS consists of 20 words describing different feelings (e.g., happy, upset), with 10 for each of the positive and negative affect scales. Participants rated their state affect on a 5-point Likert scale ranging from 1 for *very slightly or not at all* to 5 for *extremely*. Psychometric properties for the PANAS include, in student and community samples, good discriminant validity compared to measures of anxiety and depression, and good internal reliability ($\alpha = .88$) (Crawford and Henry, 2004).

Health behaviors

Current practice of positive, health-promoting behaviors was assessed with the Wellness Behaviors Inventory (WBI; Sirois, 2001), a previously validated 10-item measure of the weekly performance of common health-related behaviors including healthy eating, regular physical activity, and stress management (e.g., Sirois, 2007). Items such as "I exercise for 20 continuous minutes or more, to the point of perspiration" and "I eat healthy, well-balanced meals" are rated on a 5-point scale with possible responses ranging from 1 (*less than once a week or never*) to 5 (*every day of the week*). A mean of all items is calculated after reverse scoring two items, with higher scores indicating more frequent performance of wellness behaviors. The WBI has demonstrated good convergent validity with other health behaviors in previous research (Sirois, 2007).

Analyses

All analyses were conducted with SPSS version 21 with a significance level set at $p < .05$. Descriptive analyses were conducted to describe the sample's demographic characteristics. Correlation analyses were first conducted to assess the interrelationships among the SRR model variables. Tests of the mediation of the indirect effects of self-compassion on health behavior intentions through each of the self-regulatory variables were conducted following the Preacher and Hayes (2008) procedure which uses bootstrapping to estimate the significance of indirect effects. The Hayes macro PROCESS (Hayes, 2013) was used to run the multiple mediation analysis as it permits simultaneous testing of three mediators, thus allowing for a test of the indirect

effects of positive affect while accounting for the effects of negative affect and health self-efficacy. Contrasts of each of the individual indirect effects were also conducted. The multiple mediator model was tested using 5000 bootstrapping resamples and bias corrected 95% confidence intervals. Participant's sex, current practice of health-promoting behaviors, and BMI were entered as covariates in the model.

Results

Descriptive and correlational analyses

Table 1 presents the demographic characteristics of the emerging adult sample, which was predominantly female and white. The majority of the participants had a BMI within the healthy range.

Self-compassion was positively and significantly correlated with health behavior intentions, positive affect, health self-efficacy, and current wellness behaviors, and negatively associated with negative affect (Table 2). BMI was not correlated with self-compassion or any of the other model variables. To account for potential sex differences in BMI, the correlation analyses was also run separately for males and females. No significant associations were found. BMI was therefore not included in the mediation analyses.

Multiple mediation analyses

Table 3 presents the results of tests of the indirect effects through the self-regulation variables. Sex and current wellness behaviors were entered as covariates in the models to control for their effects. The total effect of self-compassion on health behavior intentions was significant, explaining 23% of the variance. After accounting for the indirect effects through the three mediators, the direct effect was no longer significant supporting mediation. Importantly, the analyses of the indirect effects through health self-efficacy and negative affect were significant. The indirect effects through positive affect were not significant. The contrasts of these effects revealed that the indirect effects through self-efficacy were significantly larger than the effects through negative affect.

Discussion

These findings provide preliminary support for the proposed Self-Regulatory Resource Model (SRRM) which posits that affect and self-efficacy are important self-regulatory resources for predicting health behaviors and intentions. Consistent with this model and previous research, self-compassionate emerging adults had stronger intentions to engage in health-promoting behaviors, and this was explained by their higher levels of health self-efficacy and lower negative affect. Importantly, these indirect effects were significant after controlling for

Table 1
Demographic characteristics of the emerging adult sample (18–25).

	Sample
N	403
Sex (% female)	83.9
Age	
Mean (SD)	20.37 (1.87)
Ethnicity (% White)	75.4
Education (%)	
High school or less	2.5
University	96.3
Graduate school	1.2
Body mass index category	
Underweight	10.1
Healthy weight	63.9
Overweight	17.1
Obese	6.7

Table 2
Bivariate correlations among the self-regulation resource model variables in emerging adults (N = 403).

Variable	1	2	3	4	5	6	7
1. Self-compassion	–						
2. Health behavior intentions	.26**	–					
3. Positive affect	.43**	.36**	–				
4. Negative affect	−.46**	−.15*	−.22*	–			
5. Health self-efficacy	.40**	.56**	.45**	−.34**	–		
6. Wellness behaviors	.27**	.45**	.37**	−.27**	.44**	–	
7. Body mass index	−.02	−.06	.02	−.07	.00	.06	–
Mean	2.97	7.16	3.24	2.40	4.48	3.27	23.09
Standard deviation	0.59	1.46	0.68	0.72	0.68	0.47	4.59

Note:
* $p < .05$.
** $p < .01$.

current health behaviors, gender, and BMI. Given the central role of self-efficacy in health behavior change as suggested by the Theory of Planned Behavior (TPB; Ajzen, 1991), it was not surprising that the indirect effects for these self-regulation resources were significantly larger than those for negative affect.

That the indirect effects through positive affect were not significant was unexpected given previous research demonstrating that both positive and negative affect jointly account for the link between self-compassion and health behaviors (Sirois et al., 2014). However, in this previous research health self-efficacy was not included in the model tested. The moderate positive association between self-efficacy and positive affect suggests overlap between these two self-regulation resources which may account for the null finding. It may also be that the indirect effects through positive and negative affect differ when predicting health behavior intentions as opposed to behavioral measures.

Whereas past research has noted a tendency towards health risk behaviors among emerging adults (Casey et al., 2008), the current research highlights the qualities and self-regulation resources that may be useful for encouraging the practice of health-promoting behaviors among this developmentally unique population. This focus has several important health-promotion implications. A recent review of nationally representative and longitudinal research on weight-related health behaviors in emerging adults found evidence of adverse changes in both diet and physical activity levels during this critical transition period that put this group at increased risk for poor long-term health outcomes (Nelson et al., 2008). Other researchers have noted that emerging adults, and especially college students, are in a unique environment

Table 3
Indirect effects from a moderated multiple mediation model of self-compassion on health behavior intentions through positive affect (PA), negative affect (NA), and health self-efficacy (HSE) controlling for sex and current health-promoting behaviors in a sample of emerging adults (N = 403).

Effect	B (SE)	CI	Model R²	F (df)
Indirect effect PA	.06 (.05)	[−.02, .16]		
Indirect effect NA	−.10 (.05)	[−.21, −.01]		
Indirect effect HSE	.34 (.07)	[.21, .49]		
Total indirect effects	.29 (.09)	[.12, .47]		
Total effect	.40 (.11)	[.18, .62]	.23	29.41** (3, 399)
Direct effect	.11 (.13)	[−.13, .37]		
Contrasts of indirect effects	z			
PA–NA	1.36			
PA–HSE	−2.00*			
NA–HSE	4.68**			

Note: CI = 95% confidence intervals; Bootstrapping analyses was conducted with 5000 resamples; all effects are unstandardized.
* $p < .05$.
** $p < .01$

and life stage that make them ideal candidates for developing positive health behaviors that can reduce their risk of chronic diseases such as cardiovascular disease in later life (Goldstein et al., 2014), as well as set the stage for life-long health habits.

Although self-compassion in the current study was measured as a relatively stable trait-like quality, there is mounting evidence that as a state, self-compassion can be increased through relatively easy to administer exercises and training (e.g., Neff and Germer, 2013). The use of self-compassionate imagery, loving-kindness meditation, writing a compassionate-self letter, and affectionate breathing are some of the different ways that self-compassionate thinking can be fostered either through self-initiated exercises or through more formal training programs (Germer and Neff, 2013; Smeets et al., 2014). To date, self-compassion interventions have focused mainly on reducing risky health behaviors such as overeating (Adams and Leary, 2007), and smoking (Kelly et al., 2010), rather than increasing positive health behaviors. The current findings taken in context of the SRRM provide some preliminary support for the value of such interventions for health behavior promotion by potentially also increasing the self-regulation resources of emerging adults, a group which may be vulnerable to poor health behaviors due to their underdeveloped self-regulation resources (Casey et al., 2008).

Limitations and strengths

There are both limitations and strengths in the current research that should be considered when interpreting the results. The relatively healthy state of the sample, with the majority of participants having a BMI within the healthy range, and strong intentions to engage in health-promoting behaviors (7.16/9.00), raise the issue of the generalizability of the findings to less healthy samples. The cross-sectional design of the study precludes any strong conclusions about the directionality of the relationships among the variables. Further longitudinal and experimental work is therefore needed. Nonetheless, the relationships suggested by the SRRM tested are informed by previous theory and empirical research. Controlling for current health-promoting behaviors when assessing the indirect effects on health behavior intentions is a notable strength as this reduces the bias introduced by using a cross-sectional design when testing models of health behaviors (Weinstein, 2007). In addition, health behavior intentions rather than actual behavior were examined as the dependent variable, so it is unclear whether the intentions would translate to future behavior. However, previous findings from a meta-analysis linking self-compassion to health behaviors through positive and negative affect (Sirois et al., 2014), provide support for the notion that the current findings may extend to health behaviors. Finally, the 23% of variance in health behavior intentions explained by the model clearly indicates that there is room for further research to explore other factors that may contribute to health behavior intentions in this group.

Conclusions

In the current study, self-compassion predicted emerging adults' intentions to engage in health-promoting behaviors. Higher health self-efficacy and lower negative affect were each significant self-regulation resources that, together with high positive affect, fully mediated this association. Overall, these findings suggest that focusing on ways to increase self-compassion in emerging adults may be a useful strategy for programs aimed at increasing health-promoting behaviors in this developmentally unique population.

Conflict of interest

The authors declare that there are no conflicts of interests.

Acknowledgments

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