On the moderators of trait avoidance motivation in predicting cognitive biases and adjustment

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CONTENTS

Abstract

The present research focused on motivational and personality traits measuring individual differences in the experience of negative affect, in reactivity to negative events, and in the tendency to avoid threats. In this thesis, such traits (i.e., neuroticism and dispositional avoidance motivation) are jointly referred to as trait avoidance motivation. The seven studies presented here examined the moderators of such traits in predicting risk judgments, negatively biased processing, and adjustment.

Given that trait avoidance motivation encompasses reactivity to negative events and tendency to avoid threats, it can be considered surprising that this trait does not seem to be related to risk judgments and that it seems to be inconsistently related to negatively biased information processing. Previous work thus suggests that some variable(s) moderate these relations. Furthermore, recent research has suggested that despite the close connection between trait avoidance motivation and (mal)adjustment, measures of cognitive performance may moderate this connection. However, it is unclear whether this moderation is due to different response processes between individuals with different cognitive tendencies or abilities, or to the genuinely buffering effect of high cognitive ability against the negative consequences of high trait avoidance motivation.

Studies 1-3 showed that there is a modest direct relation between trait avoidance motivation and risk judgments, but studies 2-3 demonstrated that state motivation moderates this relation. In particular, individuals in an avoidance state made high risk judgments regardless of their level of trait avoidance motivation. This result explained the disparity between the theoretical conceptualization of avoidance motivation and the results of previous studies suggesting that the relation between trait avoidance motivation and risk judgments is weak or nonexistent. Studies 5-6 examined threat identification tendency as a moderator for the relationship between trait avoidance motivation and negatively biased processing. However, no evidence for such moderation was found. Furthermore, in line with previous work, the results of studies 5-6 suggested that trait avoidance motivation is inconsistently related to negatively biased processing, implying that theories concerning traits and information processing may need refining. Study 7 examined cognitive ability as a moderator for the relation between trait avoidance motivation and adjustment, and demonstrated that cognitive ability moderates the relation between trait avoidance motivation and indicators of both

self-reported and objectively measured adjustment. Thus, the results of Study 7 supported the buffer explanation for the moderating influence of cognitive performance.

To summarize, the results showed that it is possible to find factors that consistently moderate the relations between traits and important outcomes (e.g. adjustment). Identifying such factors and studying their interplay with traits is one of the most important goals of current personality research. The present thesis contributed to this line of work in relation to trait avoidance motivation.

Tiivistelmä

Tämä väitöskirja keskittyi motivaatio- ja persoonallisuuspiirteisiin, jotka mittaavat yksilöiden välisiä eroja kielteisten tunteiden kokemisessa, herkkyydessä reagoida kielteisiin tapahtumiin ja ärsykkeisiin, sekä taipumuksessa välttää uhkia. Näihin piirteisiin viitataan tässä tutkimuksessa yhteisnimityksellä piirrevälttämismotivaatio. Väitöskirjassa esitellyt seitsemän tutkimusta selvittivät tekijöitä, jotka muokkaavat piirrevälttämismotivaation yhteyttä riskiarvioihin, kielteisen tiedon käsittelyyn, sekä yleiseen hyvinvointiin ja toimintakykyyn.

Vaikka piirrevälttämismotivaatio käsittää yksilöiden väliset erot reaktioissa kielteisiin asioihin sekä taipumuksessa välttää uhkia, tämä piirre ei vaikuta juuri olevan yhteydessä riskiarvioihin, ja piirteen yhteydet kielteisen tiedon käsittelyyn ovat epäjohdonmukaisia. Näin ollen aikaisempi tutkimus viittaa siihen, että jokin tekijä muokkaa näitä yhteyksiä. Piirrevälttämismotivaatio on myös voimakkaassa yhteydessä (alhaiseen) psyykkiseen hyvinvointiin ja toimintakykyyn, mutta viimeaikaiset tutkimukset ovat osoittaneet, että yksilölliset erot kognitiivisissa taipumuksissa tai kyvyissä voivat muokata tätä yhteyttä. Ei kuitenkaan ole selvää, johtuuko tämä kognitiivisilta taipumuksiltaan eroavien ihmisten erilaisista vastaustaipumuksista, vai kognitiivisen kyvykkyyden suojaavasta vaikutuksesta korkean piirrevälttämismotivaation kielteisiä seurauksia vastaan.

Tutkimukset 1-3 osoittivat, että piirrevälttämismotivaation ja riskiarvioiden välillä on heikohko suora yhteys, mutta tutkimusten 2-3 tulokset osoittivat lisäksi, että motivaatiotilat muokkaavat tätä yhteyttä: välttämismotivaatiotilassa olevat henkilöt tekivät korkeita riskiarvioita riippumatta piirrevälttämismotivaationsa tasosta. Tämä tulos selitti ristiriitaa piirrevälttämismotivaation teorian ja piirrevälttämismotivaation ja riskiarvioiden välisen suhteen heikkoudesta kertovien aiempien tulosten välillä. Sen sijaan yksilöiden väliset erot uhkien tunnistamisessa eivät vaikuttaneet piirrevälttämismotivaation ja kielteisen tiedon käsittelyn väliseen suhteeseen (tutkimukset 5-6). Kielteisen tiedon käsittelyä koskevat tulokset olivat aikaisempien tulosten tavoin epäjohdonmukaisia ja viittaavat siihen, että piirteiden ja tiedonkäsittelyn yhteyttä koskevia teorioita pitäisi tarkentaa. Tutkimus 7 selvitti kognitiivisen kyvykkyyden vaikutusta piirrevälttämismotivaation ja psyykkisen toimintakyvyn väliseen suhteeseen. Tulokset osoittivat, että kognitiivinen kyvykkyys muokkaa

piirrevälttämismotivaation yhteyttä sekä itsearvioituun että objektiivisesti arvioituun toimintakykyyn. Tulokset tukivat teoriaa, jonka mukaan kognitiivinen kyvykkyys aidosti suojaa ihmisiä korkean välttämismotivaation kielteisiltä vaikutuksilta.

Väitöskirjan tulokset tuottivat uutta tietoa välttämismotivaation vaikutuksia muokkaavista tekijöistä. Tällaisten tekijöiden tunnistaminen ja niiden ja persoonallisuuden yhteisvaikutusten tutkiminen on yksi nykypersoonallisuustutkimuksen tärkeimmistä tavoitteista, ja tämä väitöskirja osallistui tähän tutkimuslinjaan piirrevälttämismotivaation osalta.

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P.s. Rakas, rakas Anton, äiti tulee nyt kotiin. Kiitos kun odotit.

List of original publications

I   Leikas, S., Lindeman, M., Roininen, K., & Lähteenmäki, L. (2007). Food risk perceptions, gender, and individual differences in avoidance and approach motivation, intuitive and analytic thinking styles, and anxiety. *Appetite*, *48*, 232-240.

II   Leikas, S., Lindeman, M., Roininen, K., & Lähteenmäki, L. (2009). Avoidance motivation, risk perception, and emotional processing. *European Journal of Personality*, *23*, 125-147.

III   Leikas, S., & Lindeman, M. (2009). Personality, threat identification, and emotional processing. *European Journal of Personality*, *23*, 455-474.

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Abbreviations

N	Number of participants
r	Pearson's correlation coefficient (measure of effect size)
t	t-test value
F	Fisher's F ratio
β	Standardized regression coefficient
ΔR^2	Increase in variance explained in a regression analysis (measure of effect size)

1 Introduction

Four decades ago, it was suggested that there is no cross-situational consistency in behavior – i.e., that broad personality traits do not exist, or, even if they do exist, that they are essentially unrelated to how we behave (Mischel, 1968; Raush, 1965; Shweder, 1975). At that time, these suggestions were, to some extent, justified (Bem, 1972; Bem & Allen, 1974; but see Funder, 2009). However, the tables have turned. The trait approach to personality has been triumphant in two respects. First, we can now be relatively confident about which traits subsume the broad individual differences in personality (Costa & McCrae, 1992; Digman, 1990; Goldberg, 1993; McCrae & Costa, 1987). Second, broad traits do predict behavior, and sometimes they do so quite strongly and consistently (Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

The successful state of trait psychology today is not (merely) a happy end, but a starting point to a whole new set of questions (Fournier, Moskowitz, & Zuroff, 2009; Funder, 2009; Mischel, 2004; Mischel, Shoda, & Mendoza-Denton, 2002). These questions include: *How* does personality affect behavior? *Why* does it affect behavior? *When* does it affect behavior? And, *what kind* of entities are personality traits? What in a person's mind underlies the different trait scores? To answer these questions, it does not suffice to say that a person did something – say, talked a lot – because she stands at a certain level of a certain trait, for instance, because she has a high extraversion score, although such observations can be very interesting and important. But we also need to ask what happens in the mind of an extraverted person when she starts to talk and when she keeps on talking, and what happens when she faces internal or external pressure to stop talking. In other words, now that we know the essentials of the structure of personality, we need to start focusing on the internal dynamics of personality (Cervone, 2005) and on the processes between traits, other dispositions, situations, and behavior (Fournier, Moskowitz, & Zuroff, 2008; Fournier et al., 2009; Funder, 2009; Mischel, 2004).

The present research aims to provide some answers to the questions described above. The main focus is on the "when" question in the context of such traits that are relevant to the experience of and susceptibility to negative emotional experience, and to the tendency to avoid negative issues. Previous literature has shown that some of the

relations between such traits and some theoretically relevant variables are weak or inconsistent – i.e., sometimes there is a relation, sometimes not. In the present thesis, it is suggested that these relations are moderated by certain other variables, and seven empirical studies try to specify when these relations can be found, and why.

1.1 Trait avoidance motivation

Which exactly are those traits that encompass individual differences in (a) the experience of negative affect, (b) reactivity to negative events, and (c) the strength of avoidance motivation (i.e., individual differences in the willingness to avoid negative issues), and how are these traits related to each other and established trait taxonomies? Trait models incorporating one or more negative dimensions similar to those described above can be divided into two classes. The first types of models are rooted in motivation research. In the past few decades, several different motivational theories have suggested that at its core, behavior is regulated by two systems: a behavioral approach system, responsible for approaching desired, positive issues, and a behavioral inhibition/avoidance system, responsible for withdrawing from and avoiding threatening, dangerous, and unwanted issues (e.g. Carver, Sutton, Scheier, 2000; Cloninger, 1987; Gray, 1982; Gray & McNaughton, 2000; Higgins, 1998);[1] naturally, this latter system is relevant to the present research. The idea of approach and avoidance systems guiding behavior is commonsensical, and by no means a new thought (e.g. Miller, 1944). Although motivational research often deals with intraindividual processes rather than with between-person constructs, approach-avoidance motivation theorists have posited that there are individual differences in the sensitivity of the motivation systems (e.g. Carver & White, 1994; Gray, 1994; Smillie, 2008). Furthermore, individual differences in the strength of avoidance motivation system are related to the frequency of negative affective experiences in everyday life (Gable, Reis, & Elliot, 2000), to stronger negative reactions when anticipating a negative event or after a negative event (Carver & White, 1994; Gable et al., 2000), and to avoidance behavior (Peters & Slovic, 2000).

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[1] In reinforcement sensitivity theory, avoidance behavior is actually controlled by two systems; one controlling reactions to aversive stimuli and one controlling initial reactions to goal conflict (Gray, 1982; Gray & McNaughton, 2000).

The second type of theories incorporating a "negative" trait dimension concern individual differences in personality. The dimension of neuroticism (vs. emotional stability) is included in all major trait models of personality (e.g., Costa & McCrae, 1992; Eysenck & Eysenck, 1975; Watson & Tellegen, 1985), and such a dimension practically always emerges in empirical studies examining the structure of personality (Barrett, Petrides, Eysenck, & Eysenck, 1998; Goldberg, 1992; McCrae & Costa, 1985; 1987; Zuckerman, Kuhlman, & Camac, 1988). Neuroticism can be defined as a stable tendency to experience negative affects, self-consciousness, and insecurity (Costa & McCrae, 1992).

As suggested by the above review of dispositional avoidance motivation and neuroticism, these traits share many features, both theoretically and empirically (Carver, Sutton, & Scheier, 2000; Denissen & Penke, 2008; Gray, 1982; Gray & McNaughton, 2000; Larsen & Ketelaar, 1991; Tellegen, 1985; Watson & Clark, 1984). Indeed, measures of neuroticism are usually at least moderately correlated with measures of dispositional avoidance motivation (Carver & White, 1994; Jorm, Christensen, Henderson, Jacomb, Korten, & Rodgers, 1998), and some studies utilizing structural equation modeling have suggested that measures of neuroticism and dispositional avoidance motivation load on the same latent factor (Gable, Reis, & Elliot, 2003; Elliot & Thrash, 2002; Smits & Boek, 2006; see also Carver et al., 2000). Furthermore, both traits predict stronger negative reactions toward negative stimuli (Carver & White, 1994; Gable et al., 2000; Larsen & Ketelaar, 1991). The two avoidance motivation systems specified by revised reinforcement sensitivity theory (Gray & McNaughton, 2000, see also Footnote 1), perhaps the most prominent of the approach-avoidance motivation theories, have also been suggested to exist as two distinct but correlated aspects within neuroticism (DeYoung, Quilty, & Peterson, 2007). The notion that trait neuroticism encompasses the dispositional avoidance motivation (or vice versa) is also implicit in some interpretations of reinforcement sensitivity theory (Smillie, 2008).

Further evidence for partial overlap between systems controlling negative affect and avoidance behavior comes from research suggesting that negative affects and reactions serve as signals that inform the avoidance system of danger and of the need to withdraw from certain objects or situations (Barrett, 2006; Cacioppo, Priester, & Berntson, 1993; Chen & Bargh, 1999). For example, people push a lever away from them (vs. pull it

towards them) more quickly when evaluating negative (vs. positive) stimuli (Chen & Bargh, 1999). These results suggest that negative affective evaluations automatically evoke a tendency toward avoidance behavior.

The above discussion suggests that traits tapping the experience of negative affect and traits measuring avoidance motivation have quite a lot in common, although it is yet unclear whether one of the traits can be reduced to the other. For the purposes of the present dissertation, in which dispositional avoidance motivation and neuroticism are studied, I introduce a composite trait term *trait avoidance motivation*, which refers jointly to these two traits. The focus on these "negative" traits serves as the first of two overarching themes of the present dissertation. However, at the same time, I acknowledge that along with these common features, dispositional avoidance motivation and neuroticism also carry unique features, and that these different traits may have distinct relationships with other variables. The point of introducing a broad negative composite trait concept is to enable a coherent discussion of the rationale of the research and of the results. Most of the previous results discussed below concern both of these traits. However, sometimes the results under discussion or the research questions posed in the present studies are more relevant to one of the traits than to the other. In those cases, this is particularly noted in the text.

The term trait avoidance motivation is chosen to serve as the label of the negative composite trait because it is not currently used exclusively by any one personality theory, and therefore does not carry connotations particular to these theories, but can be used to refer generally to individual differences in negative affects and reactions and in the strength of avoidance motivation. It is important to keep in mind that in the present thesis, this term refers equally to each of the traits of neuroticism and dispositional avoidance motivation, and that the use of this general term does not suggest that these traits are identical or reducible into each other.

1.2 The "when" and "what" of trait avoidance motivation

Individual differences in the experience of negative affects and reactions, referred to in this thesis as trait avoidance motivation, seem to be related to almost every conceivable psychological problem, deviance, distress, and abnormality (e.g., Claridge & Davis, 2001; Watson, Gamez, & Simms, 2005), such as low subjective well-being

(Steel, Schmidt, & Shultz, 2008), clinical depression and anxiety disorders (Kasch, Rottenberg, Arnow, & Gotlib, 2002; Watson et al., 2005), problems in emotion regulation (Kokkonen & Pulkkinen, 2001), somatic distress (Neeleman, Bijl, & Ormel, 2004), stronger negative reactions to negative events (Gable, Reis, & Elliot, 2000), and many others (Claridge & Davis, 2001). Almost as a rule, if there is something distressing to be found in the human mind, high trait avoidance motivation is right there by its side. Therefore, a few exceptions to this rule in the literature stand out.

The present research focuses on two of the exceptions mentioned above and tries to uncover some reasons for them. In so doing, this research aims to provide some answers to the "when" question presented in the beginning of the Introduction by studying certain moderators of trait avoidance motivation. Focusing on the moderators of traits serves as the second overarching theme of this dissertation.

The first exception of those mentioned above is that, despite its status as *the* predictor of negative issues, trait avoidance motivation does not seem to be related to risk judgments (e.g., Hampson, Andrews, Barckley, Lichtenstein, & Lee, 2006; Vollrath, Knoch, & Cassano, 1999). Related to this, although trait avoidance motivation seems to be related to negatively biased information processing (Chan, Goodwin, & Harmer, 2007; Gomez & Gomez, 2002; Gomez, Gomez, & Cooper, 2002), this relation is quite inconsistently found (Bradley & Mogg, 1994; Bradley, Mogg, Galbraith, & Perrett, 1993; Chan et al., 2007; Mathews & Milroy, 1994; Rogers & Revelle, 1998; Rusting, 1998; Rusting & Larsen, 1998). The present studies examine these relations and potential moderators for them in order to clarify when trait avoidance motivation is related to risk judgments and negatively biased processing, and when it is not. It is hypothesized that state motivation obscures the relationship between trait avoidance motivation and risk judgments because state and trait avoidance motivation could have similar consequences with regards to reactions to risks (Higgins, Shah, & Friedman, 1997; Lang, 1995). Furthermore, based on recent research suggesting that individual differences in threat identification moderate the relation of trait avoidance motivation with life satisfaction and negative affect (Tamir, Robinson, & Solberg, 2006), it is hypothesized that a threat identification tendency moderates the relation between trait avoidance motivation and negatively biased processing.

The second exception emerges from quite a few recent studies suggesting that trait avoidance motivation's adverse adjustment-related consequences are not as inevitable as previously thought (Perkins & Corr, 2005; 2006; Robinson & Clore, 2007). In other words, some high-trait-avoidance motivation individuals may be able to escape the negative effects of the trait. However, on the basis of previous research it is not clear whether some variable(s) genuinely alleviate the negative effects of high trait avoidance, or whether the results mentioned above are only an artifact of the response process (Perkins & Corr, 2006; Robinson & Clore, 2007). By stringing together previous research and by an empirical examination, it is suggested that some high-trait-avoidance individuals are indeed able to escape many harmful correlates of the trait, and that a key moderator for the relation between trait avoidance motivation and these correlates is cognitive ability.

In studying the cognitive correlates of trait avoidance motivation, this thesis also aims at providing some answers to the "what" question. This question is much more profound and difficult than the "when" question, and the present research can provide only a very incomplete answer to it. Previous research concerning this question can be divided into two, interrelated lines: One tries to connect traits with genetics and neural properties (e.g., Canli, 2008; Lake, Eaves, Maes, Heath, & Martin, 2000; Ormel, Rosmalen, & Farmer, 2004) and the other with cognitive structures and processes (Borkenau & Mauer, 2007; Gomez, Cooper, McOrmond, & Tatlow, 2004; Robinson, Ode, Moeller, & Goetz, 2007; Rusting, 1998; 1999). The studies presented here join the latter research line. A range of negative processing biases and their relation to trait avoidance motivation are examined. In so doing, the present studies try to increase our knowledge about the cognitive aspects of trait avoidance motivation.

1.3 Trait-congruency theory

A long-maintained idea in personality and social psychology as well as in clinical psychology is that personality traits predispose individuals to process information and make judgments in a way congruent with their traits (e.g. Beck, 1976; King & Sorrentino, 1988; Mathews & MacLeod, 2005; Rusting, 1998). In the context of avoidance motivation, this trait-congruency theory suggests that those with high trait avoidance motivation are quicker to attend to negative information, process it more

effectively, recall it better, interpret neutral information in a more negative way, and make more negative judgments than individuals with low trait avoidance motivation (Gomez et al., 2002; Rusting, 1998; Rusting & Larsen, 1998; Zelenski & Larsen, 2002).

Trait-congruency theory is attractive for many reasons. First of all, it is intuitively appealing. People with high levels of emotional traits experience trait-congruent affects more frequently (Costa & McCrae, 1980) and react more strongly to trait-congruent events (Gable et al., 2000) than individuals low in these traits. Furthermore, high-trait-avoidance motivation individuals describe their important memories as sadder and less pleasant than low-trait-avoidance motivation individuals (McAdams, Anyidoho, Brown, Huang, Kapland, & Machado, 2004). It seems plausible that more frequent experiences with and sensitivity to events with a certain valence could enhance the processing of stimuli with this valence. Concerning trait avoidance motivation and negative judgments, it also seems plausible that a motivation to avoid negative issues might cause high-trait-avoidance individuals to judge negative issues more negatively, as such judgments (e.g., judging risks as highly likely) could help ensure that one avoids those negative issues. This view is broadly compatible with, for instance, the hierarchical model of approach and avoidance motivation (e.g., Elliot & Church, 1997), according to which cognitive structures, such as goals, mediate the relation between motivational dispositions and outcome variables such as subjective well-being and behavior. High trait avoidance motivation is related to maintaining avoidance goals (Elliot, Sheldon, & Church, 1997), and judging the to-be-avoided issues as more likely could contribute to achieving these goals.

The second reason for why the trait-congruency theory is attractive is related to the "new set of questions" presented in the beginning of the Introduction. As already mentioned, establishing a connection between trait avoidance motivation and negatively biased judgment and processing could provide us with at least partial answer to the "what" question presented above by uncovering some cognitive aspects of the trait. Third, the connections between traits and cognitive processes could suggest a way to answer the "how" question also. To illustrate, to explain why high-trait-avoidance motivation individuals experience higher negative mood than low-trait-avoidance motivation individuals in response to negative events (Gable, Reis, & Elliot, 2000; Larsen & Ketelaar, 1991), we could refer to the tendencies of high-trait-avoidance

motivation individuals to pay more attention to the negative features of an event or to evaluate the event as more negative.

The connections between trait avoidance motivation and cognitive biases have been much studied (Bradley & Mogg, 1994; Bradley et al., 1993; Derryberry & Reed, 1994; Mathews & MacLeod, 2005; Rogers & Revelle, 1998; Rusting, 1998; Young & Martin, 1981; Zelenski & Larsen, 2002). Rather surprisingly, no clear conclusions can be drawn from this body of research. To be sure, quite a few studies have found a positive relation between trait avoidance motivation and negatively biased processing (Chan et al., 2007; Derryberry & Reed, 1994; Gomez et al., 2004; Gomez et al., 2002; Rusting & Larsen, 1998 (Study 2); Young & Martin, 1981; Zelenski & Larsen, 2002). That is, those with high trait avoidance motivation tend to recall negative information better, attend to it more, and interpret neutral information in a more negative way than those with low trait avoidance motivation. However, these relations are typically weak, and for each of the processes mentioned above, there are also studies showing no relations (Bradley et al., 1993; Chan et al., 2007; Rogers & Revelle, 1998; Rusting, 1998; Rusting & Larsen, 1998, Study 1).

In the studies presented here, the relations between trait avoidance motivation and negative cognitive biases are examined. The aim is to uncover some reasons for the weakness and inconsistency of these relations. Measures of negative biases related to recall, interpretation, and judgment are administered to several samples of participants. Furthermore, the present thesis draws from previous research and theorizing to propose two moderators for the relation between trait avoidance motivation and negatively biased judgment and processing. Specifically, it is suggested that state motivation moderates the relation between trait avoidance motivation and risk judgments, and that individual differences in threat identification moderate the relationship between trait avoidance motivation and negative processing biases.

A particular focus of the present research is on the relation between trait avoidance motivation and self-reports of risk judgments. This relation could be expected to be quite strong, as trait avoidance motivation is thought to subsume most or all important individual differences in reactivity to and willingness to avoid negative issues, such as risks. However, correlations between trait avoidance motivation and risk judgments have been consistently weak (rs around .12) or nonexistent in previous research

(Gullone & Moore, 2000; Hampson et al., 2006; Peters, Burraston, & Mertz, 2004; Vollrath et al., 1999).[2] Given the theoretical conceptualization of the trait, there is a need to examine reasons for the weakness of this relation. Study 1 (Article I) examines this relation in a large sample of participants, and Studies 2 and 3 examine whether state motivation moderates this relationship.

The theoretical rationale for the connection between trait avoidance motivation and risk judgments is based on the connection of trait avoidance motivation with reactivity to and willingness to avoid negative issues. Therefore, the research questions concerning risk judgments are more related to the dispositional avoidance motivation component than to the neuroticism component of the trait avoidance motivation composite. Furthermore, most studies showing low or nonexistent relations between trait avoidance motivation and risk judgments have used measures of neuroticism as an indicator of trait avoidance motivation (e.g. Gullone & Moore, 2000; Hampson et al., 2006). It seems possible that measures tapping individual differences in dispositional avoidance motivation could be more strongly related to risk judgments than measures of neuroticism. Accordingly, a measure of dispositional avoidance motivation is used in the present risk judgment studies (1-3). Furthermore, a measure of trait anxiety, a subtrait of neuroticism, is used in Study 1. If risk judgments are related to neuroticism, the strongest relations should be found for this subtrait, since of all negative emotions, anxiety is the most likely to predict reactions to risks.

1.4 Trait avoidance motivation and negative biases: Potential moderators

Relations between trait avoidance motivation and risk judgments and negatively biased processing are theoretically plausible, but empirically weak or inconsistent. One reason for this could be that these relations are moderated by some third variable. The present

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[2] There is some evidence for somewhat higher relations (around $r = .35$) between trait avoidance motivation and self-relevant judgments of negative future events (Borkenau & Mauer, 2006; Zelenski & Larsen, 2002). However, given that trait avoidance motivation is strongly related to trait pessimism (e.g., Marshall, Wortman, Kusulas, Hervig, & Vickers Jr, 1992), the items used in these negative judgment studies (e.g., becoming homeless, being diagnosed with cancer) may overlap conceptually with the items measuring trait avoidance motivation. That is, pessimistic judgments may derive from the same source of within-person negativity as responses to trait avoidance motivation measures (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Watson & Clark, 1984). In contrast to such connections, the current research is concerned with risk judgment tendencies that are conceptually unrelated to trait avoidance motivation and with the possible empirical connection between such risk judgments and trait avoidance motivation.

research studies two such potential moderators: state motivation and a threat identification tendency. These moderators and their relevance to trait avoidance motivation and cognitive biases are discussed next.

1.4.1 State avoidance motivation and risk judgments

As noted above, trait avoidance motivation could be expected to have a strong relation with risk judgments because trait avoidance motivation subsumes practically all important individual differences in reactions to negative stimuli and in the willingness to avoid danger. However, not all negative reactions derive from within-person factors: situations can evoke a state of avoidance that can make people temporarily highly reactive to negative issues (Lang, Davis, & Öhman, 2000; Öhman & Mineka, 2001). This makes sense, as those with low trait avoidance motivation must also be able to withdraw from a threatening situation. Given that the consequences of an avoidance state (vigilance to threats, anxiety, readiness to withdraw from a situation) are very similar to those of high trait avoidance motivation (Globisch, Hamm, Esteves, & Öhman, 1999; Higgins et al., 1997), state avoidance motivation could be related to a temporary increase in risk judgments. Furthermore, many stimuli and situations evoke a momentary state of avoidance (Higgins, 2002; Lang, Bradley, & Cuthbert, 1990; Neumann, Förster, & Strack, 2003); therefore, people are probably often in an avoidance state regardless of the level of their trait avoidance motivation. As a consequence, those in an avoidance state could make high risk judgments regardless of their level of trait avoidance motivation. Thus, an interaction between state and trait avoidance motivation could have diminished the correlation between trait avoidance motivation and risk judgments in previous studies.

Studying a state × trait avoidance motivation interaction on an avoidance-related cognitive variable (risk judgments) also allows an examination of the nature of the avoidance system. It has been suggested that matching states and traits could affect relevant outcomes synergistically (Rusting, 1999). In the context of trait avoidance motivation, this would mean that a high trait avoidance motivation enhances the effects of an avoidance state so that high-trait-avoidance motivation individuals make particularly high risk judgments when they are in an avoidance state (as compared to individuals who are in an approach state or in a motivationally neutral state). However, there is evidence that the avoidance system might be different in this respect (Shah &

Higgins, 1997). In particular, because the avoidance motivation system deals with avoiding dangers and threats, it could be that this system starts working at full strength when a certain threshold of activation has been reached. Not reaching avoidance goals could be dangerous; therefore, it might be adaptive for the system to fully activate when a certain threshold is reached. The avoidance system of the high-trait-avoidance motivation individuals could be chronically operating above this threshold, whereas evoking an avoidance state could push all individuals temporarily above the threshold. This model (Shah & Higgins, 1997) therefore predicts that individuals with high trait avoidance would make similar (equally high) risk judgments regardless of their motivational states, and that individuals in an avoidance state would make similar risk judgments regardless of their level of trait avoidance motivation.

Although the predictions made in this thesis concerning the moderators of trait avoidance motivation differ for risk judgments vs. emotional processing (the latter being discussed in the next chapter), it seems possible that state motivation could also moderate the relation between trait avoidance motivation and negatively biased processing. For instance, state avoidance motivation could make negative concepts more accessible and enhance negatively biased interpretation for individuals in an avoidance state regardless of their level of trait avoidance motivation. Therefore, state $\times$ trait avoidance motivation effects on negative interpretation are also examined.

In sum, Studies 2 and 3 (presented in Article II) examine the idea that state avoidance motivation moderates the association of trait avoidance motivation with risk judgments, and compare the two theories described above. Health risks are used as judgments of such risks have shown weak or nonexistent correlations with trait avoidance motivation in previous research (e.g., Hampson et al., 2006) and are not likely to be conceptually overlapping with items measuring trait avoidance motivation (see Footnote 2). Furthermore, the potential moderating effect of state motivation on the relation between trait avoidance motivation and negative interpretation is studied in Study 4 (Article II).

1.4.2 Threat identification and negatively biased processing

Given the ubiquity of trait avoidance motivation as a predictor of psychological adversity, a recent series of studies has obtained somewhat surprising results. According to these studies, trait avoidance motivation is not directly related to daily negative affect

and life satisfaction, but these relations are moderated by individual differences in identifying threatening stimuli (Robinson, Wilkowski, Kirkeby, & Meier, 2006; Tamir et al., 2006). In particular, it was found that trait avoidance motivation predicted lower life satisfaction and higher negative affect only among those who were less skilled in identifying threatening stimuli (as measured by speed and accuracy in a categorization task). In contrast, for those who were quick and accurate in identifying threatening stimuli, there was no relation between trait avoidance motivation and affect or life satisfaction (Robinson et al., 2006; Tamir et al., 2006).

The moderating effect of threat identification on the relation between trait avoidance and affect/life satisfaction was suggested by the authors to result from the beneficial effects of quick threat identification for high-trait-avoidance motivation individuals (Tamir et al., 2006). That is, as high-trait-avoidance individuals tend to worry about threatening issues, it might be helpful for them if they were able to quickly and accurately identify threatening stimuli. As a result, they could deal with actual threats more effectively and worry less about potential threats.

If good threat-identification skills help high-trait-avoidance individuals to cope with threats, this could be reflected in their emotional processing biases as well as in their affective experience. That is, lower worry and more effective handling of threats could serve as a buffer against developing negative processing biases. As a result, only those high-trait-avoidance individuals who are less adept at identifying threatening stimuli would show a negative processing/judgment bias. By contrast, high-trait-avoidance individuals who are adept at threat identification might show a lesser bias or no bias at all. Hence, the moderating effect of threat identification tendency could, at least in part, explain the weak and inconsistent relation found between trait avoidance motivation and negative processing biases. Studies 5 and 6 (presented in Article III) examined this possibility.

Both dispositional avoidance motivation and neuroticism components of trait avoidance motivation have been found to correlate with negatively biased processing. However, the rationale for Studies 5 and 6 is based on the relation between trait avoidance motivation and life satisfaction or negative affect (i.e., negative processing biases could accompany low life satisfaction or high negative affect, not high trait avoidance motivation as such), and the relation of neuroticism with life satisfaction and

negative affect is likely to be stronger than the relation between dispositional avoidance motivation and life satisfaction/negative affect. Dispositional avoidance motivation is mainly related to sensitivity to negative events (e.g. Carver & White, 1994), whereas neuroticism is directly related to stable levels of negative affect (e.g. Costa & McCrae, 1980). In addition, neuroticism also includes other facets that may be (negatively) related to life satisfaction, such as self-consciousness and vulnerability. Furthermore, previous studies have found a strong relation between neuroticism and life satisfaction (e.g. Steel et al., 2008). Therefore, a measure of neuroticism was used as an indicator of trait avoidance motivation in Studies 5 and 6.

1.5 Trait avoidance motivation and adjustment: Inseparable or not?

Are low well-being and unhappiness irrevocable consequences of high trait avoidance motivation? The answer provided by previous research has been a firm "yes" (e.g., Costa & McCrae, 1980; Gable et al., 2000; Steel et al., 2008), and although some studies have suggested that this relationship can sometimes be moderated (Lynn & Steel, 2006; Robinson et al., 2006), no coherent picture has emerged of the possible moderators. However, some recent research suggests that such a picture could now be forming. The present thesis ties these recent advancements together with the aim of showing that cognitive ability is a key moderator of the relation between trait avoidance motivation and adjustment.

Study 7 (presented in Article IV) builds on two separate lines of research which, when combined, offer new insights into the relation between trait avoidance motivation and (mal)adjustment. First, a series of studies examining trait avoidance motivation together with reaction time tasks have shown that trait avoidance motivation does not predict negative affect, somatic complaints, negative behaviors (e.g., worrying, self-criticism), or life satisfaction among individuals who are fast, accurate, and/or flexible in reaction time tasks requiring categorization or identification of different stimuli (Robinson & Clore, 2007; Robinson et al., 2006). It should be noted here that the dependent variables (e.g., affect, life satisfaction) in these studies have been measured by self-reports. Another relevant line of research has studied cognitive ability as a moderator between trait avoidance motivation and job performance. Given the nature

and correlates of trait avoidance motivation, it is perhaps surprising that the trait is largely unrelated to job performance (Barrick & Mount, 1991). However, Perkins and Corr (2005; 2006) found that trait avoidance motivation is negatively related to job performance and performance on an entrance examination, but only among individuals low in cognitive ability. For individuals high in cognitive ability, trait avoidance motivation had no relation with performance.

Concerning studies in which reaction time performance has moderated the relation between trait avoidance motivation and daily affect and well-being, the study authors have suggested that individuals with slow or persevering responses in reaction time tasks would be less able to focus on their momentary feelings and current reality (Robinson & Clore, 2007; Robinson et al., 2006). As a result, these individuals would use their self-relevant beliefs instead of their actual experiences to reply to questions about their well-being and affect, and these same beliefs may also affect their trait reports. To illustrate, some individuals may perceive themselves as carefree and positive, and these self-beliefs may affect their trait self-reports (e.g., they would receive low scores on a trait avoidance motivation measure). Furthermore, when probed for their feeling states or well-being, those with difficulties focusing on their current feelings and experiences (i.e., those slow or perseverative in reaction time tasks) might draw from their positive self-beliefs in their responses, resulting in positive reports of feeling states and well-being. Because of this, negative correlations between trait avoidance motivation and well-being/affect would be stronger among individuals slow or perseverative in reaction time tasks as compared to individuals who show fast or flexible performance in these tasks. In contrast, the fast and flexible individuals would use their momentary experiences instead of their self-beliefs as a source of their state self-reports. As noted above, this explanation of the obtained moderation effect assumes that performance in reaction time tasks could tap individual differences in ability to focus on and process momentary experiences and stimuli (Robinson & Clore, 2007).

While reaction time performance could measure individual differences in the ability to focus on present reality, it is well established that reaction time performance is quite strongly related to cognitive ability or general intelligence (Jensen, 1993). Therefore, especially given the results of Perkins and Corr (2005; 2006), it seems possible that instead of a response process difference between fast vs. slow individuals in reaction

time tasks, differences in cognitive ability between these individuals could affect the relationship between trait avoidance motivation and affect/well-being. That is, high cognitive ability could genuinely buffer against the adverse effects of high trait avoidance motivation.

To find out whether cognitive ability moderates the effects of trait avoidance motivation by affecting the response process or by serving as a buffer, Study 7 examined the trait avoidance motivation $\times$ cognitive ability interaction on several indicators of adjustment. These indicators included self-reported, other-reported, and objective measures of performance, adjustment, and health. If the response process explanation is correct, the interaction between trait avoidance motivation and cognitive ability should only be significant for self-reported outcomes. However, a finding that cognitive ability moderates the relation between trait avoidance motivation and other-reported or objective measures of adjustment would support the idea that high cognitive ability genuinely helps high-trait-avoidance motivation individuals to cope.

1.6 Summary

To sum up, trait avoidance motivation does not seem to be reliably connected with risk judgment and negative processing biases, although such a connection could be expected given the conceptualization and other correlates of this trait. Furthermore, some recent research suggests that trait avoidance motivation does not predict adverse outcomes for all individuals, but on the basis of the previous research, the reasons for this are not clear. The present thesis examines the relation between trait avoidance motivation and risk judgment (Studies 1-3), and the relation between trait avoidance motivation and negatively biased processing (Studies 4-6), and tries to uncover some reasons for the weakness of these relations (Studies 2-6). Finally, cognitive ability as a moderator for the relation between trait avoidance motivation and adjustment is examined (Study 7). The research questions are graphically presented in Figure 1.
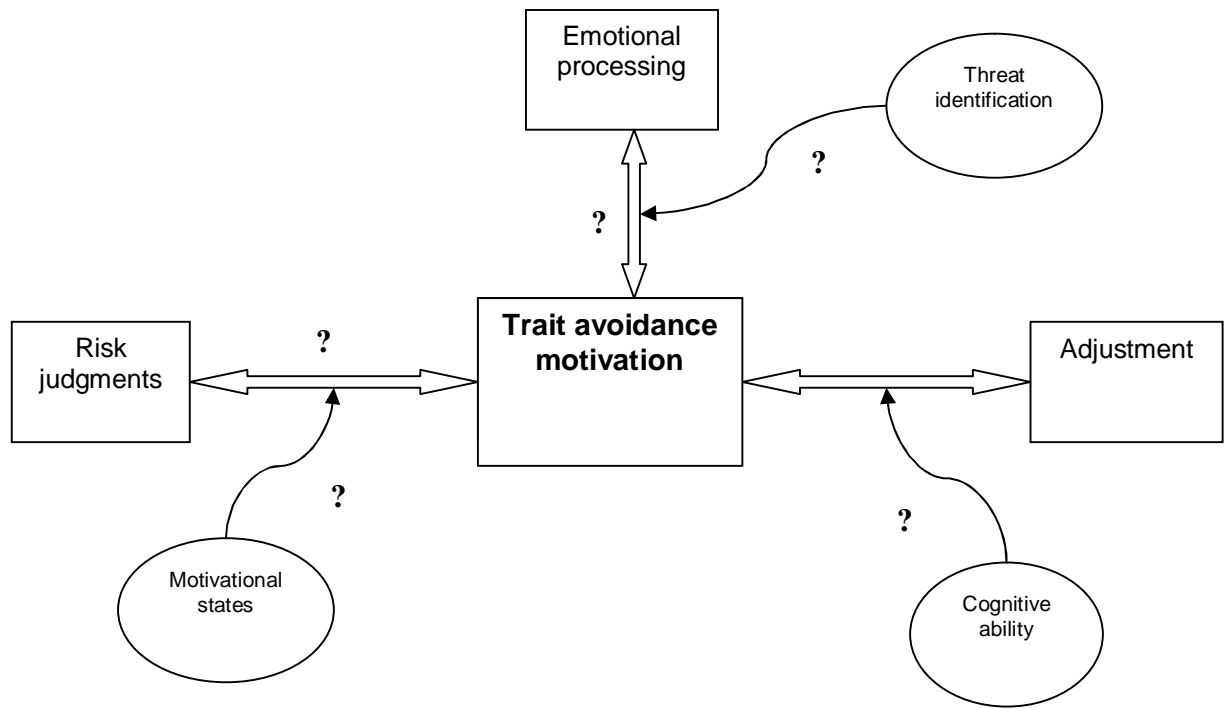
Figure 1. The research questions presented graphically. The two-headed, straight arrows depict direct relations between constructs. The one-headed, curved arrows represent a moderating influence on a direct relation between two constructs.

2 Research questions and hypotheses

The seven studies presented here were designed to contribute to the research on the cognitive correlates of trait avoidance motivation on the one hand, and the moderators of trait avoidance motivation's relations with emotional processing, judgment, and adjustment on the other. A list of the research questions is presented below, and Table 1 gives an overview of the studies.

(i)   Is trait avoidance motivation related to risk judgments? A strong relation could be expected on the basis of most theoretical conceptualizations of trait avoidance motivation (Carver & White, 1994; Costa & McCrae, 1992; Tellegen, 1985), but empirical studies have documented weak or nonexistent relations between the constructs (e.g., Gullone & Moore, 2000; Hampson et al., 2006). Therefore, no hypotheses were formed concerning this relation.

(ii) Does state motivation moderate the relation between trait avoidance motivation and risk judgments? Given that both high trait avoidance motivation and an avoidance state make people more reactive to negative stimuli (Lang et al., 2000), and that both could thus raise risk judgments, state motivation could moderate this relation.

   Hypothesis (a): State motivation moderates the relationship between trait avoidance motivation and risk judgments because individuals in an avoidance state make high risk judgments regardless of their level of trait avoidance motivation.

(iii) Is trait avoidance motivation directly related to negatively biased processing? Based on a long line of previous studies showing that the evidence for trait-congruency in the context of trait avoidance motivation is inconsistent (e.g. Chan et al., 2007; Rogers & Revelle, 1998; Rusting, 1998), no specific hypotheses were made concerning this research question.

(iv)   Do individual differences in the identification of threatening stimuli moderate the relation between trait avoidance motivation and emotional processing? Based on results showing that threat identification moderates the relation of trait avoidance motivation to emotional experience and life satisfaction (Tamir et al., 2006), threat identification could also moderate the relationship between trait avoidance motivation and negatively biased processing.

> Hypothesis (b): A threat identification tendency moderates the relation between trait avoidance motivation and negatively biased processing. In particular, among high-trait-avoidance individuals, those quick and accurate in identifying threatening stimuli are expected to show lower negative processing biases than those who are not quick and accurate in identifying threatening stimuli.

(v)   Does cognitive ability moderate the relation between trait avoidance motivation and adjustment? This research question dealt with the nature of the interaction between trait avoidance motivation and individual differences in tasks measuring cognitive performance. This interaction, found in some studies (Perkins & Corr, 2006; Robinson & Clore, 2007; Robinson et al., 2006), could be due to differences in the response processes of high vs. low cognitive ability individuals (Robinson & Clore, 2007) or to a genuine buffer effect of high cognitive ability (Perkins & Corr, 2006).

> Hypothesis (c): Trait avoidance motivation is negatively related to adjustment only among those with low cognitive ability.

Table 1. Overview of the studies

	Article I	Article II	Article III	Article IV
Studies	1	2, 3, 4	5, 6	7
Research questions	i	i, ii	iii, iv	v
Participants	Internet users	University students	University students	Male conscripts
N (Study 1, 2…)	1270	73, 82, 104	36, 53	152
N of females/N of males	645/625	55/18, 70/10, not known	28/8, 46/7	0/152
Trait avoidance motivation measure	BIS, STAI	BIS	S5 Neuroticism	16 PF Neuroticism
Other measures	self-reports of health and diet quality	Mood (Study 3)	Threat vs. nonthreat categorization task (Studies 5-6) Mood (Study 6)	Finnish Defence Forces BAT (measure of cognitive ability)
Dependent variables	Risk judgments	Risk judgments (Studies 2-3), Negative interpretation (Study 4)	Emotional interpretation (Studies 5-6), Emotional recall (Study 6)	Self- and superior-evaluated adjustment, Psychiatrist's evaluation of self-esteem and adjustment, Sick days

Note. For the research questions, see Chapter 2. For more information on the measures and dependent variables, see Chapter 3. Only the measures relevant to the present hypotheses are included in Table 1. For a full description of the studies, see the original articles.

3 Methods and results

3.1 Study 1 (Article I)

The purpose of Study 1 was to test in a large and representative sample whether trait avoidance motivation is related to risk judgments and how strong this relation is.

3.1.1 Participants and procedure

Participants were recruited from a database of respondents upheld by a research company (Taloustutkimus Oy). The database consisted of a representative sample of Finnish adult internet users. An e-mail message was sent to 2540 members of the database asking if they were willing to participate in a food-related questionnaire study. The invitation message included a link to an internet questionnaire containing all the measures used in the study. The response rate was 50%, and the number of participants was 1270 (645 females and 625 males). The participants were, on average, 41 years old (age range: 18-77 years). The participants formed a near-representative sample of Finnish internet users concerning gender, age, education level, and work status (the participants were, on average, slightly better educated than Finnish internet users on average).

3.1.2 Measures

3.1.2.1 Risk judgments

Risk judgments for six risks were included: (1) the risk of cancer as a result of eating dioxin-infested fish, (2) the risk of cardiovascular disease (CVD) as a result of a high-fat diet, (3) the risk of food poisoning as a result of eating beef with EHEC-bacteria, (4) the unknown risks of genetically modified foods, (5) the unknown risks of vegetable sterols used in functional foods, and (6) the risk of contracting a human variant of Creutzfeld-Jacob disease as a result of eating beef infected with bovine spongiform encephalitis. Participants were provided with brief descriptions of each risk and they then rated on seven-point scales how scary (1 = *not at all*; 7 = *extremely*) and likely for them (1 = *very unlikely for me*; 7 = *very likely for me*) the risks were. The scariness and likelihood ratings were subjected to exploratory factor analysis, which suggested a three-factor solution according to Kaiser's eigenvalue rule. A parallel analysis also

supported a three-factor solution. Scariness judgments loaded on one factor and likelihood judgments on another factor with the exception of both judgments of CVD risk, which formed a third factor, and the likelihood judgments concerning cancer risk, which had equally strong loading on all three factors. Based on the factor analysis results, the cancer risk likelihood judgments were dropped, and the scariness judgments (exempting the judgments of CVD) and the likelihood judgments (exempting the judgments of cancer and CVD) were averaged separately to create indices of risk scariness (Cronbach's α = .76) and likelihood (α = .73). Further, judgments concerning CVD were averaged to create an index of CVD risk (α = 63).

3.1.2.2 Trait avoidance motivation

Trait avoidance motivation was measured by two self-report scales: the Behavioral Inhibition Scale (BIS) developed by Carver and White (1994), and the State-Trait Anxiety Inventory (STAI; Spielberger, 1983), short version (Marteau & Bekker, 1992). The BIS scale measures dispositional avoidance motivation and is composed of seven items (e.g., "If I think something unpleasant is going to happen I usually get pretty 'worked up'"). Responses were made on a five-point scale (1 = *completely disagree*; 5 = *completely agree*). The scale's reliability (Cronbach's α) was .75. The STAI measures individual differences in the experience of anxiety and is composed of six items (e.g., "I'm upset"). The trait instructions were used; that is, participants were asked to respond according to how they usually feel. Responses were made on a four-point scale (1 = *not at all*; 4 = *very much*). Cronbach's α for the scale was .79. The BIS and the STAI had a correlation of .37 ($p < .001$).

3.1.2.3 Health and dietary status

Apart from individual differences in trait avoidance motivation, people's health status and dietary habits may influence their food risk judgments. To control for these possible effects, self-evaluated health and diet status were measured: participants rated on seven-point scales how they experienced their health status (1 = *very bad*; 7 = *very good*) and the healthiness of their diet (1 = *not at all healthy*; 7 = *very healthy*).

3.1.3 Results

Previous studies have shown weak relations between measures of trait avoidance motivation and risk judgments. The Pearson correlations were computed in order to test

this relation. Trait avoidance motivation measured by the BIS correlated with risk scariness ($r = .23$, $p < .001$), risk likelihood ($r = .16$, $p < .001$), and CVD risk judgments ($r = .18$, $p < .001$). Trait avoidance motivation measured by the STAI also correlated with the risk judgments ($r = .11$, $p < .001$ for risk scariness, $r = .10$, p $<$ .001 for risk likelihood, and $r = .09$, $p < .01$ for CVD risk). Hence, as could be expected from the theoretical basis, trait avoidance motivation was positively related to risk judgments. However, this relation was by no means strong (average $r = .15$).

The potential confounding effects of self-rated health status and diet quality were studied by conducting three multiple regression analyses in which risk scariness, risk likelihood, and CVD risk judgments were separately regressed on trait anxiety, BIS, health status and diet quality. All relations between trait anxiety/BIS and risk judgments remained significant ($p < .05$) when controlling for these ratings. Therefore, the results suggested that health status and diet quality do not obscure the relation between trait avoidance motivation and risk judgments.

3.2 Studies 2-4 (Article II)

Studies 2 and 3 were designed to test the hypothesis that state motivation moderates the relation between trait avoidance motivation and risk judgments (hypothesis a). Negative mood was measured in Study 3 in order to examine its possible mediating role in the relation between avoidance motivation and risk judgments. That is, avoidance motivation could affect risk judgments via stronger negative affective reactions to risks, and these reactions could be observable in negative mood. Furthermore, it was examined whether state motivation moderates the relation between trait avoidance motivation and negatively biased interpretation (Study 4).

3.2.1 Participants and procedure

All the participants were undergraduate or postgraduate students in the University of Helsinki. For Studies 2 ($N = 73$; 55 women) and 3 ($N = 83$; 70 women), the participants were recruited via student mailing lists and tested in a laboratory in groups of 1-4. Study 2 participants completed a state motivation manipulation, a risk judgment task, a filler task (to prolong the time lapse between completing the state motivation manipulation and the trait avoidance motivation measure), and finally, the trait avoidance motivation measure. The procedure for Study 3 was otherwise identical, but after making risk

judgments the participants also reported their negative mood. Study 4 participants (N = 104, gender information was unavailable) were also recruited from student mailing lists, but the data were gathered by an online questionnaire. Study 4 participants first completed the state motivation manipulation task, then the emotional interpretation tasks, and finally, the trait avoidance motivation measure.

3.2.2 Measures

3.2.2.1 State motivation manipulation

The manipulation of state motivation was based on the regulatory focus theory (Freitas & Higgins, 2002; Higgins, 1998). The participants in the state avoidance motivation condition listed and compared their current and childhood duties and obligations, and the participants in the state approach motivation listed and compared their current and childhood ideals and hopes (Study 2). For Studies 3 and 4, the manipulation was otherwise identical, but the comparison task was removed (i.e., the participants only listed their current and childhood duties or ideals).

The listing of duties is a standard manipulation of an avoidance state (Freitas & Higgins, 2002; Higgins, Roney, Crowe, & Hymes, 1994). Previous research has shown that the priming of duties has several consequences reflecting avoidant behavior, such as experiencing it as more important to avoid undesired goals than to approach desired goals (Higgins et al., 1994), preferring vigilant (rather than eager) strategies of goal pursuit (Molden & Higgins, 2004), and being more attuned to avoidant-related feelings (calmness vs. anxiety; Shah & Higgins, 2001).

3.2.2.2 Trait avoidance motivation

Trait avoidance motivation was measured with the BIS scale (see 3.1.2.2 for details). Cronbach's αs for the scale were .76, .79, and .80 for Studies 2, 3, and 4, respectively.

3.2.2.3 Risk judgments (Studies 2-3)

The participants judged the likelihood of 20 health risks for a person susceptible to the risk (e.g., they judged the likelihood of a risk related to overweight, such as high blood pressure, for an overweight person) on a seven-point scale (1= *not at all likely*; 7 = *extremely likely*). These judgments were averaged into a risk likelihood score (M = 4.82, SD = 0.58, Cronbach's α = .88 for Sample 1; M = 4.59, SD = 0.59, α = .85 for Sample 2).

3.2.2.4 Negative mood (Study 3)

Negative mood items were picked from the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), and some items were added to represent low-arousal negative affect. Participants rated on a seven-point scale (1 = *not at all*, 4 = *somewhat*, 7 = *very much*) how *irritable*, *distressed*, *sad*, *gloomy*, and *depressed* they felt at the moment. Responses to these items were averaged into a negative mood score (Cronbach's α = .84).

3.2.2.5 Emotional interpretation tasks (Study 4)

Two emotional interpretation tasks were used. These tasks were modified after Rusting (1999). A *word fragment task* presented participants with 26 word fragments, 13 of which could be completed in a negative or neutral way and 13 of which could be completed in a positive or neutral way. The number of negative and positive words used as solutions to word fragments was computed, and these scores were used as indices of negative and positive interpretation, respectively. In the s*tory completion task* the participants were presented with the following sentence: "Linda is looking out at the sunset" and asked to write a short story about what is happening in the situation, including the thoughts and feelings of any characters in the story. Two independent judges blind to the participants' state motivation condition and to the level of their trait avoidance motivation rated the amount of negative and positive content of the stories. These scores were used as indices of negative and positive interpretation, respectively.

3.2.3 Results

3.2.3.1 State × trait avoidance motivation and risk judgments

As suggested in the Introduction, state avoidance motivation could raise people's risk judgments despite their level of trait avoidance motivation, and thereby weaken the correlation between trait avoidance and risk perceptions. The results supported this idea: there was a significant or marginally significant state motivation × trait avoidance motivation interaction effect on risk judgments in both Studies 2 and 3 (β = -.23, t = -1.95, p = .056, ΔR^2 = .05 in Study 2; β = -.28, t = -2.14, p = .036, ΔR^2 = .05 in Study 3). For both Studies, the interaction was due to the fact that trait avoidance motivation strongly predicted risk judgments in the state approach group (β = .43, p < .05 for Study 2; β = .52, p < .001 for Study 3), but not in the state avoidance group (β = -.19, p = .20

for Study 2; $\beta = .21$, $p = .18$ for Study 3). Hence, the results supported the idea that the moderating effect of state motivation has in previous studies obscured the relation between trait avoidance motivation and risk judgments.

As for direct relations between avoidance motivation and risk perceptions, the present results were in line with previous research showing weak and variable correlations between these constructs: Pearson correlations indicated that trait avoidance motivation did not correlate with risk judgments in Study 2 ($r = .13$, $ns.$), but did do so in Study 3 ($r = .35$, $p < .01$). State motivation did not have a main effect on risk judgments ($F(1, 70) = 1.80$, $p = .32$ for Study 2; $F(1, 80) = 0.44$, $p = .51$ for Study 3).

In Study 3, negative mood was measured to explore it as a potential mediator of the effects of state and trait avoidance motivation on risk perceptions. However, although negative mood correlated with trait avoidance motivation ($r = .25$, $p < .05$), negative mood was not affected by state avoidance motivation ($F(1, 80) = 2.06$, $p = .16$), and it did not correlate with risk judgments ($r = -.01$, $p = .95$). Therefore, the conditions required for mediation were not met, and it was concluded that although state and trait avoidance motivation predicted risk judgments, self-reported negative mood did not mediate these relations.

3.2.3.2 State × trait avoidance motivation and negative interpretation (Study 4)

In Study 4, trait avoidance motivation correlated with the negative content of the story ($r = .25$, $p < .05$), but not with the number of negative or positive words used in the fragment task. State motivation predicted positive interpretation ($F(1, 102) = 5.65$, $p < .05$): those in an approach state used more positive words as solutions to word fragments in the positive version of the task than those in an avoidance state (Ms 7.60 vs. 6.78, respectively). Unlike in the case of risk judgments, the interaction between state motivation and trait avoidance motivation did not predict any of the emotional processing variables (all $|t|$s < 1.66, all $|\beta|$s < .16, all ps > .10).

3.3 Studies 5-6 (Article III)

Studies 5 and 6 examined the hypothesis that individual differences in threat identification moderate the relations between trait avoidance motivation and negatively biased processing (hypothesis b).

3.3.1 Participants and procedure

The participants ($N = 36$ (28 women) for Study 5; $N = 53$ (46 women) for Study 6) were recruited by an e-mail invitation to student mailing lists. Volunteers were mailed a package of personality and emotional processing measures to be completed at home and were scheduled with a testing session in the lab. During the session, the experimenter first collected the completed personality and emotional processing measures. Then, the participants completed a mood measure and a reaction time task measuring threat categorization performance (Study 5), or the recall task and the reaction time task (Study 6).

3.3.2 Measures

3.3.2.1 Emotional processing measures

Negative interpretation task (Studies 5 and 6). The negative interpretation task was identical to the negative/neutral word fragment task used in Study 4. The participants were presented with 13 word fragments and instructed to fill in the missing letters in each item to complete a word. Items could be completed as negative or neutral words (e.g., K__u__u could be completed as *kauhu* (horror) or *koulu* (school)). The number of negative words used as solutions was used as an index of negative interpretation.

Emotional recall task (Study 6). Participants rated the pleasantness of 12 positive (e.g., *elated*, *serene*), 12 negative (e.g., *hostile*, *suffering*), and 12 neutral (e.g., *margin*, *weekly*) words (neutral words served as fillers to make the task more difficult and to control for baseline differences in recall) on a five-point scale ranging from 1 (*very unpleasant*) to 5 (*very pleasant*). To make sure that all the participants processed the words semantically, they were instructed to judge the pleasantness of the words based on the words' meanings, not on the words' phonetic pleasantness. Recall of positive and negative words was measured by a surprise free recall task given to the participants immediately after they returned the pleasantness judgments. They were given a blank

sheet of paper and asked to write down as many of the words that they could in three minutes. Indices of positive and negative recall were computed as the numbers of positive and negative words recalled, respectively.

3.3.2.2 Threat identification task

The threat identification task was based on tasks used by Robinson and colleagues (2005; Tamir et al., 2006). In the threat identification task, the participants were asked to decide as quickly as possible whether words were threatening or not. Threatening words were described as words that mean something substantially dangerous (*killer*, *accident*, *murderer*, *viper*, *cancer*, *strike*, *aids*, *gun, kick*), and nonthreatening words were described as words that had negative, but not substantially dangerous meanings (*mess*, *tear*, *oily*, *stench*, *rust*, *dirt*, *debt*, *old*, *boring*). By using only negative words we could ensure that the participants used a threat vs. non-threat categorization and not, for instance, a negative vs. neutral categorization. The participants first completed a practice block of 18 trials and then a target block of 36 trials. Each trial consisted of a centered presentation of one word. Using a standard keyboard, the participants were to hit the number 1 key if the word was threatening and the number 9 key if the word was not threatening. If the response was correct, the word was removed, and there was a 150 ms delay before the next trial begun. If the response was incorrect, the word was replaced by a centered, capitalized red letter X, and the participants were to press the correct response key to proceed. When the correct key was pressed, the X was removed and there was a 150 ms delay before the next trial begun. The category labels "Threatening" and "Not threatening" were shown in the upper left and right corners of the display, respectively, throughout the task. The participants were told that both speed and accuracy were important, but that making a couple of errors was not a problem.

In addition, the participants completed a neutral categorization task in which the categories were animal (e.g., *horse*, *cat*) vs. not animal (e.g., *cloud*, *paper*). Except for the categories and stimulus words, this task was identical to the threat identification task described above. The animal categorization task was used as a measure of baseline individual differences in categorization performance. Half of the participants completed the threat task first, and half completed the animal task first.

Reaction times for the error trials in both the threat and animal blocks were excluded before computing threat identification speed (the mean accuracies for the threat task

were 97.5% (Study 5) and 96.4% (Study 6), and for the animal task, 98.5% (Study 5) and 97.8% (Study 6)). Reaction times were then log-transformed, and reaction times 2.5 standard deviations above or below the participant's mean (2.6% of the trials for Study 5 and 2.4% of the trials for Study 6) were replaced by these cut-off values (Fazio, 1990). Then, to control for baseline differences in categorization performance, threat block speed was regressed on animal block speed. The standardized residual from this regression was used as a purified measure of adeptness at threat identification (e.g., Tamir et al., 2006).

The split-half reliability of the threat identification performance was examined by computing two separate estimates of both animal block speed and threat block speed. The reduced reaction time data from the odd and even trials of both blocks were averaged separately. Mean reaction times from the odd trials in the threat block were then regressed on mean reaction times from the odd trials in the animal block, and mean reaction times from the even trials in the threat block were regressed on mean reaction times from the even trials in the animal block, resulting in two independent estimates of purified threat identification. These estimates were highly correlated ($r = .74$, $p < .001$ for Study 5, $r = .79$, $p < .001$ for Study 6), showing that threat identification performance had quite high internal consistency. Finally, speed and accuracy in all tasks were unrelated (all rs $< .23$, all ps $> .11$), showing that the participants did not adopt "fast but inaccurate" or "slow but accurate" response strategies, but tried to respond both quickly and accurately.

3.3.2.3 Trait avoidance motivation

Trait avoidance motivation was measured with the Neuroticism subscale of the Short Five measure (Konstabel, Lönnqvist, Verkasalo, & Walkowitz, 2008; Lönnqvist et al., 2008), developed to measure the same five personality factors that are measured by the NEO-PI-R (Costa & McCrae, 1992). The factor level correlations of the Finnish S5 with the Finnish translation of the NEO-PI-R are between .81 and .91 with an average of .87 (Lönnqvist et al., 2008). The Neuroticism subscale is composed of 12 items (e.g. "I am often nervous, fearful, and anxious, and I worry that something might go wrong"). The participants rated on a seven-point scale from -3 to 3 to what extent each description applied to them (-3 = *the description is completely wrong*; 0 = *I don't know, difficult to say*; 3 = *the description is completely right*). Cronbach's α for the subscale was .85.

3.3.2.4 Mood (Study 5)

Because mood affects emotional processing (Bower, 1981; Rusting, 1998), positive and negative mood were measured in Study 5 in order to control for possible mood effects. Mood items were picked from the circumplex model of affect (Russell, 1980). The participants rated on a seven-point scale how *elated*, *happy*, *excited*, *content*, and *cheerful* they felt at the moment (1 = *not at all*, 7 = *very much*). These ratings were averaged into a positive mood score (α = .74). The participants also rated how *sad*, *gloomy*, *depressed*, *irritated*, and *anxious* they felt at the moment (1 = *not at all*, 7 = *very much*). These ratings were averaged into a negative mood score (α = .86).

3.3.3 Results

As argued in the Introduction, if a good threat-identification skill helps high-trait-avoidance motivation individuals to experience higher life satisfaction and less negative affect (Tamir et al., 2006), this skill could also buffer against the formation of negative processing biases among high-trait-avoidance motivation individuals, resulting in the variable relations between trait avoidance motivation and negative processing found in previous studies (e.g., Rusting & Larsen, 1998). However, in contrast to these expectations, threat identification tendency did not consistently moderate the relation between trait avoidance motivation and emotional processing. For Study 5, the interaction between trait avoidance motivation and threat identification performance predicted the number of negative words used in the fragment task (β = .38, p < .05, t = 2.38, ΔR^2 = .13). The obtained interaction was in accordance with predictions: trait avoidance motivation predicted positively the number of negative words used for those individuals slow in identifying threats, but negatively among those fast in identifying threats. However, this interaction was not replicated: in Study 6, the trait avoidance motivation × threat identification interaction predicted the number of negative words recalled (β = .27, p < .05, t = 2.09, ΔR^2 = .07) but not negative interpretation. Furthermore, the nature of the interaction predicting negative recall was not consistent with predictions (for a graphical depiction of the interaction, see original publication III). Hence, in the context of emotional processing, the results did not support the idea

that quick and accurate threat identification is beneficial to high-trait-avoidance individuals.

Pearson correlations between trait avoidance motivation and emotional processing measures were also computed. Trait avoidance motivation had a direct relation with negative recall in Study 6 ($r = .42$, $p < .01$). There were no other significant correlations. Further, trait avoidance motivation was unrelated to the number of neutral words recalled in Study 6 ($r = .03$, $p = .85$), and the relation between trait avoidance motivation and negative recall remained significant when controlling for neutral recall ($\beta = .41$, $p < .01$), showing that trait avoidance motivation was not related to the better recall in general but specifically to better recall of negative words. Finally, positive or negative mood (measured in Study 5) had no bearing on any of the results reported above.

3.4 Study 7 (Article IV)

Study 7 was conducted to examine the hypothesis that cognitive ability moderates the relation between trait avoidance motivation and adjustment so that trait avoidance motivation is related to (lower) adjustment only among individuals low in cognitive ability (hypothesis c).

3.4.1 Overview and participants

Study 7 was a part of a larger research project concerning the behavior of military conscripts (Mäkinen, 1991). All military conscripts enrolled at the Uusimaa Light Infantry Battalion (Helsinki) in October 1987 or February 1988, in total 626 male conscripts, were asked to participate. Of them, 600 agreed and signed an informed consent form. Of these individuals, 138 were eliminated because (a) their 20th birthdays did not occur during the term of their service ($N = 108$), or (b) they were classified as having a medical condition that limited their duty assignments ($N = 30$). Out of the remaining 462 conscripts, 152 were randomly selected for the sample (see Mäkinen, 1991, for details) that participated in Study 7. The participants were, on average, 20 years old (age range: 19-21). The self-report questionnaires and cognitive ability tests were administered to all the conscripts as part of daily exercises after 4 weeks of service. The psychiatric interview was conducted after approximately 5 weeks of service.

3.4.2 Measures

3.4.2.1 Trait avoidance motivation

Trait avoidance motivation was measured with the Emotional stability (vs. Neuroticism) scale of the Finnish translation of the fourth edition of the Sixteen Personality Factor Questionnaire (16PF; Cattell, 1981; Cattell, Eber, & Tatsuoka, 1970). The Cronbach's α of this 13-item scale was .76. Note that the scale is scored so that higher values represent lower levels of trait avoidance motivation.

3.4.2.2 Cognitive ability

Cognitive ability was measured with the Finnish Defense Forces Basic Ability Test, developed by the Finnish Defense Forces Education Development Center. This test battery is designed to measure general giftedness or intelligence. The battery comprises of 40-item verbal, visuospatial, and arithmetic reasoning subtests (see Tiihonen et al., 2005, for further details). The subtest scores were highly intercorrelated, and they were summed to form a cognitive ability index (Cronbach's α = .84).

3.4.2.3 Indicators of adjustment

Self-evaluated adjustment. The participants rated themselves on a scale from 1 (*not difficult*) to 3 (*usually difficult*) on the subsequent items: getting along with (a) peers, (b) conscript superiors, and (c) regular superiors; (d) taking on the conscript role; the capacity to receive (e) teaching and (f) orders; and (g) general adjustment. As these ratings were highly intercorrelated, they were summed (after reverse-coding each item) to represent *self-evaluated adjustment*. The sum score had a coefficient alpha reliability of .77. The self-ratings were gathered between the fifth and seventh weeks of service.

Superior-evaluated adjustment. The participants' closest superiors rated them at three distinct times: after six weeks of service, after four months of service, and after completion of service (8 to 11 months). The rating scale used by these superiors, which ranged from 1 (*poor*) to 4 (*excellent*), consisted of the following 10 items: (a) adjustment to peers; the ability to establish relationships with (b) peers and (c) superiors; (d) taking on the conscript role; the capacity to receive (e) training and (f) orders; coping with (g) physical and (h) mental strain; (i) performance as a leader; and (j) masculinity. As these ratings were highly intercorrelated within each of the three assessment occasions (the mean coefficient alpha reliability across the three occasions was .92), three sum scores of competence (one for each assessment occasion) were

computed across the 10 items. Furthermore, as the mean (test-retest) correlation for those three competence scores was high (mean *r* = .59), the three sum scores were averaged to form one index of *superior-evaluated adjustment*.

Military passport ratings. After fulfilment of their military service, all the participants received a military passport that included a *general evaluation* of their general competence and performance as conscripts. Each person's evaluation, assessed on a scale from 1 (*poor*) to 5 (*excellent*), represented averaged, collective evaluations made by the conscripts' superiors. The military passport also included a similar five-point *field evaluation*, which reflected the performance of the conscript in military field exercises. The field evaluation score and general evaluation score were highly correlated (*r* = .84), and were therefore averaged into a *military passport evaluation score*.

Sick days. The *sick days* variable represented the number of days the participant was exempt from duty due to some physical or mental ailment.

Psychiatric evaluation. The final two indicators of adjustment were derived from a psychiatric interview. The approximately two-hour one-on-one psychiatric interview was semi-structured, covered several themes (e.g., family relations, sexual maturity, substance abuse), and was conducted by a psychiatrist specialized in both adolescent and adult psychiatry. At the time of the interviews, the psychiatrist was blind to the hypotheses of Study 7 and to the participants' scores on all other measures. Immediately after each interview, the psychiatrist rated the participants on *level of psychological adjustment* and *self-esteem* on four-point scales (1 = *poor*; 4 = *excellent*).

3.4.3 Results

First, Pearson correlations of trait avoidance motivation and cognitive ability with adjustment were computed. As could be expected, trait avoidance motivation and cognitive ability correlated with several indicators of adjustment. Trait avoidance motivation correlated with self-evaluated adjustment (*r* = .33, *p* < .01) and with the psychiatrist's evaluation of psychological adjustment (*r* = .25, *p* < .01); note that the trait avoidance motivation measure was reverse coded and that higher values represented lower levels of trait avoidance motivation. Cognitive ability correlated with superior-evaluated adjustment (*r* = .40, *p* < .01), the military passport evaluation (*r* =

.18, $p < .05$), and the psychiatrist's evaluations of psychological adjustment ($r = .25$, $p < .01$) and (marginally) self-esteem ($r = .15$, $p < .10$).

The interaction between trait avoidance motivation and cognitive ability was examined next. Recall that Study 7 set against each other the response process explanation and the buffer explanation concerning the moderating role of reaction time performance/cognitive ability on the association between trait avoidance motivation and indicators of adjustment. In line with the buffer explanation, cognitive ability moderated the relation between trait avoidance and both self-reported and non-self-reported adjustment. The interaction between trait avoidance motivation and cognitive ability was significant for the military passport evaluation ($\beta = -.24$, $t = -3.00$, $p < .01$, $\Delta R^2 = .05$) and number of sick days ($\beta = .20$, $t = 2.44$, $p < .05$, $\Delta R^2 = .04$), and marginally significant for self-evaluated adjustment ($\beta = -.14$, $t = -1.83$, $p < .10$, $\Delta R^2 = .01$) and superior-evaluated adjustment ($\beta = -.14$, $t = -1.83$, $p < .10$, $\Delta R^2 = .02$). In all cases, the nature of the interaction was as predicted: high trait avoidance motivation was related to lower adjustment (e.g., more sick days, a lower military passport grade) only among individuals low in cognitive ability. For individuals with high cognitive ability, trait avoidance motivation was unrelated to adjustment (for a graphical depiction of these interactions, see original publication IV). However, the interaction did not predict psychiatric evaluations.

4 General discussion

The results of this dissertation present some reasons as to why theoretically meaningful relations between trait avoidance motivation and other variables are not always found. In particular, the results showed that state motivation and cognitive ability moderate the relations between trait avoidance motivation and certain outcome variables (Studies 2-3 and 7). These results contribute to those current directions of personality research that concern the dynamics of personality and its interplay with other variables (Fournier et al., 2008; Funder, 2009; Mischel, 2004; Mischel et al., 2002; Shah & Higgins, 1997).

The results of Studies 2-3 offer an explanation for the previously observed weak relation between trait avoidance motivation and risk judgments: state motivation moderates this relation. These results also contribute to the literature concerning the cognitive aspects of traits (Borkenau & Mauer, 2007; Gomez et al., 2002; Mathews & MacLeod, 2005) in suggesting that the cognitive-affective tendency of evaluating risks may represent such cognitive aspect for trait avoidance motivation. The results concerning emotional processing were in line with previous research (e.g., Chan et al., 2007; Rogers & Revelle, 1998; Rusting & Larsen, 1998) in showing that trait avoidance motivation is inconsistently related to negatively biased processing (Studies 4-6). However, neither state motivation (Study 4) nor individual differences in threat identification (Studies 5-6) consistently moderated the relation between trait avoidance motivation and negatively biased processing. In this respect, the results of Studies 5 and 6 were incongruent with the suggestion that good threat identification skills benefit high-trait-avoidance motivation individuals (Tamir et al., 2006). Finally, the results concerning trait avoidance motivation, cognitive ability, and adjustment showed that high-cognitive-ability individuals do not suffer from some of the harmful correlates of high trait avoidance motivation (Study 7). In so doing, these results also demonstrated that the moderating effect of cognitive ability on the relations of trait avoidance motivation with certain other variables does not result from a response bias (Robinson & Clore, 2007), but from the genuinely shielding influence of high cognitive ability (Perkins & Corr, 2005; 2006).

In this chapter, the results are discussed from four perspectives. In the first section, they are evaluated in relation to the trait-congruency theory. The second section

discusses the results' implications for the avoidance motivation system. The third section focuses on the results pertaining to the interplay between trait avoidance motivation, adjustment, and cognitive ability. The fourth section of this chapter considers the limitations of the research. Finally, the general conclusions of the thesis are presented in the fifth section.

4.1 Avoidance motivation and trait-congruency

Trait-congruency is an intuitively appealing theory about the cognitive correlates of personality traits (Borkenau & Mauer, 2007; Gomez et al., 2002; Rusting, 1998). However, evidence for the theory has been somewhat mixed (Bradley et al., 1993; Rogers & Revelle, 1998; Rusting, 1998; Rusting & Larsen, 1998). The present research studied trait-congruency in the context of trait avoidance motivation and found strong evidence for trait-congruency in one cognitive domain, that of risk judgments. Although trait avoidance motivation could on theoretical grounds be expected to predict risk judgments, previous studies (Gullone & Moore, 2000; Hampson et al., 2006) have found only weak relations between the constructs. By establishing the role of state motivation, the present results offer a way to reconcile this incongruity: trait avoidance motivation (conceptualized as dispositional avoidance motivation) is quite strongly related to risk judgments, but state motivation obscures this relation as people in an avoidance state make high risk judgments regardless of their level of trait avoidance motivation. Hypothesis (a) was therefore supported. Given that many situations evoke a temporary avoidance orientation (e.g., Lang et al., 1990), it seems possible that some of the participants in previous studies have been in an avoidance state and that this has weakened the correlation between trait avoidance motivation and risk judgments.

The results concerning risk judgments suggest that trait avoidance motivation can, to some extent, be defined in terms of, or be based on, cognitive-affective individual differences. The present results therefore contribute to the literature concerning the cognitive nature of traits (e.g., Borkenau & Mauer, 2007; Canli, 2008; Rusting, 1998) by suggesting that the tendency to judge risks could represent a cognitive aspect of trait avoidance motivation.

It should be noted here that only measures tapping the dispositional avoidance motivation component of the trait avoidance motivation composite were used to test

hypothesis (a). Therefore, the results discussed above may be particular to individual differences in sensitivity and reactivity to negative events, and not concern individual differences in neuroticism.

The results concerning trait avoidance motivation and emotional information processing biases, examined in Studies 4-6, were less conclusive than the results concerning trait avoidance motivation and risk judgment. Trait avoidance motivation was strongly related to negative recall but unrelated to negative interpretation in a fragment task (across three participant samples). Further, the present studies did not find reasons for the inconsistency of these relations; the intervening effects of the potential moderators studied – threat identification tendency and state motivation – did not consistently explain the weak relations between trait avoidance motivation and emotional processing. Thus, hypothesis (b) was not supported.

The disparity between the results concerning risk judgments and emotional processing may reflect differences between the antecedents of judgments and information processing. It is well known that moods, emotions, and affective reactions influence judgments (Johnson & Tversky, 1983; Lerner & Keltner, 2000; Schwarz, 1990; Schwarz & Clore, 1983), and that high trait avoidance motivation is related to higher emotional reactivity to negative events and stimuli (Carver & White, 1994; Gable, Reis, & Elliot, 2000). Based on these findings, it was suggested and found that high trait avoidance motivation is related to higher risk judgments. However, at the moment it is relatively unclear exactly how affective influences on judgments are conveyed. In contrast, a long-maintained idea in the trait-congruency literature is that emotional processing biases are caused by differences in emotional memory networks (Bower, 1981; Rusting, 1999). That is, high-trait-avoidance motivation individuals could have a larger or a better organized memory network consisting of negative memories and concepts than those with low trait avoidance motivation. Differences in this network could cause differences in emotional processing through spreading activation in the network (Rusting, 1999). Differences in such a network could also affect negative judgments (Zelenski & Larsen, 1999), but this is by no means self-evident. Given that judgment and processing biases may have different antecedents, it is not unreasonable to assume that they have different relations with personality (see

Mayer, Gaschke, Braverman, and Evans (1992) for discussion concerning the possible dissociation between emotion-congruent judgment and recall).

Another source of discrepancy between the risk judgment results and the emotional processing results may have been that trait avoidance motivation was conceptualized as dispositional avoidance motivation in studies concerning risk judgments and as neuroticism in studies concerning emotional processing. Indeed, as already noted, it may be that dispositional avoidance motivation, but not neuroticism, is related to risk judgments. However, previous research has shown that both dispositional avoidance motivation and neuroticism are related to negatively biased processing, with correlations of roughly similar magnitude (e.g. Gomez et al., 2002; Rusting & Larsen, 1998). Therefore, there is no a priori reason to assume that the emotional processing results would have been different if a measure of dispositional avoidance motivation had been used in Studies 5 and 6. Thus, while dispositional avoidance motivation seems to be strongly related to risk judgments (when the moderating role of state motivation is taken into account), the relation between trait avoidance motivation and negatively biased processing seems to be inconsistent.

Because different emotional processing biases were studied in several samples, it is worth examining these results more closely in regard to the emotional memory network model (Bower, 1981; Rusting, 1999). The relation between trait avoidance motivation and negative recall was quite strong in Study 6, suggesting that high-trait avoidance motivation individuals could have a larger negative memory network than low-trait-avoidance motivation individuals. But, a larger negative memory network would be expected to also make negative concepts more accessible. In fact, it has been suggested that emotional memory structures affect retrieval – the cognitive variable that was most strongly correlated with trait avoidance motivation – via heightened emotional concept accessibility (Bower, 1981; 1991). However, the results of the interpretation tasks tapping negative concept accessibility (Higgins, 1996; Tulving, Schacter, & Stark, 1982) were unrelated to trait avoidance motivation in the present studies. Of course, besides individual differences, concept accessibility is also affected by situational factors (Higgins, 1996), and it could be that some situational factors made negative concepts less accessible for the high-trait-avoidance motivation participants in Studies 5 and 6, despite their presumably larger negative memory networks. However, a relation

was found between trait avoidance motivation and negative content in the story task, and the story task results are also likely to be affected by the accessibility of negative material in the memory.

Taken together, some relations predicted by the network model were found and some were not, even within the same sample of participants (in Studies 4 and 5). Therefore, the results suggest that the trait version of the network model could be partly correct, but that it is unlikely that the model stands in its simplest form (according to which larger/better organized trait-relevant networks accompany high levels of traits and that these networks affect performance in all emotional processing tasks). The results hence suggest that it could be useful to examine the network model in more detail, and perhaps revise it to some extent. For example, the present results showed that trait avoidance motivation can be related to producing more negative stories but unrelated to negative word fragment completion among the same individuals (Study 4). The reason for why the responses to these two tasks were dissociated could for instance be that the story task is affected by the accessibility of negative episodic memory content and the word fragment completion by the accessibility of negative concepts in semantic memory. Therefore, it could be that the proposed larger/better organized negative memory network exists, partly independently, in both episodic and semantic stores, and that it affects negatively biased processing through accessibility, as has been suggested (Bower, 1991). However, contextual factors could differently affect the accessibility of episodic vs. semantic memory content, leading to the observed dissociation (Study 6). The above analysis is of course speculative, but the point is that the present results suggest that such analyses – both theoretical and empirical – may be needed to refine the network model to make more precise predictions and to obtain a more accurate picture of the relation between personality and emotional processing.

In sum, the results concerning emotional processing suggest, in line with quite a few previous studies (Derryberry & Reed, 1994; Gomez & Gomez, 2002; Rogers & Revelle, 1998; Rusting, 1998; Rusting & Larsen, 1998), that there is a relation between trait avoidance motivation and negatively biased processing, but that this relation is not consistent and straightforward. Also in line with previous studies, the results imply that this relationship is probably moderated by some factor(s). However, state motivation, threat identification tendency, and natural mood do not seem to serve as such

moderators. On a final note, some previous studies have suggested that the relation between trait avoidance motivation and negative recall is the strongest for self-relevant negative material (Martin, Ward, & Clark, 1983). In contrast, the present results (Study 6) supported the view that the negative recall bias of high-trait-avoidance individuals is not exclusive to self-relevant issues.

4.2 The "what" and "how" of avoidance motivation

The present results have certain theoretical as well as applied implications concerning the nature and workings of the avoidance system. First, apart from providing some partial answers to the "when and "what" question for trait avoidance motivation, the result according to which trait avoidance motivation has a strong relationship with risk judgments could also suggest an answer to the "how" question. High trait avoidance motivation is related to, for example, worrying and rumination (de Bruin, Rassin, & Muris, 2007; Roelofs, Huibers, Peeters, Arntz, & van Os, 2008), somatic distress (Neeleman et al., 2004), susceptibility to anxiety disorders (Watson et al., 2005), and a preference for vigilant strategies of goal pursuit (Spiegel, Grant-Pillow, & Higgins, 2004). A tendency to judge risks as more likely could contribute to these outcomes. For instance, judging failure in a task as likely could enhance the use of vigilant strategies in the task (Crowe & Higgins, 1997; Spiegel et al., 2004) in order to lower the possibility of making errors. In addition, judging health problems as more likely could increase somatic complaints and somatic distress. In general, as we know that people tend to automatically evaluate objects around them (Chen & Bargh, 1999; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Zajonc, 1980), individual differences in evaluative tendencies could cause individuals to experience their surroundings quite differently and therefore contribute to a wide range of individual differences in affect and well-being. The continual stream of events that are experienced as dangerous could maintain chronic vigilance and anxiety, which could even contribute to the development of anxiety disorders. Hence, a negative judgmental tendency could serve as a mechanism through which high trait avoidance motivation conveys some of its adverse effects.

The results also have implications for the theoretical nature of the avoidance system. The nature of the interaction obtained between trait avoidance motivation and risk judgments in Studies 2 and 3 (Article II) allowed a comparison between two theories

concerning the workings of the avoidance motivation system. As noted above, the trait version of the network model of affect (Bower, 1981; Rusting, 1999) suggests that traits (e.g., trait avoidance motivation) are related to larger/better organized memory networks of trait-relevant concepts. This theory further suggests (Rusting, 1999) that matching states (e.g., state avoidance motivation, negative mood) activate this network effectively, leading to particularly strong effects on relevant behaviors and cognitions among those with matching states and traits (e.g., particularly high risk judgments among high-trait-avoidance individuals in an avoidance state). However, this was not found in the present research: state avoidance motivation did not influence risk judgments differently for high- vs. low-trait avoidance motivation individuals. Furthermore, the negative mood that, according to the trait version of the network model, could also have enhanced the risk judgments of high-trait-avoidance motivation individuals did not moderate the relation between trait avoidance motivation and risk judgments.

In contrast to the network model's predictions, the nature of the state × trait avoidance motivation interaction on risk judgments showed that both state and trait avoidance motivation raised people's risk judgments to a similar degree (relative to the judgments of low-trait-avoidance motivation individuals in an approach state). This pattern of results was congruent with a view of avoidance motivation as an "on-off" system (Shah & Higgins, 1997). According to this view, avoidance goals are viewed as necessities, i.e., they must be reached no matter what (Shah & Higgins, 1997; see also Bilsky & Schwartz, 1994). This is a plausible assumption given that avoidance goals usually involve withdrawing from a dangerous situation or avoiding threatening issues. Not reaching these kinds of goals may lead to severe and possibly fatal consequences. Because of this, it could be useful if once sufficiently activated, the avoidance system would affect one's behavior, cognition, and affect with all its strength, and its activation could thus not be decreased or increased with any further stimulation. The present results (Studies 2-3) supported this idea.

It should be noted that the idea of the avoidance system operating on an on-off principle is not incongruent with the idea of the network model as such. That is, it is possible that high trait avoidance motivation and state avoidance motivation are related to the activation of cognitive structures representing negative valence, and that

avoidance motivation affects risk judgments through such an activation. The point of the on-off theory is merely that this activation is not enhanced by combining the two sources of avoidance motivation (state and trait).

As discussed in the Introduction, several motivation researchers and a considerable amount of empirical data have suggested the existence of two independent motivation systems, an avoidance system and an approach system (e.g. Carver et al., 2000; Carver & White, 1994; Elliot & Trash, 2002; Gray, 1982). Therefore, the results concerning the interaction between state and trait avoidance motivation evoke an interesting parallel question about the interplay between state and trait approach motivation. Would state and trait approach motivation raise approach-related judgments (or behavior, or affects) to a similar degree as seems to be the case for state and trait avoidance motivation and risk judgments? This question was not addressed in the present research, but unlike avoidance goals, approach goals are not likely to be viewed as necessities (Shah & Higgins, 1997), because not reaching an approach goal is not usually dangerous (for instance, being refused a date is disappointing, but it will not kill you). Therefore, the activation of the approach system might increase gradually rather than be fully activated after a certain threshold of activation has been reached. Thus, state and trait approach could have an additive (i.e., state and trait approach would independently increase outcomes) or a synergistic effect (i.e., state approach would enhance the effect of high trait approach) on, for instance, positive evaluations. In light of the present risk judgments results, the interaction between state and trait approach in predicting approach-related outcomes is an interesting question for future research.

The present studies also examined a theory presented by Robinson and colleagues (Robinson, Meier, & Vargas, 2005; Tamir et al., 2006) concerning the nature of the avoidance system. According to this theory, high-trait-avoidance individuals (i.e., people who tend to worry about threats) would benefit from good threat identification skills. By identifying actual threats quickly, such individuals could deal with them effectively and stop worrying about issues that are only potentially, but not actually, dangerous (Tamir et al., 2006). In contrast, good threat-identification skills would not carry similar benefits for low-trait-avoidance individuals, who do not tend to worry about threats. This theory was examined in the context of emotional processing in Studies 5 and 6. However, no evidence for such a moderation effect was found. Hence,

the results did not support the idea of good threat identification skills functioning as a buffer for high-trait-avoidance motivation individuals (Tamir et al., 2006).

4.3 Trait avoidance motivation, cognitive ability, and adjustment

The results of Study 7 (Article IV) supported hypothesis (c) by showing that cognitive ability moderates the relation between trait avoidance motivation, conceptualized as neuroticism, and self-evaluated as well as objective measures of adjustment. In particular, high trait avoidance motivation was associated with lower self-evaluated and superior-evaluated adjustment and a higher number of sick days during the course of military service only among those with low cognitive ability. The moderating effect of cognitive ability on the relations between trait avoidance motivation and other variables has been suggested to result from the response process (Robinson & Clore, 2002; 2007), but also from a genuinely shielding influence of high cognitive ability (Perkins & Corr, 2005, 2006). The present research (Study 7) supported the latter view.

The results of Study 7 are of importance given that they present an exception to a relation considered as one of the strongest in research on individual differences – the one between trait avoidance motivation and different forms of maladjustment (e.g., Costa & McCrae, 1980; Duggan, Sham, Lee, & Minne, 1995; Roberts & Kendler, 1999; Steel et al., 2008). What is more, this exception was established for several, relatively valid indicators of adjustment, such as consensus evaluations of performance made by 5-10 individuals that had closely followed the target individual for 8-11 months and an objective indicator of physical and mental illness (the sick days variable). The results of Study 7 suggest, for instance, that the surprisingly low relation found between neuroticism and job performance (Barrick & Mount, 1991) could be partly explained by the moderating influence of cognitive ability.

Concerning the reasons for the moderating effects of cognitive ability, it has been suggested that high trait avoidance motivation consumes attentional resources in a stressful situation, and that high cognitive ability helps people to cope with this cognitive overload (Perkins & Corr, 2006). However, the present results are not entirely consistent with this view because the moderating effect of cognitive ability was also found on criterion measures derived from behavior in non-stressful situations. Although

superior-evaluated adjustment was partly based on performance in presumably stressful situations, it also contained evaluations of the targets' ability to form social relationships. Furthermore, high cognitive ability lowered the number of sick days among high-trait-avoidance individuals. These results imply that the beneficial effects of high cognitive ability exceed those of merely helping with momentary cognitive overload.

The particular mechanism through which high cognitive ability buffers against the adverse effects of high trait avoidance motivation was not examined in the present research. The broad array of implications discussed above suggests, however, that the mechanism may be some rather general process, perhaps based on a constructive reconceptualization of negative experiences (Kremen et al., 2007) or on the better problem-solving skills (Gottfredson, 2004) of high-cognitive ability individuals. Whatever the shielding effect of high cognitive ability is and wherever it derives from, it seems to help people to adjust socially and to cope better with the physical and psychological distresses and illnesses that they face.

The results concerning the psychiatric evaluation suggest that the shielding effect of high cognitive ability, although quite general, does not extend to all forms of adjustment. In light of these results, it seems that while the beneficial effects of high cognitive ability help high-trait-avoidance motivation individuals to cope better in their everyday lives, these effects do not change certain aspects of a person that can be detected by an experienced mental health professional. For instance, it could be that all high-trait-avoidance motivation individuals experience more negative affect in problematic situations, thus contributing to a more negative implicit self-concept, but that those high-trait-avoidance motivation individuals with high cognitive ability are better able to deal with the problematic situations (Gottfredson, 2004), leading to a positive explicit self-concept. Given that implicit and explicit self-views may be unrelated (Briñol, Petty, & Wheeler, 2006), this explanation seems worth examining.

4.4 Limitations

A limitation common to several of the present studies concerned the size and representativeness of participant samples. Many of the samples were quite small and biased in their gender distribution, and all the participants were Finnish. To increase

confidence in the conclusions, it would be desirable to examine the relations found in the present studies in larger groups and more gender-balanced groups, and among individuals with other ethnic or cultural backgrounds.

The sample of participants in Study 7 was most unrepresentative in that it consisted solely of men conducting their military service. This naturally raises some questions as to the generalizability of the obtained results, especially given that women tend to score higher than men on trait avoidance motivation measures (Costa, Terracciano, & McCrae, 2001; Jorm et al., 1998). However, there is some evidence showing that both trait avoidance motivation and cognitive ability predict at least health-related outcomes identically for both genders (Gottfredson, 2004; Shipley, Weiss, Der, Taylor, & Deary, 2007). These results speak against the possibility of between-gender differences in the operation of trait avoidance motivation and cognitive ability. It remains possible, however, that the interplay of these two variables differs between genders. For instance, women might experience more anxiety than men after a stressful situation (Schmaus, Laubmeier, Boquiren, Herzer, & Zakowski, 2008), perhaps to the extent that the moderating effects of high cognitive ability would not be enough to buffer against distress or low performance. Furthermore, the participants in Study 7 were in an unusual and stressful life situation (conducting a military service) that may have distorted the results. For instance, it is possible that cognitive ability only buffers against the negative consequences of high trait avoidance motivation in a very structured environment (such as the military) where goals are clearly defined and straightforward, but not in less structured everyday life. Thus, given the relatively wide implications of the Study 7 results, it would be important to examine trait avoidance motivation × cognitive ability interactions also among women and individuals in the midst of a regular life phase.

A limitation particular to Studies 2-4 (Article II) was that no motivationally neutral control group was included as all the participants were either in an avoidance state or an approach state. Therefore, it remained unclear whether state avoidance raised risk judgments relative to a neutral state or whether state approach lowered risk judgments relative to a neutral state, or both. Although the most natural interpretation of the results is that state and trait avoidance motivation operate similarly with regards to risk judgments, it is impossible to say with certainty which of the above-described effects caused the results, and it would be desirable to examine the interaction effect with a

neutral group. A further limitation of these studies is that participants vulnerable to the risks in question were not included; the results may not hold for the risk judgments of such individuals because vulnerability to risks may raise judgments of those risks regardless of personality.

A more minor limitation of the studies was that not all negative processing biases were studied in relation to all moderators. For instance, in the light of the results of Study 7, it seems possible that cognitive ability could moderate the relation between trait avoidance motivation and negative biases. Some recent research has obtained results supporting this idea in the context of attention (Lonigan & Vasey, 2009). However, the present thesis focused more on the moderators of trait avoidance motivation than on trait-congruency. In future studies, researchers frustrated with the inconsistency of trait-(in)congruent results may wish to examine cognitive ability as a moderator.

On a final note concerning the limitations of the research, it has been maintained on several occasions in the present dissertation that the relations of trait avoidance motivation with risk judgment and negatively biased processing have been weak or inconsistent in previous studies as well as in the present ones. However, it should be noted that there is no absolute criterion for weak or strong in this context. Responses to information processing tasks are much more susceptible to measurement error than, for instance, self-reports of personality. Furthermore, it also is possible that emotional processing tendencies do not represent stable individual difference variables at all, although there is some evidence for test-retest reliability among such measures (Strauss, Allen, Jorgensen, & Cramer, 2005). However, it is clear that situational variables (e.g., fatigue, motivation) affect information processing tasks much more strongly than they affect responses to personality questionnaires (Robinson, 2007). Therefore, such possible empirical and methodological limitations of the emotional processing research should be kept in mind when considering such criticism of trait-congruency theory that is based on the inconsistency of empirical results. More research on the nature of the emotional processing variables is needed to fully understand what kind of relations could be expected between personality and emotional processing, and what kind of relations there actually are.

4.5 Conclusions

The results of the present thesis suggest that state motivation and cognitive ability serve as moderators of trait avoidance motivation. These results have implications for our understanding of personality as well as for research using trait avoidance motivation as a predictor variable. Personality traits are related to behavior and cognitive processing, but these relations are not always straightforward. The relations of traits with such outcome variables may often be moderated incidentally by moods, other states, and situational factors such as the behavior of others; however, recent research and theorizing suggests that there may be stable patterns of moderation ("if…then…" signatures) that may capture individual differences with more precision than traits alone. The work by Fournier and colleagues (2008, 2009) focuses on the moderating role of situations, as the present Studies 2-4, but there could also be interactions between personality and other individual difference variables, such as those observed in Study 7. It seems that identifying such interactions may be informative concerning the nature and workings of personality.

The results also contributed to the long line of work conducted on trait-congruency. The present results are in line with previous work (Chan et al., 2007; Rusting, 1998; Rusting & Larsen, 1998) in showing that relations between trait avoidance motivation and negative processing biases are cumbersome, and perhaps disappointingly, the moderators studied in the present research did not help to understand these relations better. However, together with previous studies, the present thesis points to the need to scrutinize theories on trait-congruency to accommodate them with empirical findings.

As compared to emotional processing, trait-congruency has received less attention in the domain of risk judgments. This may be because risk judgment has traditionally been studied in judgment and decision-making (J/DM) research, which has remained dissociated from personality psychology. J/DM research typically focuses on the universal rules behind risky choice. As a consequence, individual differences have not received much attention in this line of work (Weber & Johnson, 2009). The present thesis suggests a way to connect the J/DM tradition with personality psychology by showing that individual differences in risk judgment are related to the trait of avoidance motivation, as long as the moderating role of state motivation is taken into account.

In sum, the results of the seven studies presented here offer new information about how individuals differing in their negative feelings, reactions, and motivation differ in their thoughts and actions, and why. The results bridge a gap in the previous literature concerning these individual differences and risk judgments. They also add to the cumulating literature on the variability and inconsistency of trait-congruent processing, suggesting a need to revise some of the assumptions guiding this line of research. Furthermore, the results merge different lines of research concerning the cognitive moderators of personality, and suggest a plausible interpretation of previous, unconnected results. Finally, the present thesis contributes to the current research directions of personality psychology by demonstrating two novel interactions, one involving personality and cognitive ability, and one involving personality and situation.

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