Chapter 4. Cognitive Self-Affirmation Inclination: An Individual Difference in Dealing With Self-Threats

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People have a fundamental need to maintain a positive global self-image (e.g., Baumeister, 1982; Steele, 1988; Tesser, 1988). According to Steele (1988) people want to feel competent, good, coherent and stable. When the self is threatened, people experience psychological discomfort that they are motivated to reduce. There is a great variety of means that people can use to maintain their self-image (for an overview, see Tesser, Crepaz, Collins, Cornell, & Bach, 2000). One very important theory about the possible means available is the Self-esteem Maintenance Model of Tesser (1988). This model emphasizes the social means that people can use to maintain self-integrity (i.e., social comparison). The current research will concentrate on a theory that explicitly focuses on the use of personal values or self-restoring images, namely Self-affirmation Theory. Self-affirmation Theory (Steele, 1988) specifically focuses on self-restoring methods that affirm some important aspect of the self that is unrelated to the threatened domain. By doing something else “good” or “adequate,” people provide themselves with a positive self-image. Several studies have applied a self-affirmation procedure that mimics people’s spontaneous self-affirmative actions by providing them with positive and robust self-restoring images (Sherman & Cohen, 2006). Besides these externally provided self-restoring images, people may also have more continuous access to self-generated positive self-images that they can use whenever they experience a self-threat. In the present research the focus is on existence, meaning, stability and the effects of people’s natural inclination to use self-generated affirming self-images when the self is threatened. The aim is to construct a scale to measure that natural self-affirmation inclination and to take the first steps in validating this scale.

**Self-Affirmation Activity**

The basic tenet of Self-affirmation Theory is that people are motivated to maintain the integrity of the self (Steele, 1988). Threats to self-integrity always revolve around real or perceived failures to meet social or cultural standards. For example, the self may typically be threatened when reading information relevant to one’s own unhealthy behavior.
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(e.g., Reed & Aspinwall, 1998), after receiving negative feedback on an IQ test (Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999) or when reading a report attacking one’s political worldview (e.g., Cohen, Aronson, & Steele, 2000). How do people handle these threats and maintain their self-integrity?

Research suggests that people have a pervasive inclination to display defensive adaptations such as denying, dismissing or avoiding the self-integrity threat in some way (e.g., Liberman & Chaiken, 1992; Sherman & Cohen, 2002). Although a defensive bias can restore self-integrity, rejection of the threatening information can lessen the probability that the person will learn from the threatening information. Self-affirmation Theory (Steele, 1988) proposes a self-restoring activity that actually reduces or eliminates the need for these defensive reactions, namely self-affirmation. For example, by reminding themselves about the “good” things they value or the “good” things they have done, defensive reactions are no longer needed. Such “self-affirmations” make people realize that their self-worth does not hinge on the evaluative implications of the immediate situation. Thus, the motivation to protect self-worth is satisfied via self-affirmation, resulting in an open-minded approach to threatening messages (e.g., Sherman & Cohen, 2006).

Operationalizations of this self-restoring activity can be behavioral or cognitive, although all affirmations are aimed at underscoring “the overall worth and integrity of the self” (Sherman & Cohen, 2006, p. 188). This proposition is supported by results from studies that apply self-affirmation procedures. Several different self-affirmation procedures are used to externally provide people with self-restoring images (e.g., McQueen & Klein, 2006). The most common operationalization is one in which people first report an important value or life domain and are then given the opportunity to write an essay about it or complete a scale or exercise that allows them to assert its importance (e.g., Sherman, Nelson, & Steele, 2000). Another possible self-affirmation manipulation based on Steele’s (1988) Self-affirmation Theory is providing participants with positive feedback on an important skill (Correll, Spencer, & Zanna, 2004). These self-affirmation
procedures have been shown to induce open-mindedness towards threatening information. For example, Harris and Napper (2005) showed that self-affirmation procedures resulted in increased risk perceptions for the mentioned health risk (i.e., the negative consequences of excessive alcohol consumption). In addition, Sherman et al. (2000) showed that self-affirmation manipulations resulted in a stronger intention to change unhealthy behavior according to the recommendation made in the threatening message. Thus, making alternative sources of self-integrity available by means of a self-affirmation manipulation lowers the need to protect one’s self-worth and makes people more open, realistic and willing to engage in the advocated adaptive behavior change. In other words, self-affirmation leads to threat acceptance and not to threat reduction or trivialization of the threat (see also Correll et al., 2004).

Internally Available Self-Restoring Self-Images
Besides these induced ways of instigating cognitions that maintain self-integrity, there are indications that people can affirm themselves cognitively by retrieving positive self-images from memory. For example, in the absence of an explicit self-affirmation manipulation, those participants who retrieved and reported more self-affirming cognitions coped best with breast cancer, irrespective of the given intervention (Creswell, Lam, Stanton, Taylor, Bower, & Sherman, 2007). The self-affirmational resources view (Spencer, Josephs, & Steele, 1993; Steele, Spencer, & Lynch, 1993) proposes that people possess self-image resources. This view reasons that people with high self-esteem have more self-image resources available to apply in the face of threat. However, the most recent systematic review concerning self-affirmation (McQueen & Klein, 2006) emphasizes the inconsistent and fluctuating relationship between self-affirmation and self-esteem. Although Study 2 by Steele et al. (1993) does suggest that self-esteem might be a resource that people can use in the face of a threat to their self-integrity. The results of the study show that people with high self-esteem have less need to resolve cognitive dissonance as compared to people with low self-esteem. Thus, self-esteem is at least related to a
source of positive self-restoring images that people can use to deal effectively with a potential self-threat.

What does this source of positive self-restoring images look like? How are self-esteem and people’s natural self-inclination related? The aim of the present research is to explicitly define and directly measure people’s natural inclination to generate and access internally self-restoring self-images in the face of a self-threat. In addition, we will contrast this self-affirmation inclination with the role of self-esteem.

Natural Self-Affirmation Inclination

We conceptualize the active retrieving, considering, and weighing of important self-image resources as being that self-affirmation tendency that people have naturally. Due to the non-behavioral character of this tendency, we will define it as people’s cognitive self-affirmation inclination (CSAI). Self-esteem may be an important variable in the context of self-affirmation. Self-esteem is a more general self-evaluation, based on a reservoir of standing resources that people can use in the face of a threat to their self-integrity (Steele et al., 1993). It is, however, the actual and active use of one’s possible resources that is essential. This leads to our fundamental idea that people have a self-memory (Rogers, Kuiper, & Kirker, 1999) on which they can base their self-esteem, for example. However, people can also make active use of positive self-images available in that memory. We assume that people differ in the extent to which they use positive self-images when their self is threatened and that this difference is stable enough to be conceptualized as an individual inclination. The essence of this tendency is that people actively and strategically use positive self-images when needed, that is, when their self-integrity is threatened. We define cognitive self-affirmation as the inclination to react with “pop-ups” of positive self-images in the face of self-threats.

By introducing the concept of self-memory, the relationship between CSAI and self-esteem becomes clearer. We can state that both CSAI and self-esteem originate from the same source (i.e., from the self-memory) and, therefore, show some overlap. However, both concepts have unique aspects that work separately and have separate
effects. CSAI is an activity aimed at maintaining self-integrity merely by using available self-images. Thus, people with a high CSAI do not add or strengthen positive images in self-memory; they just use existing memories. This is in line with the research findings that report no effect of self-affirmation procedures on self-esteem measurements (for an overview, see McQueen & Klein, 2006).

In order to measure people’s CSAI, we developed a new scale. The scale items ask people for the perceived frequency with which they normally use or think of positive self-images. The items capture the active maintenance of one’s self-integrity (Tesser & Cornell, 1991) by asking for responses to statements such as, “I realize that besides all the ‘stupid’ things I do, I also do some things very well.” There are also statements that refer more generally to the inclination to think of positive self-images such as, “I notice that I did some things very well.” These statements refer to the active cognitive remembrance and summary of actions that underscore one’s self-worth.

Overview of Studies
In four different studies, one cross-sectional, one longitudinal and two experimental, the focus is on the uniqueness, the meaning, the stability and the effects of the CSAI of people. These studies try to uncover the natural self-affirmation tendency of people in the context of persuasive health communication, because threats in these domains cover self-threats to the essence of one’s being, in other words, the very physical conditions that determine the length and quality of one’s life. Health communications emphasize the enhanced risk for self-inflicted negative outcomes (for an overview, see Harris & Napper, 2005).

Study 4.1
To develop a measurement for CSAI and to increase our understanding of this concept, a survey was conducted among smokers. Because self-esteem is the most commonly used concept to explain the effects of self-affirmation procedures (e.g., McQueen & Klein, 2006), we contrasted CSAI with self-esteem. Research concerning self-esteem indicates that this positive self-conception enables one to uphold an
unrealistically positive outlook when confronted with self-threatening material. For example, Gerrard, Gibbons, Reis-Bergan, and Russell (2000) showed that people who have high self-esteem do not fully acknowledge their vulnerability to the negative consequences of their own behavior. In addition, Steele et al. (1993) have shown that for people with high self-esteem, an inconsistency between their cognitions and actions (i.e., a self-threat) does not result in the commonly found strongly negative feeling one needs to resolve. In explaining these effects of self-esteem, Steele et al. (1993) refer to the use of available self-related resources to restore global self-worth. We claim, however, that this active use of one’s self-image resources is a unique concept, which is related to a realistic outlook instead of a generally positive outlook. In other words, we state that self-esteem and CSAI (i.e., the active use of positive self-images) are distinct concepts. Consequently, we should have different expectations concerning the roles played by CSAI and self-esteem.

Sherman and Cohen (2006) showed that self-affirmation manipulations resulted in open-mindedness due to active use of positive images. Consequently, it should be expected that smokers who have a strong CSAI will become more realistic, leading to the experience of a significant self-threat when presented with a persuasive health message. Using negative self-evaluative emotions as an indicator of self-threat (Dijkstra & Buunk, 2008), we expected that the stronger one’s CSAI, the more negative self-evaluative emotions smokers should experience due to their smoking. In addition, because they are more open-minded, they may also experience a higher personal risk (e.g., Harris & Napper, 2005). In contrast, for self-esteem we expected that, because of the generally positive outlook self-esteem causes, it should be related to experiencing weaker negative self-evaluative emotions and a lower risk.

Method

Recruitment and Procedure
Smokers were recruited using advertisements in local newspapers throughout the Netherlands. They could then choose to receive a paper-
and-pencil questionnaire, which they could return by envelope, or to receive an email with a link to an Internet questionnaire. Participants who completed the entire questionnaire were offered the chance to win one of 20 gift coupons, each worth 20 euros. We received 250 completed questionnaires. Eleven participants who only smoked cigars or pipes were not included in the analyses, because such smokers generally do not inhale the smoke, thus resulting in a different health risk. We were left with 239 questionnaires (160 women, 78 men, 1 did not indicate gender).

**Questionnaire**

The questionnaire began with some general questions concerning the smoking behavior of the participants. Next, participants completed the 10-item Rosenberg self-esteem scale (1965) (e.g., “I am in general very satisfied with myself,” with endpoint labels of 1 [*totally not agree*] to 5 [*totally agree*]). The answers to some questions were reversed, so that a high score corresponded to high self-esteem ($\alpha = .85$, $M = 3.90$, $SD = 0.77$).

Subsequently, participants answered questions concerning their risk perception (Dijkstra, De Vries, & Bakker, 1996). The items assessed the anticipated negative physical and social outcomes of smoking, and could be scored from "not sure" or "not expecting a certain outcome" (0) to "strong expectation of the outcome" (3). Concerning the long-term physical disadvantages, participants were presented with three statements: “Smoking increases my risk of...lung cancer/cardiovascular diseases/chronic lung conditions.” In addition, participants responded to statements concerning the short-term physical consequences of smoking: “Smoking deteriorates my...health/condition/my appearance.” The social outcomes consisted of the following three items: “Smoking...is bad for the health of people around me/is an annoyance for people around me/makes me a bad example for people around me.” Principal component analysis with varimax rotation revealed two clearly interpretable factors. One component referring to the physical consequences (6 items; $\alpha = .88$, $M$...
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= 1.63, SD = 0.77). The other component referred to the social consequences (3 items; α = .80, M = 1.40, SD = 0.87).

Following this, participants’ emotions related to their smoking behavior were mapped. First, participants were asked to indicate how frequently in the past thirty days they felt a particular emotion due to their smoking behavior. For example, participants were asked, “How often do you feel angry at yourself because you smoke,” with endpoint labels of never (1) to very often (5). Participants indicated the frequency of the following emotions: angry, guilty, being fed up, infuriated, regretful, disappointed, feeling ill at ease, humiliated by others, ashamed, embarrassed by others, feeling inferior, looking silly and being less worthy. The 13 items were averaged to create a composite measurement (α = .94, M = 1.83, SD = 0.80). Second, participants were asked to imagine that they wanted to quit smoking and the resulting emotions they would feel when they no longer smoked cigarettes. The same 13 emotional outcomes were mentioned, but participants were asked whether they thought that quitting smoking would lower these negative emotions, for example, “If I quit smoking, I will be less angry with myself,” with endpoint labels of totally not agree (1) to totally agree (5). The 13 items were averaged to create a composite measurement (α = .95, M = 2.17, SD = 1.07). Finally, participants were asked to indicate whether quitting smoking would result in more positive emotions. Three different statements were presented: “If I quit smoking... I will think more positively about myself, I will have more self-respect, and I will be prouder of myself.” A composite measurement was created (α = .89, M = 3.26, SD = 1.34).

We measured participants’ tendency to affirm themselves cognitively by presenting statements. Participants had to answer whether or not they had specific thoughts (endpoints 1 [never] and 5 [very often]). Ten items were presented; however, six items were retained to create a CSAI scale (see the results section concerning the scale development). The following six statements were part of the final CSAI scale: “I notice that I did some things very well,” “When I feel bad about myself, I think about all the things that I can be proud of,” “I think about the past and all the things that I did well,” “I think about all
the things that I have successfully completed,” “When I have done something wrong that made me feel dissatisfied with myself, I say to myself that I do not do everything wrong,” and “I realize that besides all the ‘stupid’ things I do, I also do some things very well.” The questions were averaged to create a composite measurement ($\alpha = .83$, $M = 2.62$, $SD = 0.74$).

**Results and Discussion**

*Scale Development and Reliability*

To create a CSAI scale, we generated a list of items that reflected the active use of positive self-images. This initial effort resulted in ten items. Exploratory principal component analysis was conducted on these items. One factor was extracted from this analysis (eigenvalue of 5.73), which explained 57% of the variance. All of the items correlated strongly with each other (correlations between .29 and .71; $p < .001$). In addition, the conceptualization of CSAI as “the active use of one’s self-esteem resources” determined that there should be some mild to moderate overlap between CSAI and self-esteem (i.e., both originate from the same source, which is the self-memory, and therefore both concepts should display some overlap). This coincides with the findings of Steele et al. (1993) that the Rosenberg self-esteem scale (1965) at pretest determines the effectiveness of self-affirmation. As a result, four items were eliminated because they were not significantly related to self-esteem (correlations between .08 and .12; $p > .05$). The remaining six items did correlate with self-esteem (correlations between .15 and .42, $p < .05$), leaving a 6-item scale with a good internal consistency ($\alpha = .83$).

*CSAI Versus Self-Esteem*

CSAI and self-esteem correlated significantly ($r = .31$, $p < .01$). In order to illuminate the predicted exclusive content of cognitive affirmation, we controlled for the relationship with self-esteem in all of the following analyses of Study 4.1. To further increase our understanding of CSAI and how it differs from self-esteem, identical
analyses were conducted for CSAI and self-esteem. All the analyses concerning self-esteem were controlled for the effect of CSAI.

**Physical and Social Consequences of Smoking and/or Quitting**

CSAI and the perceived social disadvantages of smoking were significantly related (partial $r = .16, p < .05$). This indicates that people who display a high level of cognitive self-affirmation tend to judge the negative social consequences of smoking as more strongly present. However, CSAI did not correlate significantly with the perceived physical consequences of smoking (partial $r = .07, p = .31$). The relationship between self-esteem and both outcome measurements proved to be exactly the opposite (concerning social outcomes: partial $r = -.21, p < .01$; concerning physical outcomes: partial $r = -.28, p < .01$). Thus, the relationship between CSAI and social outcomes is in line with the reasoning that the inclination should be related to increased open-mindedness towards threatening information. And the relationship between self-esteem and social and physical outcomes is in line with the reasoning that high self-esteem should be related to a general positive perception.

**Emotional Outcomes**

Reported negative self-evaluative emotions due to smoking behavior (partial $r = .21, p < .01$) and expectations about relieving these negative emotions in the case of quitting (partial $r = .13, p < .05$) were significantly and positively related to CSAI. CSAI was also marginally related to an increase in expected positive self-evaluative emotions in the case of quitting (partial $r = .12, p = .08$).

In contrast, self-esteem was negatively related to the reported negative self-evaluative emotions due to smoking (partial $r = -.35, p < .01$) and the expected lowering of negative emotions in the case of quitting (partial $r = -.34, p < .01$). Furthermore, self-esteem was negatively related to expected positive self-evaluative emotions in the case of quitting (partial $r = -.20, p < .01$). Thus, the positive relationship between CSAI and negative self-evaluative emotions is in line with the idea that people are more open-minded, less defensive
and ready to accept the self-threat. In contrast, the negative relationship between self-esteem and negative self-evaluative emotions is in line with the idea that people give reality a more positive bias. This notion is further supported by the participants’ expectation of less positive self-evaluative emotions in the case of quitting.

In sum, these findings are in line with the idea that CSAI can be described as a psychological process that results in an accepting, realistic and open mindset. In contrast, self-esteem corresponds to an unrealistically positive outlook.

**Study 4.2**

Study 4.1 indicated that a strong CSAI coincided with an accepting and realistic mindset. The aim of the second study was to determine the reproducibility (i.e., stability, reliability) of this new individual difference variable. Thus, with repeated administrations of the CSAI scale, how similar are the answers people provide to the questions posed (i.e., test-retest effects)? To answer this question, participants were asked to complete the CSAI scale at two different moments in time. The average time period between both administrations was 1.5 weeks. In addition, we aimed to provide some data on the construct validity of the CSAI scale. The hypothesis is that the stronger participants’ CSAI the more positive thoughts they report in the face of a health threat.

**Method**

*Recruitment and Procedure*

The participants in this longitudinal study were students at the University of Groningen. The first administration of the questionnaire was completed during a mass testing session scheduled in the first week of the academic year. All first-year psychology students had to participate in this testing session in exchange for course credits. During this testing session participants answered multiple paper-and-pencil questionnaires. In total 562 students (377 women, 119 men, 66 did not indicate gender) completed the first measurement of the CSAI and the question aimed at determining the construct validity of the CSAI scale. All participants were asked whether they would be willing to answer a
short follow-up Internet questionnaire. In exchange for completing the follow up they were offered the chance to win one of 10 gift coupons, each worth 20 euros.

The participants who were willing to participate in the follow-up study received an email with a link towards an Internet questionnaire exactly a week later. In total 310 students (226 women, 60 men, 22 did not indicate gender) completed the CSAI scale for the second time. In the test-retest analyses we have included only those participants who completed the CSAI questionnaire at both moments in time.

Measurements
CSAI. Cognitive self-affirmation was measured at both times by the six questions presented in Study 4.1. The CSAI scale proved to have a good internal consistency at both the first measurement ($\alpha = .74$, $M = 2.69$, $SD = 0.60$) and also at the second measurement ($\alpha = .84$, $M = 2.87$, $SD = 0.73$).

Positive images. Participants were asked about their positive thoughts to determine the construct validity of the CSAI scale. More specifically, after the first measurement of CSAI all participants read a threatening text about the negative health consequences of insufficient fruit and vegetable intake. Afterwards we asked them “How many positive thoughts did you have when you read the text?” (endpoints 1 [no positive thoughts] and 7 [many positive thoughts]).

Results and Discussion
Dropouts
Of the total 562 participants who completed the first measurement, 44.8% of these participants did not complete the second measurement of the CSAI scale. Fortunately, the participants who did not complete the second measurement of CSAI ($M = 2.71$, $SD = 0.61$) did not differ

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16 Before participants read the threatening text, half of the participants wrote about important values in their life, while the other half wrote about their least important values. This manipulation was part of another study present in the mass testing session. To unconfoundedly measure the link between CSAI and positive thoughts we only included participants who were not first forced to generate positive thoughts – that is, think about positive values (N = 269).
from those participants who did complete the second questionnaire in terms of their answers to the six items measuring CSAI ($M = 2.66$, $SD = 0.59$), $F(1, 560) = 0.95$, $p = .33$, $\eta^2_p = .002$.

**Reliability of the CSAI Scale**
The test-retest analysis showed a strong correlation between the first measurement and the second measurement of the CSAI ($r = .72$, $p < .01$). In addition, an Intra Correlation Coefficient (ICC-agreement or ICC $[A,1]$, see McGraw & Wong, 1996) was computed to confirm the stable and reliable character of the scale. The results showed a satisfactory reliability ($ICC = .69$, $p < .01$). In conclusion, at the two testing times, separated by about 1.5 weeks, scores on the scales were highly associated. This suggests that the CSAI scale is a stable and reliable measurement over time. The level of stability of this new individual difference measurement resembles personality measurements such as agreeableness and friendliness (e.g., Caprara, Barbaranelli, Borgogni, & Perugini, 1993; Tsaonnis & Kerpelis, 2004).

**Construct Validity of the CSAI Scale**
We found a significant correlation between CSAI and the amount of positive thoughts ($r = .20$, $p < .01$). Thus, participants with a strong CSAI reported more positive images when confronted with a self-threat than participants with a low CSAI. These outcomes support the construct validity of the CSAI scale.

**Study 4.3**
Study 4.1 indicated that a strong CSAI coincided with an open and rational approach toward threatening information. However, do people with a strong CSAI react in the same rational and open way to induced levels of threat? Also, how effective do these self-affirmational processes remain in the face of very strong self-threats? Previous research showed that self-affirmation manipulations increase open-mindedness towards many different threatening experiences. Some threats entail, for example, writing an essay that contradicts long-held beliefs about capital punishment (e.g., Cohen et al., 2000). Threats can
also consist of a self-inflicted physical threat such as the consequences of unsafe sex (Sherman et al., 2000) or real-life threats such as facing loss or trauma (Bonanno, Field, Kovacevic, & Kaltman, 2002). These findings coincide with the statement by Sherman and Cohen (2006) that “self-affirmation inoculates people against threat, and thus making them open to ideas that would otherwise be too painful to accept” (p. 205). Thus, the activation of positive self-images is characterized in the literature as a very powerful and robust tool in dealing with or defending oneself against all kinds and levels of self-threats. Accordingly, Study 4.3 aimed to show an equalizing effect of self-affirmation: self-restoring images enable one to restore one’s self-integrity and be open-mindedly independent of the level of threat. Therefore, in Study 4.3, participants were confronted with both a moderately threatening and a highly threatening health message about the negative consequences of having too much stress.

Besides an equalizing effect from the mobilization of self-affirmational resources, what exactly can be expected in both the moderately and the highly threatening condition? Previous research shows a consistent pattern of findings concerning the handling of moderate self-threats (e.g., Sherman & Cohen, 2006; Spencer, Fein, & Lomore, 2001). When participants undergo a moderate self-threat without being provided with a self-affirmation manipulation they react in a defensive manner, for example, by rejecting the content of the message (e.g., Sherman et al., 2000). However, when participants undergo a self-affirmation manipulation, they react with increased acceptance and processing of the self-threatening information. From the perspective that CSAI leads the individual to apply a self-affirmation procedure internally in the face of a self-threat, the same pattern could be expected. Individuals with a weak CSAI will react defensively towards moderately threatening information, while those with a strong inclination will be more accepting of the self-threatening information.

Where a high threat is entailed, the same is to be expected for participants with a strong CSAI. They will be able to accept the message because their readily available positive self-image will prevent the defensive reflex in information processing. Thus, for these
participants, the moderately and the highly threatening information will lead to similar levels of acceptance and persuasion. The reactions to highly self-threatening information by participants with a weak CSAI, however, are less easy to predict. It is possible that a strong self-threat is so confronting that defensive reactions are no longer effective in warding off the threat and people are “forced” to accept the threat. For example, when people experience an extreme fear (e.g., arachnophobia), this results in an adaptive response such as an increased need to adopt the recommendations present in the message (e.g., analogous to the extensive focus on the spider instead of avoidance; Pflugshaupt, Mosimann, Von Wartburg, Schmitt, Nyffeler, & Müri, 2005). One can also reason, as is commonly done in the fear-appeal literature, that a strong self-threat further intensifies the defensive reactions present (Witte & Allen, 2001). In that case, the acceptance might even be lower as compared to a moderate level of threat.

CSAI was determined at pretest by the measurement presented in Study 4.1. The effects of the threatening health messages were assessed using a commonly used outcome measurement in persuasion research: the intention to act in accordance with the recommendations.

Method

Participants and Design

Ninety students (72 women, 18 men) at the University of Groningen and the Hanze University Groningen participated in exchange for partial course credit or 5 euros. Participants were randomly assigned to one of two conditions. In the first condition, participants read a highly threatening text, and in the second condition, participants read a moderately threatening text.

Procedure

The students were invited to the laboratory to participate in a series of studies related to stress. Study sessions were completed in separate cubicles, and all measurements were presented via computers. First, some pretest measurements were taken. Next, participants read a
health message about stress. Then they were asked to complete the questions comprising the dependent measurements, which were said to be questions necessary for collecting important information about students and stress. Finally, the experimenter debriefed the participants carefully.

**Materials and Measurements**

**Pretest measurements.** Before measuring CSAI, participants were first asked to answer two questions concerning how they intended to cope with stress: “When you experience stress, will you be planning to actively try to lower the level of stress?” (endpoints 1 [certainly not planning this] and 9 [certainly planning this]) and “When you experience stress, how likely is it that you will actively try to lower the level of stress?” (endpoints 1 [certainly not likely] and 9 [certainly likely]). The questions were averaged to create a composite measurement ($r = .74$, $M = 6.79$, $SD = 1.64$). We also measured the level of self-esteem of the participants by means of the Rosenberg (1965) self-esteem scale ($\alpha = .82$, $M = 3.99$, $SD = 0.59$). Finally, as in Studies 4.1 and 4.2, we measured participants’ individual tendency to affirm themselves cognitively. The six items were then averaged ($\alpha = .80$, $M = 2.89$, $SD = 0.62$).17

**Threat manipulation.** To induce a self-threat, participants were presented with a text about the negative consequences of experiencing stress. The text was ostensibly from a brochure designed by the University of Amsterdam. This university was said to be specialized in research concerning stress and that they had only recently started doing research on the stress experienced by students. It was said that the findings collected so far were combined, resulting in an information brochure about ”students and stress.” The participants were told that the aim of the study was to evaluate the brochure. Participants were presented with a text of two pages, each on a different screen through which they could scroll (total of 375 words). First, the definition of

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17 In Studies 4.3 and 4.4, the second item of the CSAI scale was slightly different (“When I feel bad about myself, I think about all the good things that I’m able to do”).
stress was addressed: “Stress is a physical reaction to a stimulus.” It was said that even temporary and low levels of stress increase the production of stress hormones. Second, the causes of stress were described (e.g., “stress is dependent on the assessment of whether or not you can handle a certain situation”). Third, three consequences of stress were described in both conditions: cardiovascular diseases, infectious diseases and burnout. In the highly threatening condition, it was said that these diseases were very severe and resulted in awful outcomes (e.g., “numerous deaths in the Netherlands each year”). In the moderately threatening condition, it was noted that the diseases were not that severe and resulted in milder outcomes (e.g., “antibiotics can stop the infections, but the symptoms may persist for up to three weeks”).

Dependent measurements. Responses to three statements, measured in terms of 7-point scales, assessed the participants’ intention to lower their stress level. “When I experience stress in the next six months, I will be planning to try to lower the stress (in every possible way)” (endpoints 1 [certainly not planning this] and 7 [certainly planning this]). “When I experience stress in the next six months, it is likely that I will try to lower the stress (in every possible way)” (endpoints 1 [certainly not likely] and 7 [certainly likely]). And, lastly, “When I experience stress in the next six months, I will be willing to try to lower the stress (in every possible way)” (endpoints 1 [certainly not willing] and 7 [very willing]). A composite measurement was created for intention ($\alpha = .92$, $M = 5.51$, $SD = 1.20$).

We only included indirect-manipulation check questions in order to check the effectiveness of the threat manipulation. Participants were presented with three statements concerning self-evaluative emotions, for example, “When I experience stress in the next three months and don’t make sure that the stress level decreases, I will feel dissatisfied about myself” (endpoints 1 [totally not agree] and 5 [totally agree]). Participants were also asked how ashamed and dumb they would feel if they did not decrease their stress level. A composite measurement was created for self-evaluative emotions ($\alpha = .75$, $M = 2.04$, $SD = 0.80$).
Results and Discussion

Manipulation Check
We expected that the highly threatening text would induce a more negative image of the expected consequences of stress, resulting in more negative emotions. To test this prediction, we conducted a one-way analysis of variance (ANOVA). As predicted, we found that participants who read the highly threatening text expected to experience marginally significantly more negative emotions when experiencing stress in the near future ($M = 2.17$, $SE = 0.15$) than participants who read the moderately threatening text ($M = 1.86$, $SE = 0.15$), $F(1, 83) = 3.27$, $p = .07$, $\eta_p^2 = .04$.

Inclusion of a Covariate
Before testing the moderating role of CSAI, the relationship between intention and the pretest measurements of intention was examined. A strong correlation between both measurements would influence the analysis with which we were testing the moderating role of CSAI (Yzerbyt, Muller, & Judd, 2004). Correlation analysis showed a strong relationship between both measurements, $r = .75$, $p < .01$. Consequently, the pretest measurement of intention was included as a covariate in the analyses.

Moderating Role of CSAI on Intention
A two-way analysis of covariance (ANCOVA) was conducted to test whether the effect that the threatening message had on intention depended on CSAI. Level of threat was included as a factor and CSAI as a continuous variable. As predicted, a significant interaction was found, $F(1, 80) = 5.06$, $p < .05$, $\eta_p^2 = .06$. We computed simple slopes for the dependent variable at two different levels of the moderator. The complete data set was used to model participants scoring low or high on CSAI by respectively subtracting one standard deviation (1 SD below the mean) from the standardized scores and adding one standard deviation to the standardized scores (1 SD above the mean) (Cohen, Cohen, West, & Aiken, 2003). For the participants who displayed low levels of cognitive affirmation, we found that the level of threat
determined the amount of persuasion. The simple slopes analysis showed that the participants in the highly threatened group reported a stronger intention \( (M = 5.58) \) than the moderately threatened group \( (M = 5.08) \), \( F(1, 80) = 4.29, p < .05, \eta^2_p = .05 \) (see Figure 4.1).

For the participants who displayed high levels of cognitive affirmation we expected an equalizing effect; no difference between either of the threatening conditions in terms of intention. The simple slopes analysis illustrated the non-significant difference, \( F(1, 80) = 1.35, p = .25, \eta^2_p = .02 \). The means were as follows: highly threatening condition \( (M = 5.52) \) and moderately threatening condition \( (M = 5.80) \).

These findings also supported the expectation that for those participants who were confronted with a moderately threatening text, a high level of cognitive self-affirmation should result in a significantly higher intention than a low level of cognitive affirmation \( (r = .36, p < .05) \). For highly threatened participants, it was found that the presence of self-affirmational processes did not lead to significantly lower levels of persuasion \( (r = -.03, p = .85) \).
Controlling for Self-Esteem
Does the two-way ANCOVA remain significant when we control for the influence of self-esteem? To answer this question we included the main effect of self-esteem, but also the interaction between condition (high threat vs. moderate threat) and self-esteem. This was done because self-esteem and CSAI correlated significantly (\( r = .52, p < .01 \)). The inclusion of this interaction enables one to further correct the affirmation measurement (Yzerbyt et al., 2004). The results showed that the inclusion of self-esteem did not alter the moderating role that CSAI has on intention; the interaction between CSAI and threatening conditions remained significant, \( F(1, 78) = 4.40, p < .05, \eta_p^2 = .05 \).

Study 4.4
Study 4.3 showed the equalizing effects of CSAI. Study 4.4 aimed at replicating this effect and taking it one step further by including an external self-affirmation procedure. We formulated two expectations. First, for participants with a weak CSAI, it was expected that the external self-affirmation procedure would result in the exact same pattern of persuasion as was found in Study 4.3. Second, for participants who displayed high levels of cognitive self-affirmation, we expected to find no effects from the self-affirmation manipulation because their high level of spontaneous use of self-affirmation would have already evened out all the effects (just as in Study 4.3). The external self-affirmation procedure consisted of a standard self-affirmation manipulation. Participants received positive bogus feedback on a test that was said to predict future success in work and social relationships (Schwinghammer, Stapel, & Blanton, 2005; Steele et al., 1993).

Method
Participants and Design
One hundred and ninety-five students (123 women, 72 men) at the University of Groningen and at the Hanze University Groningen participated in exchange for partial course credit or 5 euros. Participants were randomly assigned to one of four conditions of a 2 (no self-
affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) between-subjects design.

Procedure
After being welcomed to the laboratory (individual cubicles), participants were told that they would participate in a series of studies that involved, among other things, stress and a test. All measurements were conducted by computer. Before the participants were exposed to any manipulation, some pretest measurements were taken. Subsequently, half of the participants underwent a self-affirmation procedure. The other half of the participants performed a puzzle task. Next, the participants read a text about stress (same threat manipulation as in Study 4.3). Again the aim of the study was said to be the evaluation of the folder concerning "students and stress." Next, the participants were asked to complete the questions comprising the dependent measurements. Finally, the experimenter debriefed the participants carefully.

Materials and Measurements
Pretest measurements. Similar pretest measurements were taken as described in Study 4.3. Both items measuring intention were averaged to create a composite measurement ($r = .79$, $M = 6.57$, $SD = 1.92$). We also created a composite measurement for the Rosenberg (1965) self-esteem scale ($\alpha = .83$, $M = 4.02$, $SD = 0.64$). The six items measuring CSAI were also averaged ($\alpha = .76$, $M = 2.99$, $SD = 0.65$).

Self-affirmation manipulation. The participants were asked to complete the SFAI-test (i.e., Social Functioning and Ambition Inventory Test), which was said to predict future success in work and social relationships very reliably. Participants were presented with ten statements (e.g., "I would rather not be responsible for other people") and were asked to indicate to what extent these statements applied to them (endpoints 1 [not at all like me] and 5 [very much like me]). In the self-affirmation conditions, participants were affirmed using positive bogus feedback on their test. They were then asked to write down why their score was so high. Participants who did not undergo the self-
affirmation procedure were given a puzzle task. They were asked to unscramble the names of twenty animals.

**Dependent measurements.** The same measurements were taken as described in Study 4.3. The intention measurements were averaged to create a composite measurement (\( \alpha = .90, M = 5.67, SD = 1.13 \)). The three questions concerning negative self-evaluative emotions were also averaged (\( \alpha = .76, M = 2.17, SD = 0.93 \)). To explicitly check the effectiveness of the threat manipulation, we included three additional questions concerning the perceived risk of contracting the diseases caused by stress. Participants were asked, “What is your risk of contracting cardiovascular disease when you experience stress?” The same was asked for infectious diseases and burnout. Participants could give an answer on an 11-point scale (endpoints 1 [no risk] and 11 [100 percent risk]). A composite measurement was created for perceived risk (\( \alpha = .81, M = 4.28, SD = 2.05 \)).

To check the effectiveness of the self-affirmation manipulation, we included one additional question. Participants reported their self-feelings as a result of the task they performed: “Did your completion of the SFAI-test/puzzle task result in a positive feeling about yourself?” (endpoints 1 [totally no good feeling] and 7 [very good feeling]).

**Results and Discussion**

**Manipulation Check**

A 2 (no self-affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) ANOVA showed the expected main effect of the threat manipulation; participants who read the highly threatening text perceived their personal risk for the diseases caused by stress as higher (\( M = 4.90, SD = 2.06 \)) than did those participants who read the moderately threatening text (\( M = 3.64, SD = 1.83 \)), \( F(1, 191) = 19.74, p < .01, \eta^2_p = .09 \). Just as in Study 4.3, we also found an indication of the effect that the threat manipulation had on reported negative self-evaluative emotions. Participants who read the highly threatening text expected more negative emotions when experiencing stress in the near future (\( M = 2.28, SD = 0.96 \)) than did participants who read the moderately threatening text (\( M = 2.05, SD = 0.90 \)), \( F(1, 191) = 3.39, p = .07 \).
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$p = .07, \eta_p^2 = .02$. The self-affirmation manipulation also showed the expected effect on self-feelings. Self-affirmed participants reported significantly more positive self-feelings ($M = 5.45, SD = 1.04$) than did non-affirmed participants ($M = 4.76, SD = 1.40$), $F(1, 191) = 15.02, p < .01, \eta_p^2 = .07$.

**Inclusion of a Covariate**
Before testing the moderating role of CSAI, we again checked the relationship between intention and pretest measurement of intention. The correlation analysis showed a strong correlation between both measurements ($r = .69, p < .01$): therefore, intention measured at pretest was included as a covariate in the analyses.

**Moderating Role of CSAI on Intention**
It was predicted that the interaction between the self-affirmation manipulation and the threat manipulation would only be significant for participants who displayed a low level of cognitive self-affirmation. This two-way interaction was predicted to be absent for participants with high levels of cognitive affirmation. Thus, within a three-way ANCOVA we expected – only for participants with low levels of cognitive self-affirmation – that the two-way interaction between the self-affirmation manipulation and the threat manipulation would be significant. To test these hypotheses, we computed the two-way interactions separately for low ($1 SD$ below the mean) and high levels of cognitive self-affirmation ($1 SD$ above the mean). Just as in Study 4.3, we used the complete data set to model the participants scoring low or high on the moderator. As predicted, we found a significant 2 (no self-affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) interaction for participants who displayed low levels of cognitive self-affirmation, $F(1, 186) = 9.59, p < .01, \eta_p^2 = .05$. And, again as predicted, a two-way interaction between the threat manipulation and the self-affirmation manipulation was absent for participants who displayed high levels of cognitive self-affirmation, $F(1, 186) = 0.80, p = .37, \eta_p^2 = .004$. 
Each interaction was unraveled by computing the contrasts between the four conditions for low and high CSAI separately. For the participants who displayed low levels of cognitive affirmation, we expected that when a self-affirmation manipulation was absent we would find a significant difference in reported intention for different levels of threat. The simple slopes analysis showed that the participants in the highly threatened group reported a stronger intention ($M = 5.83$) than did the moderately threatened group ($M = 5.17$), $F(1, 186) = 7.77$, $p < .01$, $\eta^2_p = .04$. For the participants who underwent a self-affirmation procedure, we expected an equalizing effect, that is, no difference between either threatening condition for intention. The simple slopes analysis illustrated the non-significant difference, $F(1, 186) = 2.44$, $p = .12$, $\eta^2_p = .01$. The means were as follows: highly threatening condition ($M = 5.50$) and moderately threatening condition ($M = 5.86$) (see Figure 4.2).

Concerning those participants who reported low levels of cognitive self-affirmation, the findings also supported the expectation that adding a self-affirmation manipulation would result in a higher intention when confronting participants with a moderately threatening text, $F(1, 186) = 8.65$, $p < .01$, $\eta^2_p = .04$. For those participants who were confronted with a strong self-threat, it was found that the presence of self-affirmational processes did not change the level of persuasion, $F(1, 186) = 2.07$, $p = .15$, $\eta^2_p = .01$. 


For those participants who displayed high levels of cognitive self-affirmation, we expected that level of threat and presence or absence of self-affirmation would have no influence on reported intention. Not one simple slope analysis showed a significant difference (see Figure 4.3). The participants in the highly threatened group ($M = 6.01$) and the participants in the moderately threatened group who did not undergo a self-affirmation procedure ($M = 5.64$) also did not differ, $F(1, 186) = 1.99, p = .16, \eta_p^2 = .01$. Participants who did undergo a self-affirmation procedure also did not differ when either moderately ($M = 5.67$) or highly threatened ($M = 5.73$), $F(1, 186) = 0.10, p = .75, \eta_p^2 = .001$. The data also confirmed the expectation that, for those participants with a high level of cognitive self-affirmation, the absence or presence of a self-affirmation manipulation would not influence reactions to a highly threatening message ($F[1, 186] = 1.24, p = .27, \eta_p^2 = .007$) or moderately threatening text ($F[1, 186] = 0.01, p = .91, \eta_p^2 < .001$).
Cognitive Self-Affirmation Inclination

High CSAI

Figure 4.3 Intention as a function of high cognitive self-affirmation inclination, self-affirmation manipulation and threat, Study 4.4.

Controlling for Self-Esteem

Both two-way interactions between the self-affirmation manipulation and the threat manipulation could be due to the influence of self-esteem. Therefore, we controlled for the potential influence of self-esteem measured at pretest. In the analyses performed, we included both the main effect of self-esteem and the self-esteem in interaction with the manipulations (i.e., we included two-way interactions and a three-way interaction). Just as in Study 4.3, this was done because self-esteem and CSAI correlated significantly ($r = .44$, $p < .01$). Both two-way interactions did not change significantly when we controlled for self-esteem (for low CSAI: $F[1, 182] = 9.50, p < .05, \eta_p^2 = .05$; for high CSAI: $F[1, 182] = 0.22, p = .64, \eta_p^2 = .001$). The results indicate that CSAI has its own influence, which is independent of self-esteem.
General Discussion

The goal of the present studies was to show the stability, meaning and effects of a new scale that was designed to measure an individual's CSAI. This inclination is thought to be related to people's cognitive reactions towards self-threats. In people high in CSAI, positive self-images strategically enter the individual's awareness when their self is threatened, in order to restore their positive self-view. One basic expectation is that self-affirmed people will be more open-minded towards the threatening information (Sherman & Cohen, 2002). Study 4.1 showed that those high in CSAI reported more negative consequences and more negative emotions with regard to their smoking behavior, which is in line with the notion of less defensiveness and more open-mindedness. Study 4.2 showed the stable character of the CSAI scale, and provided support of the construct validity of the CSAI scale. In addition, Study 4.3 showed that higher scores on CSAI were related to more persuasion in the case of a moderate threat. This is also in line with the notion of increased open-mindedness and replicates past findings (e.g., Harris & Napper, 2005), but is also in line with the findings in Study 4.4 on the persuasive effects of the application of a self-affirmation procedure. The similarity of effects between a strong CSAI and self-affirmation procedures suggests that they refer to the same self-restoring mechanism, the availability of positive self-images (Sherman & Cohen, 2006).

Participants with a weak CSAI displayed a defensive reaction towards the moderate threat. However, in Studies 4.3 and 4.4 this defense seemed no longer effective when the threat was high (Fry & Prentice-Dunn, 2005). It may be that the defense “leaked” the threatening information and that participants tried to cope with the resulting self-threat by forming an intention to change the unhealthy behavior that was the basis of the self-threat. In contrast, in participants with a strong CSAI, the cognitive self-affirmation activities seemed equally effective under moderate and high threat. The positive self-images that came to mind when the participants were confronted with the threat seemed capable of avoiding defensive reactions (closed-mindedness), even when the threat was high. Again, the pattern of
persuasion in the case of high threat was the same as the pattern when a self-affirmation procedure was applied, thus suggesting the same self-restoring mechanism, the availability of positive self-images. This conclusion is further supported by the finding that in people with a strong CSAI, the self-affirmation procedure no longer had any effect. In other words, because these people actively used positive self-images that prevented defensive reactions, the self-affirmation procedure could no longer make a difference through lowering defenses. Thus, people with a strong CSAI were already saturated with positive self-images.

**CSAI and Self-Esteem**

We assume that the positive self-images that come to mind when people are confronted with a threat stem from self-memory (Rogers et al., 1999). At the same time, this self-memory may be the basis for the global self-evaluation that is referred to as a person’s self-esteem. This notion that self-esteem and the positive self-images that our measurement assessed both originate from the same memory pool is supported by the moderate but significant correlation between a state of self-esteem (Rosenberg, 1965) and CSAI ($r = .31$). However, the present data also suggest that both psychological factors differ in essential ways. Study 4.1 showed that despite their positive correlation, the correlations with criterion variables were opposite, thus suggesting open-mindedness through cognitive self-affirmation and a generally positive outlook through self-esteem. In addition, including self-esteem as a covariate did not change the moderating effects of CSAI in Studies 4.3 and 4.4. Overall, our conclusion is that CSAI and self-esteem are related but different psychological phenomena. This might mean that in past studies in which self-esteem moderated the effects of self-threats (e.g., Stone & Cooper, 2003), the effects may have been confounded by cognitive self-affirmation and at least partly reflected the effects of cognitive self-affirmation.

**Limitations**

There are some limitations about the present studies that should be taken into account when interpreting the findings. Importantly, we did
not assess whether the moderating effects of CSAI were, indeed, mediated by positive self-images. In principle, it is possible that other mechanisms (e.g., social comparison) that are related to self-reports of the frequency of thinking of positive self-images are responsible for these effects. However, the similarity between the effects of self-affirmation procedures and the moderating effects of CSAI strongly suggest that the mediation is caused by positive self-images. In other words, most self-affirmation procedures are designed to provide people with positive self-images and often do not offer social comparison or other types of information that could be held responsible for these effects (e.g., McQueen & Klein, 2006). In addition, Study 4.2 showed a significant link between CSAI and positive thoughts. Nevertheless, future studies could try to track the mediation by positive self-images.

**Future Research**

The fact that CSAI can function as a stable individual difference has implications for other lines of research. As the present data suggest, CSAI could be relevant in research into persuasive communication. In more general terms, in all paradigms in which the self is threatened, CSAI can help explain the effects. In addition, studies of self-esteem should take into account (e.g., control for) CSAI. Furthermore, psychiatric phenomena such as depressed mood and narcissism could be related to low or excessive use, respectively, of cognitive self-affirmation. The effects of CSAI on social interaction might be of interest. For example, what are the effects of CSAI on self-presentation, the need for self-identity or for stereotyping? Lastly, what is the role of CSAI in the context of Terror Management Theory (for an overview, see Solomon, Greenberg, & Pyszczynski, 2004) in which people use self-esteem to lower their fear of death? These questions suggest that CSAI as a concept has the potential to help us further in many different areas of social psychology.