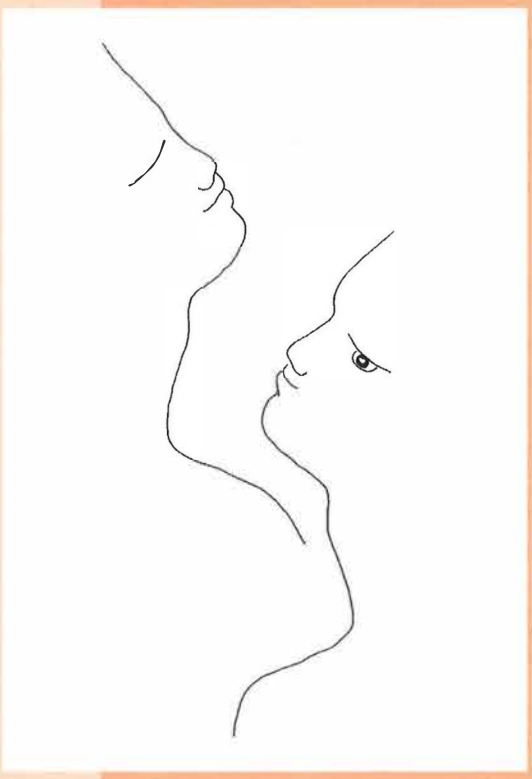
MARJA KOKKONEN

EMOTION REGULATION AND PHYSICAL HEALTH IN ADULTHOOD



A Longitudinal, Personality-Oriented Approach

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ LONGITUDINAL STUDY OF PERSONALITY AND SOCIAL DEVELOPMENT

JYVÄSKYLÄ STUDIES IN EDUCATION, PSYCHOLOGY AND SOCIAL RESEARCH 184

Marja Kokkonen

Emotion Regulation and Physical Health in Adulthood

A Longitudinal, Personality-Oriented Approach

Esitetään Jyväskylän yliopiston yhteiskuntatieteellisen tiedekunnan suostumuksella
julkisesti tarkastettavaksi yliopiston Villa Ranan Blomstedt-salissa
syyskuun 15. päivänä 2001 kello 12.

Academic dissertation to be publicly discussed, by permission of
the Faculty of Social Sciences of the University of Jyväskylä,
in the Building Villa Rana, Blomstedt Hall, on September 15, 2001 at 12 o'clock noon.

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2001

Emotion Regulation and Physical Health in Adulthood

A Longitudinal, Personality-Oriented Approach

JYVÄSKYLÄ STUDIES IN EDUCATION, PSYCHOLOGY AND SOCIAL RESEARCH 184

Marja Kokkonen

Emotion Regulation and Physical Health in Adulthood

A Longitudinal, Personality-Oriented Approach

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2001

Editors
Tapani Korhonen
Department of Psychology, University of Jyväskylä
Pekka Olsbo and Marja-Leena Tynkkynen
Publishing Unit, University Library of Jyväskylä

Cover design: Minna Laukkanen
Cover picture:Taimi Korhonen

URN:ISBN:978-951-39-8444-1
ISBN 978-951-39-8444-1
ISSN 0075-4625

ISBN 951-39-1021-0
ISSN 0075-4625

Jyväskylä University Printing House,
Jyväskylä and ER-Paino Ky, Lievestuore 2001

ABSTRACT

Marja Kokkonen
Emotion Regulation and Physical Health in Adulthood: A Longitudinal, Personality-Oriented Approach
Jyväskylä: University of Jyväskylä, 2001, 52 p.
(Jyväskylä Studies in Education, Psychology and Social Research
ISSN 0075-4625; 184)
ISBN 951-39-1021-0
Yhteenveto: Aikuisiän tunteiden säätely ja fyysinen terveys: pitkittäistutkimuksellinen ja persoonallisuuskeskeinen lähestymistapa
Diss.

This longitudinal study investigated the relations between prior personality characteristics, later cognitive and social emotion regulation, and dysregulation, and self-reported physical health. Firstly, the thesis examined whether childhood personality characteristics reflecting self-control of emotions account for the use of the emotion regulation strategies of Repair, Dampening, and Maintenance in adulthood. In addition, heterotypic continuity in the personality characteristics reflecting self-control of emotions, and the role of emotion regulation strategies in this continuity, was examined. Secondly, the mediational model linking the prior Big Five personality traits to the later use of Repair, Dampening, and Maintenance via current mood and its cognitive evaluation was tested. Thirdly, the explanatory role of the prior Big Two personality traits for later emotion regulation and dysregulation was investigated. Fourthly, the role of prior personality characteristics indicating low self-control of emotions in explaining self-reported physical symptoms in adulthood, and the mediating role of Repair were examined. Finally, the mediational model connecting the personality characteristics of low self-control of emotions and behavioural expression in adolescence to various self-reported health outcomes in adulthood through self-reported health-related behaviours was tested. The study was part of the ongoing Jyväskylä Longitudinal Study of Personality and Social Development. The data were obtained from the original sample of 196 males and 173 females at ages 8, 14, 27, 33, and 36 by teacher-ratings or self-reports. The findings indicated that prior personality characteristics indicating low self-control of emotions accounted for the lowered use of Repair, Dampening, and Maintenance. Additionally, heterotypic continuity in the self-control of emotions in men was partially explained by the mediating role of Repair and Dampening. Furthermore, the impact of the prior Big Five personality traits on the later use of the strategies studied was mostly indirect via current mood and its cognitive evaluation. In general, Extraversion led to high social emotion regulation and low emotion dysregulation, whereas Neuroticism led to low cognitive emotion regulation and high emotion dysregulation. Prior personality characteristics reflecting low self-control of emotions further accounted for self-reported poor physical health in adulthood. The negative impact of low self-control of emotions on self-reported physical health was mostly indirect, via lowered use of Repair and health-risk behaviours. Overall, the effects of prior personality characteristics on both emotion regulation and dysregulation, as well as on self-reported physical health, varied considerably by sex.

Keywords: emotion regulation, physical health, health-related behaviour, longitudinal study, mediator

Author's address

Marja Kokkonen
Department of Psychology
University of Jyväskylä
The Centre of Excellence
Agora/Psykocenter
P. O. Box 35
FIN-40351 Jyväskylä
Finland
e-mail: kokkonen@psyka.jyu.fi

Supervisor group

Professor Lea Pulkkinen
Department of Psychology
University of Jyväskylä
The Centre of Excellence
Finland

Professor Heikki Lyytinen
Department of Psychology
University of Jyväskylä
The Centre of Excellence
Finland

Professor Jarl Wahlström
Department of Psychology
University of Jyväskylä
Finland

Reviewers

Carl A. Happold Distinguished Professor of Psychology
Ross A. Thompson
Department of Psychology
University of Nebraska
The United States

Professor Jussi Saarinen
Department of Computer Science & Information Systems
University of Jyväskylä
Finland

Opponent

Carl A. Happold Distinguished Professor of Psychology
Ross A. Thompson
Department of Psychology
University of Nebraska
The United States

ACKNOWLEDGEMENTS

My deepest gratitude is addressed to my supervisor and mentor, Professor Lea Pulkkinen, who has encouraged and patiently guided me from the outset of my studies. I greatly value her flexibility, and human understanding and tolerance of individual differences. I am also grateful to her for the opportunity to work in her several research projects, and in this way to learn the many facets of scholarly work.

I extend my warmest thanks to Professors Heikki Lyytinen and Jarl Wahlström for their supervisory work. Thanks are also due to Professors Ross Thompson and Jussi Saarinen for the time they dedicated to reviewing and commenting on my thesis. I wish also to thank Professor Jari-Erik Nurmi for his valuable comments on the earlier version of my thesis; Doctor Jane Erskine and English lecturers Michael Peacock and Michael Freeman for proofreading my English text; Professor Heikki Leskinen for proofreading the Finnish summary; and Satu Barman for her professional editorial help. Mentally, despite the geographical distance separating us, the support of Professor Boele De Raad has been irreplaceable. I also wish to thank Professor Peter Salovey, and his graduate students at Yale University for the half a year I was able to work with them as a Fulbrighter.

This study was conducted during my participation in the Finnish Graduate School of Psychology, and supported by the University of Jyväskylä and the Academy of Finland. I wish to express my gratitude to these organizations. Especially, I wish to thank the participants of the ongoing longitudinal study. I would also like to thank all those with whom I have been privileged to work during these years. I owe special thanks to Asko Tolvanen and Ari Mäkiaho, who painstakingly helped me with some of the secrets of statistics and computing. The members of the Department of Psychology, and especially my fellow post-graduate students in the LAKU and EMO projects, deserve my thanks for their long-term support and valuable advice. My warmest thanks are due to Katja Kokko, who shared with me the excitement, frustration, and fun of conducting research, and who was always available for critique, discussion, collaboration - and shopping.

I gratefully acknowledge the contribution of my family and many friends. I wish to express my deepest appreciation to my parents, Irene and Raimo Kokkonen, who have been pillars of encouragement and unfailing emotional and material support. Especially, I wish to thank them for their love and constant faith in me. My beloved brother Juha Kokkonen, who has been conducting his doctoral studies side by side with me, I thank for his great sense of humour and inspiring discussions. He has also been very helpful in my sport psychology studies.

I owe special thanks to all my friends for their friendship, and for putting up with the stresses and strains involved in achieving my goal. I want to thank Lea for standing by my side at all times; Päivi for her infectious positive energy; Johanna and Riikka for numerous dance sessions and bubbling girly talk; and Tommi for repeatedly accommodating and feeding the tired traveller. Finally, I wish to thank three caring men: Stephen, for his figure-of-eight love; Esa, for his unconditional, everlasting love; and Juha for his continually growing love, and tolerance of my unregulated emotions.

Jyväskylä, September 2001 Marja Kokkonen

CONTENTS

LIST OF PUBLICATIONS

I Kokkonen, M., & Pulkkinen, L. (1999). Emotion regulation strategies in relation to personality characteristics indicating low and high self-control of emotions. *Personality and Individual Differences*, *27*, 913-932.

II Kokkonen, M., & Pulkkinen, L. (2001). Examination of the paths between personality, current mood, its evaluation, and emotion regulation. *European Journal of Personality*, *15*, 83-104.

III Kokkonen, M., & Pulkkinen, L. (in press). Extraversion and neuroticism as antecedents of emotion regulation and dysregulation in adulthood. *European Journal of Personality*.

IV Kokkonen, M., Pulkkinen, L., & Kinnunen, T. (2001). Low self-control of emotions as an antecedent of self-reported physical symptoms: A longitudinal perspective. *European Psychologist*, *6*, 26-35.

V Kokkonen, M., Kinnunen, T., & Pulkkinen, L. (in press). Direct and indirect effects of adolescent self-control of emotions and behavioural expression on adult health outcomes. *Psychology and Health.*

1 INTRODUCTION

1.1 Emotion, emotion regulation and dysregulation

After decades of neglect, psychology rediscovered emotion in the 1980s (Gross, 1999a). As the meta-analytic review by Endler and Speer (1998) showed, emotion has become a highly favoured topic among researchers. Although there is still controversy about how emotions should be defined, the current definitions emphasize the dynamic, functional, and adaptive nature of emotions. For example, Keltner and Gross (1999) consider *emotions* episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action, and communication that take place in response to specific physical and social challenges and opportunities. Theoretically, emotions have been differentiated from moods (e.g., Clore & Ortony, 2000; Ekman, 1994; Frijda, 1993; Goldsmith, 1994; Watson & Clark, 1994). In practice, however, the concepts of emotion and mood have not been viewed as sharply distinct. In particular, personality researchers have only occasionally distinguished emotion from mood (Matthews, Derryberry, & Siege, 2000).The two concepts have been used interchangeably (Barry & Oliver, 1996; Batson, Shaw, & Oleson, 1992; Billings, Folkman, Acree, & Moskowitz, 2000; Gohm & Clore, 2000), and rarely differentiated at the level of measurement (Mayne, 1999).

The renewed interest in emotion gave rise to the novel research subject of emotion regulation, which grew out of the earlier lines of research into stress, coping, and temperament, and out of psychoanalytic research (Eisenberg, 1998; Gross, 1999b). Given the lack of consensus on the definition of emotion, it is unsurprising that emotion regulation too has been defined in various ways. Emotion regulation is one specific form of self-control (Tice & Bratslavsky, 2000). According to the recent definition by Eisenberg, Fabes, Guthrie and Reiser (2000), *emotion regulation* refers to the processes of initiating, maintaining, modulating, or changing the occurrence, intensity, or duration of emotion-related physiological processes and internal feeling states, which often serve the attainment of one's goals. Thus, in the same way as emotions nowadays, emotion regulation is considered relevant for individual functioning and well-being. It has been stated to be crucial in reducing stressful levels of emotions (Cicchetti, Ackerman, & Izard,

1995; Grolnick, Bridges, & Connell, 1996; Kopp, 1989), preventing maladaptive behaviour (Cicchetti et al., 1995; Cicchetti, Ganiban, & Barnett, 1991), enabling individuals to be emotionally open and flexible (Labouvie-Vief, Hakim-Larson, DeVoe, & Schoeberlein, 1989; Mayer & Salovey, 1997; Walden & Smith, 1997), and serving several social functions at the interpersonal level (Manstead & Fisher, 2000). In addition, it has been broadly regarded as a synonym for coping (Brenner & Salovey, 1997, p.170) and for a type of coping (Eisenberg, Fabes, & Losoya, 1997; Poon & Lau, 1999), notably emotion-focused coping (e.g., Eisenberg, 1998; Eisenberg & Fabes, 1992; Gross, 1998; Losoya, Eisenberg, & Fabes, 1998; Parkinson & Totterdell, 1999). More narrowly defined, emotion regulation has been seen as, for instance, the highest level of a hierarchical personality construct called emotional intelligence (Mayer & Salovey, 1997; Mayer, Salovey, & Caruso, 2000), or a component of meta-mood experience (Mayer & Gaschke, 1988).

Although the numerous definitions of emotion regulation have their own points of divergence, there are important similarities in their underlying assumptions, viz.1) Emotion regulation can be viewed as both statelike and traitlike (Davidson, Jackson, & Kalin, 2000) and either a process or an outcome (Thompson, Flood, & Lundquist, 1995); 2) It entails management of the physiological concomitants of emotional arousal, emotion-related behaviour (e.g., emotion expression) and the subjective experience of emotion (Eisenberg, 1998; Eisenberg, Fabes, et al., 1997; Feldman Barrett & Gross, 2001; Gross, 1999a; Walden & Smith, 1997); 3) It applies to both negative and positive emotions (Cole, Michel, & Teti, 1994; Grolnick et al., 1996; Gross, 1999a; Kopp, 1989); 4) It operates within the individual as well as between individuals, i.e. emotions are self-regulated, but they are also managed by others (Gross, 1999b; Mayer & Salovey, 1997; Thompson & Calkins, 1996); 5) It requires the effortful management of attention (Calkins, 1994; Gross, 1998, 1999a,b; Eisenberg, Fabes, et al., 2000; Thompson, 1990, 1994), cognitive capacity (Cicchetti et al.,1995; Kopp, 1989; Pulkkinen, 1995), and neurophysiological processes (Thompson et al., 1995); 6) It operates both unconsciously and consciously (Gross, 1999b; Karoly, 1993; Mayer & Salovey, 1995; Mayer & Stevens, 1994); 7) It is in part contextually bound and related to a particular situation (Cole et al., 1994; Eisenberg, Fabes, et al., 2000; Thompson et al., 1995; Underwood, 1997; Walden & Smith, 1997); and 8) Emotion regulation is more characteristic of women than men (Ben-Ze'ev, 2000; Tobin, Graziano, Vanman, & Tassinary, 2000).

There are relatively fewer definitions of emotion dysregulation. According to Cole et al. (1994), *emotion dysregulation* is viewed as difficulty in modulating both the experience and expression of emotion in response to contextual demands and in controlling the effect of emotional arousal on the organization and quality of thoughts, actions, and interactions. It is also seen as forms of over- and underregulation (Cole et al.,1994), and as the existing control structures that operate in a maladaptive way and direct emotions towards inappropriate goals (Cicchetti et al.,1995). It has been argued to constitute, for example, inflexibility, stereotypy, and rigidity (Thompson et al.,1995), and result in emotional, cognitive, and behavioural outcomes which are maladaptive for the individual in a particular situation (Garber & Dodge, 1991).

Eisenberg (1998) points out that in the literature various types of emotion regulation have unfortunately not been generally distinguished, and stresses the importance of investigating these different types separately (Eisenberg, Fabes, et al., 2000). Garnefski, Kraaij, and Spinhoven (2001) additionally argue that conscious, cognitive components of emotion regulation have not often been addressed. Furthermore, the emphasis has traditionally been on the down-regulation of negative emotions only (Bonanno & Mayne, 2001). In the present study, the focus was on the (mostly cognitive) up- and down-regulation, and dysregulation of the subjective

experience of emotion. Consequently, the regulation of emotion-related physiological processes and behaviour were considered beyond the scope of this investigation.

1.2 Factors contributing to emotion regulation

Current research has concentrated on identifying factors contributing to emotion regulation. Generally, the main focus has been on social and contextual factors. It has been shown, for example, that among children the absence of early exposure to routine nonparental care (Morales & Bridges, 1996), secure attachment history (Cassidy, 1994), maternal positive feedback and guidance (Calkins & Johnson, 1998), the expression of positive emotion within the family (Garner, 1995), and the presence of peers and parents (Zeman & Garber, 1996) are associated with a high level of emotion regulation. Similarly, on the rare occasions adults have been studied, it has been found that a secure attachment style (e.g., Mikulincer & Florian, 1998) and the presence of others (Friedman & Miller-Herringer, 1991) are related to emotion regulation.

Another line of research has ascertained the importance of physiology in emotion regulation. Developmental studies have shown that physiological and cognitive maturation (see Greenberg & Snell, 1997; Thompson, 1990,1994 for reviews) plays a significant role in emotion regulation. In particular, the activity of the hypothalamic-pituitary-adrenocortical (HPA) system (Stansbury & Gunnar, 1994), frontal lobe executive functioning (Dawson, Panagiotides, Klinger, & Hill, 1992; Fox, 1994; LeDoux, 1996; Luu, Collins, & Tucker, 2000; Posner & Rothbart, 1998), and cardiac vagal tone (Eisenberg, Fabes, Karbon, et al.,1996; Eisenberg, Fabes, Murphy, et al., 1996; Porges, Doussard-Roosevelt, & Maiti, 1994) have recently attracted the interest of emotion regulation researchers.

Little interest, however, has been shown in understanding the role of personality characteristics in emotion regulation. It has recently been demonstrated, mostly from an emotional intelligence perspective, that concurrent verbal IQ, life satisfaction (Mayer, Caruso, & Salovey, 1999), optimism (Salovey, Mayer, Goldman, Turvey, & Palfai,1995), Agreeableness (Tobin et al., 2000), Extraversion and low Neuroticism (Davies, Stankov, & Roberts, 1998), empathy (Ciarrochi, Chan, & Caputi, 2000; Mayer et al., 1999) and self-esteem (Ciarrochi et al., 2000; Smith & Petty, 1995) are connected with high emotion regulation.

Previous research on emotion regulation has largely ignored adult samples (Gross, Carstensen, Tsai, Skorpen, & Hsu, 1997; Gross & Levenson, 1997), focused on either its external or biological correlates, and has utilized cross-sectional designs. Consequently, this study aimed at overcoming these earlier limitations by examining prior personality characteristics as explaining directly or indirectly adults' regulation and dysregulation of the subjective experience of emotion from a longitudinal perspective.

1.3 Strategic approach to emotion regulation

The different ways of regulating emotions are typically referred to as 'emotion regulation strategies'(Calkins, 1994; Gross, 2000), 'affect-regulation strategies'

(Parkinson & Totterdell, 1999), 'mood regulation strategies' (Mayer & Stevens, 1994; and later as strategies of emotional regulation in Salovey et al., 1995; Rusting & Nolen-Hoeksema, 1998), 'emotional self-regulatory styles' (Thompson, 1990), 'emotion regulation/management skills' (Shipman, Zeman, Penza, & Champion, 2000; Thompson, 1994), and 'coping strategies' (Saarni, 1997). In the present study, the regulation of the subjective experience of emotion has been approached from this strategic viewpoint.

Emotion regulation strategies, potentially limitless in number (Gross, 2000), have been grouped in various ways. For example, Gross (1999a,b; Gross & Munoz, 1995) divided emotion regulation strategies into antecedent-focused and response-focused processes, whereas Brenner and Salovey (1997) described strategies along the dimensions of external-internal and social-solitary. Ben-Ze'ev's (2000) division was based on the extent, the focus, the nature, and the content of regulating means or strategies. The most general classification of emotion regulation strategies can be seen in Parkinson and Totterdell (1999), who identified 162 specific strategies, which finally fell into two main clusters, Cognitive Strategies and Behavioural Strategies. In the present study, emotion regulation in adults was studied mostly in terms of the conscious, active, and cognitive state-like strategies of Repair, Dampening (the so called intervening strategies) and Maintenance, based on Mayer and Stevens' (1994) Meta-Regulation Scale (MRS). Repair refers to an individual's active attempt to turn a negative emotion in a more positive direction by planning, recalling, and imagining something desirable. According to these scholars, dampening is the active attempt to damp down positive emotions, for example, by reminding oneself of reality. Maintenance is used to preserve an ongoing emotion unchanged.

Recent research has revealed that, to a certain extent, some ways of regulating emotions are more likely to be used by women, such as social support and avoidance (e.g., Labouvie-Vief, Hakim-Larson, & Hobart, 1987; Lutzky & Knight, 1994; Ptacek, Smith, & Zanas, 1992). Men, on the other hand, have been found to prefer direct tension reduction through drugs, alcohol, and sex, and through pleasurable activities and distractions, such as using humour or engaging in hobbies (Thayer, 1996; Thayer, Newman, & McClain, 1994).

The majority of the studies on emotion regulation strategies suffer from one or more of three common limitations. Firstly, the issue of group differences, such as sex, in emotion regulation has received rather little empirical attention (Gross, 1999b). Secondly, adult samples have rarely been used, whereas studies have been often conducted with infants (Buss & Goldsmith, 1998; Mangelsdorf, Shapiro, & Marzolf, 1995), preschoolers (Morales & Bridges, 1996; Rubin, Coplan, Fox, & Calkins, 1995; Stansbury & Sigman, 2000) and school-aged children (Brown, Covell, & Abramovitch, 1991; Eisenberg, Guthrie, et al., 1997). Control groups have also been compared with abnormal groups such as developmentally delayed (Wilson, 1999) or maltreated (Shields & Cicchetti, 1997; Shipman et al., 2000) children. These studies have found general developmental trends, for example, that emotion regulation gradually shifts from a reliance on external sources (e.g., caregivers) to more intraindividual, internal sources, while concrete, behavioural ways of regulating emotions are mostly replaced by more self-initiated, mentalistic, cognitive emotion regulation strategies (Eisenberg, 1998; Losoya et al., 1998; Walden & Smith, 1997).

Thirdly, in a variety of previous studies, emotion regulation strategies have been operationalized in terms of different coping scales. Together with other simultaneous measurements, these studies have shown that, for example, concurrent mood and mood awareness (Totterdell & Parkinson, 1999), affect

intensity (Catanzaro, 1997; Flett, Blankstein, & Obertynski, 1996), shyness (Eisenberg, Fabes, & Murphy, 1995), attachment security (Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000), optimism (Carver et al., 1993), Type A behaviour patterns (Carver, Scheier, & Weintraub, 1989; Gomez, 1997), external locus of control (Gomez, 1997), and level of education, financial strain, and foreign background (Grossi, 1999) are associated with the use of different coping strategies. From the viewpoint of personality, which has been less often taken, social desirability, self-esteem, trait anxiety (Carver et al., 1989), and Neuroticism and Extraversion (Halamandaris & Power, 1999; McCrae & Costa, 1986; Watson & Hubbard, 1996) have been linked to various strategies. Interestingly, sex differences have been found recently in correlations between Neuroticism and Extraversion and coping strategies (Amirkhan, Risinger, & Swickert, 1995; Gomez, Holmberg, Bounds, Fullarton, & Gomez, 1999; Rim, 1993).

In brief, research on emotion regulation strategies has generally suffered from indifference to sex differences, over-reliance on coping scales, and insufficient interest in personality characteristics as explanatory factors. Furthermore, a few rare exceptions aside (Bolger, 1990; Vollrath, Torgersen, & Alnaes, 1995), studies have been predominantly cross-sectional. Consequently, issues of causality have remained unresolved. Therefore, little is known about the factors, particularly personality-related factors explaining emotion regulation strategies, and the sex differences in them.

1.4 The role of personality and emotion regulation in health

While personality characteristics have been largely neglected in emotion regulation, they have been repeatedly found to be linked to psychological (e.g., Emery, Huppert, & Schein, 1996; Lu, 1994; Murberg, Bru, Svebak, Aarsland, & Dickstein, 1997) and physical (e.g., Miller, Smith, Turner, Guijarro, & Hallet, 1996; Suls, Wan & Costa, 1995) health, and to health-related behaviour (Artistico, Baldassarri, Lauriola, & Laicardi, 2000; Avia et al., 1995; Bermudez, 1999; Vollrath, Knoch, & Cassano, 1999). According to the review by Smith and Williams (1992), Type A behaviour, Neuroticism, hostility, antagonism, hardiness, optimism, health locus of control, and sense of coherence are among the most highly studied factors in the field of personality and health. However, as pointed out by Caspi et al. (1997), most of the previous studies in this field suffer from flaws such as selected samples, investigation of only a single personality trait or health-related behaviour, and cross-sectional data. Moreover, an interest in processes has been lacking; according to Contrada, Cather, and O'Leary (1999), future work should include investigation of, for example, how different biological, psychological, and behavioural processes explain the relationship between personality and health. So far, attempts to examine the relations between personality, health, and health-related behaviour within a single study have been extremely rare. As concluded by Friedman (2000), there has been little research on early personality and later health behaviours, and very little long-term, mediational knowledge about why some people are more likely to develop certain medical conditions and diseases.

In the light of the most recent but very limited and largely cross-sectional literature, there is some evidence that not only emotional states (see Leventhal & Patrick-Miller, 1993; Salovey, Rothman, Detweiler, & Steward, 2000 for reviews)

but also strategically approached emotion regulation have ties to psychological and physical health. Findings in the more frequently studied field of psychological health show that lower generalized expectancies for negative mood regulation (Catanzaro & Mearns, 1990; Catanzaro, Wasch, Kirsch, & Mearns, 2000), rumination (Higgins & Endler, 1995; Nolen-Hoeksema, McBride, & Larson, 1997; Nolen-Hoeksema & Morrow, 1993), suppression of angry thoughts and feelings (Bridewell & Chang, 1997), lower use of trait-Repair, that is regulating negative emotions by orienting them in a more positive direction (Salovey et al., 1995; Salovey, Stroud, Woolery, & Epel, in press), lower use of approach coping and higher use of avoidant coping (Herman-Stahl, Stemmler, & Petersen, 1994) are linked to higher depression. Longitudinally, it has been shown that active goal-oriented coping lessened symptoms of anxiety, and seeking social support decreased depressive symptoms, but venting emotions, alcohol/drug use and distraction had a negative impact on psychological well-being (Vollrath, Alnaes, & Torgersen, 1996).

The link between emotion regulation and physical health has been examined less frequently, and mostly in terms of physical symptoms or self-assessed health. It has been argued that inhibition (Berry & Pennebaker, 1993; Pennebaker, 1990, 1992; Pennebaker & Traue, 1992), suppression (Gross, 1998; Gross & Levenson, 1993), ruminating and day-dreaming (Higgins & Endler, 1995), and an alexithymic emotion regulation deficiency in which difficulties are experienced in identifying and describing feelings to others (Deary, Scott, & Wilson, 1997; Lumley, Stettner, & Wehmer, 1996) are detrimental to physical health. In addition, behaviours (e.g., eating, substance use, sex) used to up-regulate or down-regulate emotions can also influence health when they become frequent, intense, and of long duration (Mayne, 2001; see also Mayne, 1999). In contrast, regulating negative emotions by the use of trait-Repair has been found to be related to less physical symptoms (Salovey, Stroud, et al., in press) and to a lower likelihood of getting sick and fewer health centre visits (Goldman, Kraemer, & Salovey, 1996); and using instrumental mastery-oriented coping appears to be linked to fewer complaints about pain and gastrointestinal problems (Eriksen, Olff, & Ursin, 1997).

1.5 The aims of the present study

Up to the present, the research disciplines of personality and emotion regulation, personality and physical health, and emotion regulation and physical health have been seen as separate. In the present study my intention was to examine the associations between these three domains from a longitudinal perspective. More specifically, the focus was on the role of prior personality characteristics in strategic emotion regulation, emotion dysregulation, and in physical health in adults.

My study was divided into two parts. In *the first part* (Studies I-III), I concentrated mainly on the personality precursors of adults' cognitive and social emotion regulation strategies. The specific research questions and hypotheses were as follows:

Study I

Do personality characteristics reflecting self-control of emotions at age 8 account for the use of the emotion regulation strategies of Repair, Dampening, and Maintenance as well as the personality characteristics reflecting self-control of emotions at age 36?

It was hypothesized that low self-control of emotions (indexed by aggression, shifting moods, inattentiveness, and anxiety) at age 8 would account for the low use of Repair, Dampening, and Maintenance and the personality characteristics reflecting low self-control of emotions (indexed by aggression, impulsivity, anxiety, and emotional ambivalence) at age 36. On the other hand, high self-control of emotions (indexed by compliance, emotional stability, and constructiveness) at age 8 was assumed to account for the high use of Repair, Dampening, and Maintenance, and the personality characteristics reflecting high self-control of emotions (indexed by inhibition of aggression, cognitive control, and socialization) at age 36.

Furthermore, does the use of emotion regulation strategies account for the heterotypic continuity of self-control of emotions between ages 8 and 36 ?

Heterotypic continuity means that a particular attribute at one age is predictive of a phenotypically different but theoretically reasonable attribute at a later age (Kagan, 1971). Therefore, behaviours may change in form, while still reflecting the same basic process (Rutter, 1989). It was hypothesized that low self-control of emotions (indexed by aggression, shifting moods, inattentiveness, and anxiety) at age 8 would show heterotypic continuity in low self-control of emotions (indexed by aggression, impulsivity, anxiety, and emotional ambivalence) at age 36 via the low use of Repair, Dampening, and Maintenance. On the other hand, high self-control of emotions (indexed by compliance, emotional stability, and constructiveness) at age 8 was assumed to show heterotypic continuity in high self-control of emotions (indexed by inhibition of aggression, cognitive control, and socialization) at age 36 via the high use of Repair, Dampening, and Maintenance.

Study II

Do the Big Five personality traits at age 33, factor alpha (i.e., Emotional Stability/ Neuroticism, Agreeableness, and Conscientiousness) and factor beta (i.e., Extraversion, Openness to Experience) explain the use of Repair, Dampening, and Maintenance at age 36 either directly or indirectly via current mood and its cognitive evaluation?

The Big Five personality traits have been interpreted in terms of factors alpha and beta by Digman (1997). It was expected that factor alpha (Emotional Stability / Neuroticism, Agreeableness, and Conscientiousness) would account for the use of cognitive emotion regulation strategies more than factor beta (Extraversion, Openness to Experience). It was also assumed that Neuroticism would account for the lower use of Repair, Dampening, and Maintenance, whereas Extraversion was expected to explain higher use of these strategies. In addition, the effects of the Big Five personality traits were hypothesized to be indirect via current mood and its cognitive evaluation, and vary by sex.

Study III

Do the Big Two personality traits, Extraversion and Neuroticism, measured at ages 27 and 33, explain emotion regulation (indexed by the use of Repair, and Emotional Social Support) and emotion dysregulation (indexed by Emotional Ambivalence) at age 36?

In comparison with the second study, this study narrowed its explanatory variables down to the Big Two personality traits, Extraversion and Neuroticism. On the other hand, this study extended its concerns from cognitive emotion regulation only, to both cognitive and social emotion regulation, and dysregulation, and covered a longer time span than the second study. It was hypothesized that Extraversion would explain high emotion regulation and low emotion dysregulation, whereas Neuroticism would explain high emotion dysregulation and low emotion regulation. In addition, it was assumed that the impact of Extraversion and Neuroticism would show stability, or differential continuity (Caspi, 1998; Caspi & Roberts, 1999).

In *the second part* of the study (Studies IV-V), my general focus was on the explanatory role of the personality characteristics of low self-control of emotions and behavioural expression in physical health. I also examined the possible mediation of the use of Repair and health-related behaviour in this relationship. My specific research questions and hypotheses were as follows:

Study IV

Do low self-control of emotions (indexed by aggression, shifting moods, inattentiveness, and anxiety at age 8; Neuroticism at age 27) and the low use of Repair at age 36 explain self-reported physical symptoms at age 36?

It was expected that low self-control of emotions at ages 8 and 27 would account for self-reported physical symptoms at age 36. It was also hypothesized that the effect of prior low self-control of emotions on self-reported physical symptoms would be indirect via low use of Repair. Furthermore, sex differences were expected to emerge.

Study V

Do the personality characteristics of low self-control of emotions and behavioural expression at age 14 explain health-related behaviours (i.e., exercise, tobacco use, heavy drinking) at age 36, and various physical health outcomes at age 36 both directly and indirectly via health-related behaviours at age 36?

It was hypothesized that low self-control of emotions at age 14 would be linked to health-related behaviours at age 36. Additionally, it was expected to have both a direct and an indirect effect on physical health outcomes at age 36 via health-related behaviours in both sexes. Furthermore, behavioural expression at age 14 was expected to relate to physical health outcomes at age 36 directly and indirectly in men only.

2 METHOD

2.1 Participants and procedure

The participants of the present study derive from the ongoing Jyväskylä Longitudinal Study of Personality and Social Development, conducted by Professor Lea Pulkkinen in Jyväskylä, a medium-sized town in central Finland, since 1968 (for details, see Pulkkinen 1982, 1998). The original sample (173 girls and 196 boys, second-graders, ethnically Finnish, mean age 8 years, 3 months) consisted of 12 school forms drawn randomly from urban and suburban elementary schools of Jyväskylä. The present study is based on the first data collection in 1968 and those of the follow-ups carried out in 1974 (at age 14), 1986 (at age 27), 1992 (at age 33), and the most recent in 1995 (at age 36). I participated in the 1995 data collection.

At the ages of 8 (173 girls; 196 boys) and 14 (167 girls, 97% of the original sample; 189 boys, 96% of the original sample), the data were collected mainly by teacher rating of participants' socio-emotional behaviour. At age 27 (155 women, 90% of the original sample; 166 men, 85% of the original sample), the data were drawn from a semi-structured, tape-recorded interview, a mailed Life Situation Questionnaire (LSQ1), and two personality inventories. One of the personality inventories was the standardized Finnish version (Haapasalo, 1990) of the Eysenck Personality Inventory (ECQ; Eysenck & Eysenck, 1975). At age 33, participants were mailed a Big-Five Personality Inventory (Pulver, Allik, Pulkkinen, & Hämäläinen, 1995), which was returned by 126 women (73% of the original sample) and 122 men (62%). At age 36, a mailed Life Situation Questionnaire (LSQ2) was returned by 150 women (87% of the original sample) and 161 men (83%; two men had died); and 137 women (79%) and 146 men (75%) participated in a semi-structured, tape-recorded interview. In addition, they filled in 20 questionnaires during the interview, for example, Mayer and Stevens'(1994) Meta-Regulation Scale (MRS) and Meta-Evaluation Scale (MES), the Brief Mood Introspection Scale (MBI; Mayer & Gaschke, 1988), the Ambivalence Over Expressiveness Questionnaire (AEQ; King & Emmons, 1990), and the Self-Control Schedule (SCS; Rosenbaum, 1980). In addition, two questionnaires, for example, the Karolinska Scales of Personality (KSP; af Klinteberg, Schalling, & Magnusson, 1986, 1990) were given to be completed at home and sent back in prepaid envelopes.

Sample attrition analyses at ages 27 and 36 showed that the participants

were representative of the original random sample; participants and non-participants did not differ from each other with regard to socio-emotional behaviour and school success measured at ages 8 and 14. Attrition at age 36 was higher among the participants who were problem drinkers at age 27 than among the rest. Education, however, was not a reason for attrition from age 27 to 36. In comparison with the data derived from Statistics Finland (1994), the participants at age 36 also unbiasedly represented their age cohort (born in Finland in 1959) with respect to marital status (10% of the women and 16% of the men were single, 57% of the women and 59% of the men were married, 21% of the women and 20% of the men were cohabiting, 12% of the women and 6% of the men were divorced), number of children, and unemployment (13% of the women and 17% of the men were unemployed or redundant).

2.2 Measures

The study variables fell into three categories: 1) personality variables; 2) emotion regulation, dysregulation, and mood-related variables; and 3) variables relating to physical health and health-related behaviour. Their positions and the alpha coefficients of the sum scores are given in Table 1.

2.2.1 Personality variables

Personality characteristics were derived in childhood (at ages 8 and 14) from teacher ratings, and in adulthood (at ages 27, 33, and 36) from self-reported questionnaires. *At age 8*, class teachers were asked to rate each pupil in the class on 33 items by using a scale from 0 = teacher has never observed the characteristic in question to 3 = the characteristic in question is very prominent. Variables based on standardized z-scores reflected the model of emotional and behavioural regulation (Pulkkinen, 1995, 1996). Variables indicating low self-control of emotions were as follows: *Aggression*, a sum score of four variables, for example,'Hurts another child when angry, for example, by hitting, kicking, or throwing something'; *Shifting Moods*, a single variable, i.e. 'Is sometimes very touchy and sometimes a really nice chum'; *Inattentiveness*, a single variable, i.e. 'Is unsteady and lacks concentration in his/her work and attentiveness'; and *Anxiety*, a sum score of three variables, for example, 'Starts crying easily if others treat him/her nastily'. Variables indicating high self-control of emotions consisted of *Compliance*, a sum score of three variables, for example, 'Is peaceable and patient'; *Emotional Stability*, a sum score of the variables 'Always tries to be friendly to others' and 'Is considered reliable'; and *Constructiveness*, a sum score of three variables, for example,' Thinks that if one negotiates, everything will be better'. The dimension of behavioural expression vs. inhibition was depicted by two variables: *Activity*, a single variable, i.e. 'Is always busy and plays eagerly with other children'; and *Passivity*, a sum score of the variables 'Is always silent and does not like being busy' and 'Is too withdrawn and timid'. *At age 14*, two factors labelled '*Self-Control of Emotions*' and '*Behavioural Expression*' were drawn from similar teacher-rated single variables using a multiple correspondence analysis (for more details, see Kokko, Pulkkinen, & Puustinen, 2000). At age 8, boys scored higher in aggression, shifting moods, and inattentiveness (low self-control of emotions), whereas girls were more constructive, compliant, emotionally stable (high self-control of emotions), and

TABLE 1 Summary of the variables and methods used in studies I-V.

Study	Longitudinal data	Variables	Statistical methods
Study I	At age 8: 196 boys 173 girls At age 36: 140 men 128 women	Independent variables at age 8: - Aggression α = .86 - Shifting moods - Inattentiveness - Anxiety α = .69 - Compliance α = .84 - Constructiveness α = .84 - Emotional Stability α = .79 Dependent variables/Mediators at age 36: - Repair α = .73 - Dampening α = .48 (♀) - Maintenance α = .56 - Aggression α = .80 - Inhibition of Aggression α = .72 - Impulsivity α = .74 - Anxiety α = .91 - Emotional Ambivalence α = .72 - Socialization α = .86 - Cognitive Control α = .53 - Unsuccessful Control α = .70	Pearson product-moment correlations Principal Axis Factor analysis with varimax rotation Student's *t* test for independent samples Two-way multivariate analysis of variance Sheffe's test Path analysis
Study II	At age 33: 122 men 126 women At age 36: 140 men 127 women	Independent variables at age 33: - Neuroticism α = .92 - Extraversion α = .88 - Openness to Experience α = .91 - Agreeableness α = .79 - Conscientiousness α = .82 Dependent variables/Mediators at age 36: - Negative Mood α = .78 - Positive Mood α = .80 - Active Mood α = .60 - Calm Mood α = .77 - Mood Influence α = .60 - Mood Typicality and Acceptance α = .67 - Mood Clarity α = .43 - Repair α = .73 - Dampening α = .48 (♀) - Maintenance α = .56	Pearson product-moment correlations Student's *t* test for independent samples Path analysis
Study III	At ages 27, 33, and 36: the same 81 men and 89 women	Exogenous variables at age 27/33: - Neuroticism α = .72 / α = .92 - Extraversion α = .77 / α = .88 Endogenous variables at ages 36: - Repair α = .73 - Emotional Ambivalence α = .72 - Emotional Social Support α = .71	Pearson product-moment and disattenuated correlations Student's *t* test for independent samples Structural Equation Modelling with multisample analysis

(continues)

TABLE 1 (continues)

Study	Longitudinal data	Variables	Statistical methods
Study IV	At ages 8, 27, and 36: the same 112 men and 112 women	Independent variables at age 8: - Aggression α = .86 - Shifting moods - Inattentiveness - Anxiety α = .69 Dependent variables/Mediators at ages 27 and 36: - Neuroticism α = .92 - Repair α = .73 - Gastrointestinal problems α = .66 - Problems of cardiovascular and nervous systems α = .62 - Fatigue α = .75 - Pain α = .62	Pearson product-moment correlations Student's *t* test for independent samples Structural Equation Modelling
Study V	At ages 14 and 36: the same 129 men and 123 women	Independent variables at age 14: - Low self-control of emotions - Behavioural expression Dependent variables/Mediators at age 36: - Exercise habit - Tobacco use - Heavy drinking - Self-reported physical symptoms α = .80 - Self-assessed health - Accidents and traumas - Chronic diseases - Disabilities - Medicine use	Pearson product-moment correlations Student's *t* test for independent samples Cross tabulations Path analysis

passive. Also at age 14, girls scored higher in self-control of emotions.

At age 27, personality traits of *Neuroticism* and *Extraversion* were measured using the standardized version (Haapasalo, 1990) of the ECQ (Eysenck & Eysenck, 1975), which consists of 101 items assessing extraversion, neuroticism, and psychoticism. The response scale was: 0 = no, 1 = yes. Extraversion was a sum score of 21 items, and Neuroticism was a sum score of 23 items. At age 33, the Big Five personality traits were measured using an authorized, 181-item adaptation of the NEO Personality Inventory (NEO-PI; Costa & McCrae, 1985) called the Big-Five Personality Inventory (Pulver et al., 1995) in which about one-quarter of the items are substitutes for the original American items. The response scale ranged from 1 = strongly disagree to 5 = strongly agree. The sum scores, based on five factors extracted from both the Finnish and Estonian samples, were *Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness*. Women scored higher than men in Openness to Experience and Agreeableness.

At age 36, personality was measured using the KSP (af Klinteberg et al.,1986, 1990), the Aggression Questionnaire (Buss & Perry, 1992), the AEQ (King & Emmons, 1990), and the SCS (Rosenbaum, 1980). In all the measures, the response scale ranged from 1 = describes me very badly to 4 = describes me very well.

Aggression was a 12-item sum score based on six items from the Aggression Questionnaire (Buss & Perry, 1992), two items from Pulkkinen (1987), and four items from the Verbal Aggression Scale of the KSP (af Klinteberg et al.,1986, 1990). The nine-item sum scores for *Inhibition of Aggression* and *Impulsivity*, the 30-item sum score for *Anxiety*, and the 20-item sum score for *Socialization* were all based on the KSP (af Klinteberg et al., 1986, 1990). *Emotional Ambivalence/Conflict over emotional expression* was a sum score of seven items derived from the AEQ (King & Emmons, 1990), and the 5-item sum score of *Unsuccessful Control* and 7-item sum score of *Cognitive Control* were based on the SCS (Rosenbaum, 1980).

2.2.2 Emotion regulation, dysregulation, and mood-related variables

Emotion regulation and dysregulation were studied at age 36 using self-reports. The modified, seven-item MRS (Mayer & Stevens, 1994) was used to assess three active, conscious, cognitive state-like emotion regulation strategies: 1) *Repair* - the sum score of the items 'I am imagining something better to improve my mood' and 'I am planning positive things to keep my mood going'; 2) *Dampening* - in women, the sum score of the items 'I am trying to restrain too positive or too negative moods' and 'It is so high that I am trying to bring myself down to better concentrate'; in men Dampening was measured by the single item ' I am trying to restrain my negative mood so that it will not cause difficulties'; and 3) *Maintenance* - the sum score of the items 'I would not want to change this mood' and 'I am not trying to change it because I believe it is important to experience'. The response scale ranged from 1 = does not describe my mood at all to 4 = describes my mood very well. *Emotional social support* was a sum score of eight LSQ2 items concerning number of close friends (from 0 = none to 3 = several), the extent to which the participants spent their leisure time associating with friends or acquaintances (1 = not at all to 3 = mainly), satisfaction with present friendly relations (from 1 = very unsatisfied to 4 = very satisfied), the number of people among family members/relatives, friends, and fellow workers or students with whom the participants discussed their personal matters and problems (from 0 = none to 3 = several for each), the availability of social support (from 1 = strongly disagree to 4 = strongly agree), and gratitude for support (from 1 = strongly disagree to 4 = strongly agree). The indicator of emotion dysregulation, *Emotional Ambivalence*, was a sum score of four items reflecting the desire to express emotion and being unable to do so, for example, 'Often I'd like to show others how I feel, but something seems to be holding me back', and three items reflecting the expressing of emotion and later regretting it, for example, 'I worry that if I express negative emotions such as fear and anger, other people will not approve of me'. The response scale of the AEQ (King & Emmons, 1990) ranged from 1 = describes me very badly to 4 = describes me very well.

The 16 adjectives of the BMI (Mayer & Gaschke, 1988) were used to assess participants' current mood at the beginning of the interview at age 36. The sum scores of *Negative Mood* (five adjectives), *Positive Mood* (two adjectives), *Active Mood* (three adjectives), and *Calm Mood* (four adjectives) reflected the valence and arousal dimensions of current mood. The response scale ranged from 1 = does not describe my mood at all to 4 = describes my mood very well.

The modified, nine-item version of the MES (Mayer & Stevens, 1994) was used to measure participants' conscious evaluation of their current mood: 1) *Mood Influence* - a sum score of four items, for example, 'My mood might make me act without considering the consequences'; 2) *Mood Typicality and Acceptance* - a sum

score of the items 'I am in this mood often' and 'There is nothing wrong with it', in which men scored higher than women; and 3) *Mood Clarity* - a sum score of 'It is hard to describe' and 'I know exactly how I am feeling'. The response scale ranged from 1 = does not describe my mood at all to 4 = describes my mood very well.

2.2.3 Variables relating to physical health and health-related behaviour

Physical health and health-related behaviour were assessed at age 36 by self-reports. For physical health, a total of ten variables were created. Five of them were taken from an 18-item symptom check-list based largely on the questionnaire by Aro (1988): *Gastrointestinal problems*, a sum score of three items, for example, 'heartburn or acid dyspepsia'; *Fatigue*, a sum score of two items, for example, 'tiredness and weakness'; *Problems of the cardiovascular and nervous systems*, a sum score of six items, for example, 'heart palpitations or irregular heart beats'; *Pain*, a sum score of two items, for example, 'low-back pain'; and *Self-reported physical symptoms*, a sum score of all 18 items. The response scale ranged from 1 = never to 4 = very often. *Self-assessed health* was measured with a question 'How was your health during the last year?'. The response scale ranged from 1 = very good to 5 = very poor. *Accidents or traumas* were studied by the question 'How many times have you been examined or treated because of an accident or trauma?' In this variable men scored higher than women. *Chronic diseases* were studied by the question 'Do you have some long-term diseases that affect your working and functional capacity?' *Disabilities* were clarified by the question 'Do you have a disability that affects your working and functional capacity?' Responses to the questions on accident and traumas, chronic diseases, and disabilities were coded into a dummy variable (0 = no, 1 = one or more). Finally, *medicine use* was studied by the question 'Do you take permanently any medication prescribed by a physician?' Responses were given on a two-point scale: 0 = no, 1 = yes.

Health-related behaviours were elicited by the mailed LSQ2. *Exercise habit* was elicited by the question 'To what extent do you spend your leisure time for physical exercise and sports?' Responses were coded into a dummy variable: 0 = no time used for physical exercise and sports, 1 = a little or most of the leisure time used for physical exercise and sports. *Life-time tobacco use* was investigated by the question 'Do you smoke or have you ever smoked?' For the data analysis, responses were coded from 1 = never been a regular smoker to 3 = uses tobacco products daily'. *Heavy drinking*, in which men engaged more frequently than women, was studied by the question 'How often in the last 12 months have you consumed so much alcohol that you have been very drunk?' The response scale ranged from 1 = not once to 7 = a couple of times a week or more often.

2.3 Methods of data analysis

Following the variable-oriented approach, the data analysis, in all five studies, included Pearson product-moment correlations to reveal interrelationships between the study variables, z transformation (McNemar, 1969) to test the equality of the correlation coefficients between men and women, and Student's *t* tests and/or cross-tabulations to investigate sex differences in the study variables. In all studies, Structural Equation Modelling (SEM) utilizing either LISREL 7.20 (Jöreskog & Sörbom, 1989) or 8.14 (Jöreskog & Sörbom, 1996) was employed to examine the direct and indirect (mediated) effects of personality characteristics. Path analysis,

a subtype of SEM including measured variables only, was used in Studies I - II, and V. Latent variable SEM was used in Studies III - IV. Studies II and V included alternative model comparisons. Study III included a multisample analysis. In addition to these methods, Principal Factor Analysis (PAF) with Varimax rotation was computed for data reduction in Studies I and II, and two-way multivariate analysis of variance (MANOVA), followed by Sheffe's test of pairwise comparisons, was conducted in Study I.

3 OVERVIEW OF THE ORIGINAL STUDIES

Study I

Kokkonen, M., & Pulkkinen, L. (1999). Emotion regulation strategies in relation to personality characteristics indicating low and high self-control of emotions. *Personality and Individual Differences*, 27, 913-932.

The main focus of the first study was on the explanatory role of childhood personality characteristics indicating self-control of emotions in the use of the cognitive emotion regulation strategies of Repair, Dampening, and Maintenance in adulthood. This study also addressed the question of the heterotypic continuity of self-control of emotions between ages 8 and 36, and the possible role of Repair, Dampening, and Maintenance in this continuity. At age 8, teachers rated 196 boys and 173 girls according to their socio-emotional behaviour, and at age 36, the followed-up 140 men and 128 women filled in several inventories concerning, for example, personality and emotion regulation.

The findings showed that, in general, personality characteristics reflecting low self-control of emotions at age 8 accounted for lowered use of the studied emotion regulation strategies at age 36, as expected, despite the length of the interval between the measurement points. In men, self-control of emotions at age 8 was also linked to self-control of emotions at age 36. This hypothesized heterotypic continuity of self-control of emotions in men was found to be partially explained by the mediation of the intervening strategies of Repair and Dampening: compliance at age 8 was linked to lower anxiety, lower inhibition of aggression, and lower unsuccessful control at age 36 via higher use of Repair. At the same time, shifting moods at age 8 was linked to higher emotional ambivalence at age 36 via lower use of Dampening.

It should be noted, however, that at age 8 the personality characteristics of low self-control of emotions which accounted for lowered use of different emotion regulation strategies at age 36 in men differed from those in women. In men, childhood aggression, shifting moods, and inattentiveness were related to lowered use of the intervening strategies of Repair and Dampening at age 36. In women, childhood aggression and shifting moods were linked to lowered use of Maintenance. Additionally, childhood high self-control of emotions marked by compliance accounted for men's higher use of Repair at age 36, whereas in women childhood high self-control of emotions did not explain the use of any of the studied emotion regulation strategies in adulthood. In women, self-control of emotions between ages 8 and 36 did not show heterotypic continuity either.

Study II

Kokkonen, M., & Pulkkinen, L. (2001). Examination of the paths between personality, current mood, its evaluation, and emotion regulation. ***European Journal of Personality, 15,*** **83 - 104.**

The second study concentrated on the participants' adult years, and was designed longitudinally to find out whether the Big Five personality traits measured at age 33 accounted either directly or indirectly via current mood and cognitive mood evaluation for the use of Repair, Dampening, and Maintenance at age 36. Data based on self-reports was derived from 122 men and 126 women at age 33, and 140 men and 127 women at age 36.

The findings revealed, as assumed, that factor alpha accounted for the use of Repair, Dampening, and Maintenance more significantly than factor beta. Also as expected, Neuroticism was generally associated with lowered attempts to repair, dampen, or maintain emotions. This result held especially in men. The expectation about the link between Extraversion and higher use of Repair, Dampening, and Maintenance was confirmed only in part. In women Extraversion was not connected to use of the studied emotion regulation strategies, and in men its impact depended on current mood and its cognitive evaluation.

Path analysis lent support to the hypothesized mediational model which, on comparison with alternative models, also showed that the effects of the Big Five personality traits on the use of Repair, Dampening, and Maintenance were mainly indirect through current mood and its cognitive evaluation. In other words, it was found that individual differences in prior personality traits rendered both men and women susceptible to different moods, which, in turn, they evaluated differently. These evaluations led to the adoption of different cognitive emotion regulation strategies.

The results concerning the expected sex differences can be summarized in three ways. *Firstly,* a closer look at the statistically significant differences in the correlation coefficients between men and women showed that, in general, the Big Five personality traits were significantly less frequently and/or less strongly related to mood evaluation and the use of emotion regulation strategies in women. Additionally, current mood was less strongly associated with mood evaluation and less frequently linked to the use of emotion regulation strategies in women. Furthermore, intercorrelations among mood evaluations as well as among emotion regulation strategies in women were lower than in men, although in the same direction. *Secondly,* the path analysis suggested that factors alpha and beta explained the use of emotion regulation strategies in women and men differently. Only the traits belonging to factor alpha were indirectly linked to women's use of Repair, Dampening, and Maintenance, whereas traits reflecting both factors accounted for men's use of those strategies. As for factor alpha, the composition of the traits theoretically belonging to this factor varied between the women's and men's path models. In women, Neuroticism and Conscientiousness indirectly explained the use of Repair, Dampening, and Maintenance. In men, Neuroticism and Agreeableness were the factor alpha-related antecedents of the use of those strategies. *Finally,* the path analysis also indicated that in women current mood and its cognitive evaluation functioned as mediators between the Big Five personality traits and the emotion regulation strategies to a lesser extent than in men, which together with the lower number of the explanatory Big Five personality traits led to the fact that a smaller proportion of the variance among the emotion regulation strategies was accounted for in women than in men.

In sum, this study demonstrated that the prior Big Five personality traits predisposed people to certain moods, certain mood evaluations and, finally, to attempts to cognitively regulate or not regulate emotions. However, the effects of the traits varied considerably between the sexes.

Study III

Kokkonen, M., & Pulkkinen, L. (in press). Extraversion and neuroticism as antecedents of emotion regulation and dysregulation in adulthood. ***European Journal of Personality.***

In this, the third study, the possible explanatory variables were narrowed down to the Big Two personality traits, Extraversion (E) and Neuroticism (N), but the time span was extended from three years to nine years, and outcomes extended from cognitive emotion regulation only, to both cognitive and social emotion regulation, and dysregulation. The specific goal was to examine the contribution of prior E and N for later emotion regulation (indexed by the use of Repair and Emotional Social Support) and dysregulation (indexed by Emotional Ambivalence) in adults. The data were drawn from the self-reports of the same 81 men and 89 women measured at ages 27, 33, and 36. At age 33, the women belonging to the sample were less neurotic than the rest of the female participants at the .01 level.

As expected, prior N led to higher emotional ambivalence, and to lower use of Repair. In contrast, prior E was linked to higher use of emotional social support and lower emotional ambivalence. The relationship between prior E and later use of Repair was negative, which was the opposite of our assumption. Emotional social support itself was more frequently used among women than men. In addition to the SEM based findings, correlations demonstrated that E and N showed differential continuity between ages 27 and 33.

Taken together, the results highlighted the explanatory role of prior E and N in adults' subsequent emotion regulation and dysregulation and generally demonstrated, as expected, that E is typically associated with high social emotion regulation and low emotion dysregulation, while N is connected to high emotion dysregulation and low cognitive emotion regulation.

Study IV

Kokkonen, M., Pulkkinen, L., & Kinnunen, T. (2001). Low self-control of emotions as an antecedent of self-reported physical symptoms: A longitudinal perspective. ***European Psychologist, 6,*** **26-35.**

The main purpose of the fourth study was to investigate longitudinally whether personality characteristics indicating low self-control of emotions at ages 8 (indexed by aggression, shifting moods, inattentiveness, and anxiety) and 27 (indexed by Neuroticism), and lower use of Repair at age 36 accounted for self-reported physical symptoms at age 36. The sample consisted of the same 112 men and 112 women, from whom data were gathered by teacher ratings at age 8 and by self-reports at ages 27 and 36.

Supporting the proposed hypothesis, personality characteristics indicating low self-control of emotions at ages 8 and 27 accounted for self-reported physical symptoms at age 36 in both sexes at the correlational level. As expected, however, sex differences emerged. In men, inattentiveness at age 8 was linked to gastrointestinal problems at age 36. Neuroticism at age 27 was additionally related to gastrointestinal

problems, symptoms of cardiovascular and nervous systems, and fatigue at age 36. In women, shifting moods at age 8 correlated with pain at age 36, and aggression at age 8 was associated with fatigue at age 36. In general, test of equality between the statistically significant correlation coefficients for men and women showed that the study variables were significantly more frequently associated with each other among men, and in those cases where the direction of the correlation between two variables was the same in both sexes, the correlation was significantly lower in women.

Further examination based on latent variable SEM revealed that for men only inattentiveness at age 8 was positively linked to Neuroticism at age 27, which was related to self-reported physical symptoms at age 36. There was, however, an indirect additional path from Neuroticism at age 27 to lower use of Repair, which, in turn, also resulted in self-reported physical symptoms at age 36. This finding testified to the assumed central role of emotion regulation in the relationship between personality and health in men; the impact of prior low self-control of emotions, that is inattentiveness and Neuroticism, on subsequent self-reported physical symptoms was partially indirect, mediated by lowered use of Repair. At the same time, the link between inattentiveness at age 8 and Neuroticism at age 27 were in line with the finding in Study I on the heterotypic continuity of low self-control of emotions over time. In women, prior low self-control of emotions did not account for the lowered use of Repair later in life, as already demonstrated in Study I, and the lowered use of Repair did not account for the relationship between prior low self-control of emotions and subsequent self-reported physical symptoms.

Study V

Kokkonen, M., Kinnunen, T., & Pulkkinen, L. (in press). Direct and indirect effects of adolescent self-control of emotions and behavioural expression on adult health outcomes. ***Psychology and Health.***

In the fifth study a mediational model linking personality characteristics of low self-control of emotions and behavioural expression at age 14 to various self-reported health outcomes at age 36 (physical symptoms, self-assessed health, accidents and traumas, chronic diseases, disabilities, and medicine use) via self-reported health-related behaviours at age 36 (exercise, tobacco use, and heavy drinking) was tested. The sample consisted of the same 129 men and 123 women, from whom data were gathered by teacher ratings at age 14, and by self-reports at age 36.

The findings showed, as expected, that low self-control of emotions in adolescence accounted for health-related behaviours in adulthood. In both sexes, low self-control of emotions at age 14 was related to tobacco use and heavy drinking at age 36. According to the hypothesized mediational model, low self-control of emotions in adolescence also had both direct and indirect effects on adults' self-reported physical health via tobacco use and heavy drinking. In men, low self-control of emotions at age 14 was related to disabilities at age 36 directly, and self-assessed poor health and physical symptoms at age 36 indirectly via heavy drinking at age 36. In women, low self-control of emotions at age 14 was linked to disabilities, self-assessed poor health and physical symptoms at age 36 via high tobacco use at age 36. Furthermore, low self-control of emotions at age 14 was related to self-assessed good health at age 36 via heavy drinking.

Path analysis further showed that behavioural expression at age 14 was

directly related to disabilities at age 36 in men, while in women it did not turn out to be linked to health outcomes at all. In brief, the results indicated that the personality characteristics marking emotional and behavioural regulation in adolescence explained self-reported health in adulthood differently in men and women, and mostly indirectly through health-risk behaviours.

4 GENERAL DISCUSSION

4.1 Main findings

The aim of this series of prospective longitudinal studies over a time span of 28 years was twofold: firstly, to investigate the personality precursors of adults' subsequent emotion regulation and dysregulation, and secondly, to examine the explanatory role of prior personality characteristics and emotion regulation in adults' physical health. In Study I, adults' active, conscious, and cognitive emotion regulation strategies of Repair, Dampening, and Maintenance were studied in relation to personality characteristics indicating low and high self-control of emotions at ages 8 and 36. In Study II, the mediational model connecting the prior Big Five personality traits to these cognitive emotion regulation strategies via current mood and its cognitive evaluation was tested. In Study III, the explanatory role of the Big Two personality traits, measured at ages 27 and 33, in both cognitive and social emotion regulation, and dysregulation at age 36, was investigated. In Study IV, the direct and indirect effects of personality characteristics indicating low self-control of emotions, manifested in aggression, shifting moods, inattentiveness, and anxiety at age 8, and in Neuroticism at age 27, on self-reported physical symptoms at age 36, and the mediating role of Repair were studied. In Study V, the mediational model linking the personality characteristics of low self-control of emotions and behavioural expression at age 14 to various self-reported health outcomes at age 36 through self-reported health-related behaviours was tested. I will now outline the main findings and the conclusions based on them.

The findings revealed that prior personality characteristics indicating low self-control of emotions accounted for adults' lowered subsequent use of the cognitive emotion regulation strategies of Repair, Dampening, and Maintenance. Additionally, self-control of emotions showed heterotypic continuity over the 28 years. In men, this continuity was partially explained by the mediating role of Repair and Dampening. The findings concerning the prior Big Five personality traits showed that their impact on the later use of the strategies studied was mostly indirect via current mood and its cognitive evaluation. It also varied considerably according to sex. Furthermore, in both sexes Extraversion generally led to high social emotion regulation and low emotion dysregulation, whereas Neuroticism led to low cognitive emotion regulation and high emotion dysregulation. Prior

personality characteristics reflecting low self-control of emotions further accounted for self-reported poor physical health in adulthood. The detrimental impact of low self-control of emotions on self-reported physical health, which varied considerably by sex, was mostly indirect via lowered attempts to repair negative emotions in a more positive direction, and via such health-risk behaviours as high tobacco use and heavy drinking. The effects of prior personality characteristics reflecting low self-control of emotions on self-reported physical health also varied considerably by sex.

Concurrent work on emotion regulation has largely focused on the contribution of social (e.g., Calkins & Johnson, 1998), contextual (e.g., Zeman & Garber, 1996), and physiological (e.g., Luu et al., 2000) factors. Unlike most previous studies, the present study clearly demonstrated that prior personality characteristics predisposed individuals to the adoption or non-adoption of different emotion regulation strategies. It was found that teacher-rated personality characteristics at ages 8 and 14 as well as the Big Five personality traits at ages 27 and 33 contributed to emotion regulation and dysregulation at age 36. This finding strengthened the findings of the earlier cross-sectional studies conducted within the domains of stress and coping (e.g., Halamandaris & Power, 1999; McCrae & Costa, 1986; Watson & Hubbard, 1996) and of emotional intelligence (Davies et al., 1998). Also consistent with the previously found links between the Big Two personality traits and concurrent (mal)adaptive ways of managing emotions (e.g., Ciarrochi et al., 2000; Davies et al., 1998; McCrae & Costa, 1986; Watson & Hubbart, 1996), the present study suggested that in general Extraversion accounted for high emotion regulation, especially social emotion regulation, and low emotion dysregulation, whereas Neuroticism accounted for low cognitive emotion regulation and high emotion dysregulation. However, the earlier knowledge on the role of the personality traits in emotion regulation was further extended by the novel finding concerning the indirect effects of the Big Five personality traits on the use of cognitive emotion regulation strategies. It was found that the link between the Big Five personality traits and the use of Repair, Dampening, and Maintenance was partially mediated by current mood and its cognitive evaluation.

Theoretically, scholars have argued that emotion regulation has four main functions: the reduction of stressful levels of emotions (Cicchetti et al., 1995; Grolnick et al., 1996; Kopp, 1989), the prevention of maladaptive behaviour (Cicchetti et al., 1995; Cicchetti et al., 1991), emotional openness and flexibility (Labouvie-Vief et al., 1989; Mayer & Salovey, 1997; Walden & Smith, 1997), and the service of several social functions at the interpersonal level (Manstead & Fischer, 2000). The results of the present study demonstrating the heterotypic continuity of self-control of emotions between ages 8 and 36 suggested that in addition to its previously proposed functions, emotion regulation, measured in terms of cognitive emotion regulation strategies, might serve a further goal. In men, the heterotypic continuity of self-control of emotions was partially mediated by the intervening emotion regulation strategies: shifting moods at age 8 was related to higher emotional ambivalence at age 36 via lower use of Dampening. In contrast, compliance at age 8 was linked to lower anxiety, lower inhibition of aggression, and lower unsuccessful control at age 36 via higher use of Repair. Thus, at least in men, the use of cognitive emotion regulation strategies seemed to have an additional function in modulating the heterotypic continuities of low and high self-control of emotions from childhood to adulthood.

By adopting the joint personality-emotion regulation approach to self-reported physical health, the present study succeeded in avoiding the previous shortcomings

of selected samples, inclusion of only a single personality trait or health-related behaviour, cross-sectional data (Caspi et al., 1997; Friedman, 2000), and the neglect of processes which might help to explain the relationship between personality and health (Contrada et al., 1999). The present study stressed the mediating effects of both health-risk behaviours and the lowered use of Repair in the relationship between personality and physical health. In accordance with earlier notions concerning the link between emotional lability and poor physical health (e.g., Deary et al., 1997; Murberg et al., 1997; Smith & Williams, 1992; Suls et al., 1995), and the repeatedly found relationship between hostility, impulsivity, Neuroticism, and high substance abuse (e.g., Bermudez, 1999; Cooper, Agocha, & Sheldon, 2000), it was found that personality characteristics reflecting low self-control of emotions, that is aggression, shifting moods, and inattentiveness at age 14 were related, indirectly for the most part through high tobacco use and heavy drinking, to self-reported poor physical health at age 36. This finding was also in line with Mayne's (2001) conclusion that such emotion regulation behaviour as substance use can lead to physical damage. This finding is not, however, wholly consistent with Vollrath et al. (1999), who showed that highly neurotic university students engaged in the health-risk behaviours of smoking, being drunk, drunk driving, and risky sexual behaviour less often than their less neurotic study mates. Following earlier cross-sectional findings concerning the link between Neuroticism and physical symptoms (e.g., Lu, 1994; Ondersma, Lumley, Corlis, Tojek, & Tolia, 1997), it was additionally found in the present study that in men inattentiveness at age 8 led to high Neuroticism at age 27, which in turn resulted in more frequent self-reported physical symptoms at age 36. We also showed that for men childhood inattentiveness was linked to high Neuroticism at age 27 and, further, to lower use of Repair at age 36, which led similarly to more frequent self-reported physical symptoms at age 36. Our finding was in agreement with the earlier idea that attentional control is a major component of emotion regulation (e.g., Calkins, 1994; Eisenberg, Fabes, et al., 1997, 2000; Eisenberg, Guthrie, et al., 2000; Greenberg & Snell, 1997; Gross, 1998; Thompson, 1990, 1994), and enhanced our understanding of the consequences of the use of Repair in relation to physical health. The present study demonstrated that in men's lives low use of Repair mediated the relationship between prior personality characteristics indicating low self-control of emotions and the later more frequent manifestation of physical symptoms. Previously, low use of trait-Repair has been shown to be related to a higher likelihood of falling ill and visiting health centres (Goldman et al., 1996), and to less physical symptoms (Salovey, Stroud, et al., in press). The present finding also matched the previous results showing that the less adaptive emotion regulation strategies of ruminating and daydreaming (Higgins & Endler, 1995) as well as the alexithymic emotion regulation deficiency of having difficulties in identifying and describing feelings to others (Deary at al., 1997; Lumley et al., 1996) have negative effects on physical health.

The sex differences that emerged from the present study are of especial interest. Earlier emotion regulation studies have mostly focused on the sex differences in the means of emotion regulation (e.g., Ciarrochi et al., 2000; Mayer et al., 1999) or in emotion regulation strategies (e.g., Labouvie-Vief el. al.,1987; Lutzky & Knight, 1994; Ptacek et al., 1992; Thayer, 1996; Thayer et al., 1994). The present study, however, revealed that the impact of preceding personality characteristics on the use of emotion regulation strategies varied considerably by sex. It was generally found that prior personality characteristics explained more frequently and more strongly the subsequent use of the cognitive emotion regulation strategies in men. Similarly traits belonging both to factors alpha (i.e., Neuroticism, Agreeableness) and beta (i.e., Extraversion, Openness to Experience)

accounted indirectly for cognitive emotion regulation strategies only in men. In addition in men, the effects of the Big Five personality traits were to a greater extent indirect through current mood and its cognitive evaluation. It was also noteworthy that, contrary to the findings in men, in women self-control of emotions did not show heterotypic continuity between ages 8 and 36, that the low use of Repair did not mediate the relationship between low self-control of emotions in childhood and self-reported physical health in adulthood, and that behavioural expression in childhood did not explain self-reported physical health in adulthood.

4.2 Methodological evaluation

Both the strengths as well as the weaknesses of the present study have their roots principally in 1) the nature of the data and the statistical methods used in the data analysis, 2) the measures selected, and 3) the characteristics of the sample. According to Eisenberg, Fabes, et al. (2000), the origins, pathways, and consequences of individual differences in emotion regulation can only legitimately be examined by means of well-designed and well-conducted longitudinal studies. By using prospective data across a time span of 28 years, the present study was successful in extending the earlier cross-sectional findings concerning personality characteristics, emotion regulation, and physical health, and linking these previously separate research domains.

The longitudinal nature of the data also guided the choice of the statistical methods employed. Structural Equation Modelling (SEM) was chosen as a major statistical method because it has been highly recommended for the analysis of longitudinal (e.g., Farrell, 1994; Zapf, Dormann, & Freze, 1996) and nonexperimental data (Hoyle & Smith, 1994; Keith, 1999). In the present study, SEM was used with and without latent variables, following the classification of Keith (1999). Advantage was taken to a varying degree of the following possibilities provided by SEM: the calculation and comparison of direct, indirect, and total effects simultaneously, thus allowing examination of the statistically separate effects of several independent variables on a particular outcome (Studies I-V) (Keith, 1999), the testing of models with multiple mediators (Study II) (Shadish & Sweeney, 1991), the estimation of errors of measurement (Studies III and IV) (Bollen & Long, 1993; Keith, 1999; Ullman, 1996), the testing of competing, alternative models (Studies II and V) (Bollen & Long, 1993; Farrell, 1994; Keith, 1999) and the simultaneous examination of two groups (Study III) (Jöreskog & Sörbom, 1996a, p. 277). We also followed the notion of Davidson, Prkachin, Lefcourt, and Mills (1996) and investigated men and women separately to capture possible sex-related mediators.

There are three areas in which the statistical analysis employed in the present study could be regarded as problematic. Firstly, latent variable SEM was employed only in Studies III and IV. In three other studies the measured variables were used, and possible measurement errors in them were not taken into account. The application of latent variable SEM to these studies, too, would have portioned out much of the measurement error in the study variables (Brummett et al., 1998), and thus made it possible to get closer to the construct of true interest, as argued by Keith (1999), resulting in slightly stronger findings. Secondly, the final models were obtained through some empirically determined modifications in which the parameter with the largest modification index was set free. Irrespective of the fact

that this is the manner in which such models are often modified in practice (MacCallum, Roznowski, & Necowitz, 1992), Hoyle and Panter (1995) suggest that such models should be described as tentative until replicated. Thirdly, although the models provided statistically plausible representations of the observed data, it should be noted that, in cases where the cognitive emotion regulation strategies were used as outcomes, for instance, the variables used accounted for 5 - 41% of their variance (Study II). This points to the so-called omitted-variable problem (Fergusson, 1997): there are indeed other variables that could be included in a more comprehensive model to account for larger proportions of variance in the outcome variables. As for the emotion regulation strategies, the present study focused on the explanatory role of prior personality characteristics, and therefore a number of factors known to be essential in emotion regulation, such as emotional intensity (Catanzaro, 1997; Flett et al., 1996), social context (e.g., Eisenberg, Fabes, et al., 2000; Friedman & Miller-Herringer, 1991), and individuals' sociographic background (Grossi, 1999) were intentionally excluded from the hypothesized models. These factors, and other possible contributory factors which remained unexamined, would be interesting subjects of future research.

In the present longitudinal study, given the focus on mediational relations, the issue of causality is very relevant. Although SEM is seen as one means of exposing causal theories to testing (Fergusson, 1997), inferring causality is tied to research design, not to the statistical analysis used (Hoyle & Smith, 1994), and thus caution has to be exercised in making causal inferences in the present study. Although longitudinal studies in general are needed to tease apart causal relations, other criteria (e.g., the existence of a relation between the presumed cause and effect, and the exclusion of the other competing explanations for the observed effects; see Bollen, 1989; Duncan, Duncan, Strycker, Li, & Alpert, 1999) are required to enable this to be done. As stated by Farrell (1994), nonexperimental longitudinal data do not permit either the isolation of the independent variables or controlling for possible confounding variables. Causal inferences can best be justified on the basis of longitudinal, experimental data. But as Farrington (1992) points out, from both an ethical and a practical point of view experimental studies are difficult to conduct with human beings. I believe, in line with for example, Breckler (1990), that although longitudinal data alone does not offer sufficient grounds to allow firm causal conclusions to be drawn, it provides a stronger basis than cross-sectional data. More specifically, the prospective longitudinal data used here satisfied at times the criterion of time precedence necessary for making causal inferences. For example, in Study III, where the dependent variables (i.e., emotion regulation and dysregulation) were measured at age 36, the latent variables for E and N were indicated by two observed variables, one measured at age 27 and the other at age 33. In order to stay on the safer side in the question of causality, we also leant on formal theory and previous research, as recommended by Keith (1999). In Studies II and V, where some of the variables were measured at the same time, alternative models with a partially different ordering of the variables were tested and compared with the hypothesized model. I believe that evaluating the alternative interpretations strengthened the validity of the conclusions, although the results still have to be interpreted with caution.

An additional methodological issue concerns *the measures selected.* In the present study, the multi-method, multi-informant approach urged by Eisenberg, Fabes, et al. (2000) was applied to some extent; at ages 8 and 14 the data were

based on teacher ratings, and at ages 27, 33, and 36 on generally well-established questionnaires with known psychometric properties. The strong reliance on self-reports in the later data collections, however, may have inflated the magnitude of the relationships between the self-reported variables owing to the common method variance. The question of subjectivity could have been removed by including more objective measures (e.g., observer ratings and exercise tests). For example, the use of medical records or physical examination – although especially the latter may also contain a significant subjective component – might have illustrated the relation between Neuroticism at age 27 and self-reported physical symptoms at age 36 (Study IV). Now it remained doubtful whether the link indicated an actual association between a prior personality trait and later objectively verified disease, or whether it reflected previously suggested association between Neuroticism and a tendency to perceive and report symptoms in the absence of an objectively verified disease (e.g., Clark & Watson, 1988; Feldman, Cohen, Doyle, Skoner, & Gwaltney, 1999; Watson & Pennebaker, 1989; Wiebe & Smith, 1997). On the other hand, Lazarus, DeLongis, Folkman, and Gruen (1985) have argued that measuring psychological dimensions may best be done by asking the participants directly, as they have the greatest familiarity with their own internal states. Because there is no objective measurement of emotional experience (Feldman Barrett & Gross, 2001; Spain, Eaton, & Funder, 2000), investigations of emotional experience should be based on consciously given self-reports (Feldman Barrett & Gross, 2001). According to Gross, John, and Richards (2000), application of self-reports on emotion regulation has also shown to be quite successful. As for physical symptoms, we are often compelled to accept self-reported symptoms as their only representation (Spruijt-Metz, 1999, p. 99). Self-report symptom scales have been extensively validated against objective health measures, and found to be significantly correlated with external measures of health status (Watson, 2000, p. 265).

Previously, emotion regulation strategies have been studied using coping scales, such as the Children's Coping Strategies Checklist (CCSC; Sandler, Tein, & West, 1994), Adolescent Coping Scale (ACS; Frydenberg & Lewis, 1993), the Coping Across Situations Questionnaire (CASQ, Seiffge-Krenke & Schulman, 1990), Ways of Coping (Folkman & Lazarus, 1980), and the COPE scale (Carver et al., 1989). In the present study, to go one step further, the Mayer and Stevens' (1994) Meta-Regulation Scale (MRS) was chosen because at the time the data collection was planned in 1995 it had just come out, and represented a fresh method of measuring emotion regulation strategies more precisely. The original MRS was modified to make it more versatile, and shortened to reduce the strain on the participants as much as possible. These steps may be seen as problematic in terms of generalizing of the results to the original MRS. The present study may also have profited from observational and physiological measures (Underwood, 1997) or the ability measures of emotion regulation used in the study of emotional intelligence (Mayer et al., 1999; Mayer, Salovey, & Caruso, 2000). But like in other studies based on so-called secondary analysis of data (McCall & Appelbaum, 1991), the main measures had been chosen before I started my thesis.

Finally, *the sample used* in the present study significantly contributes to the generalization of the findings. This study overcame most of the limitations of previous samples by longitudinally throwing light on the emotion regulation of adults, a topic which has long been ignored (Gross et al., 1997; Gross & Levenson,

1997). Using a random, representative sample of a normal population the present findings are more generalizable than those of earlier studies based on more restricted samples. An additional advantage of the present study was that both men and women were subject to scrutiny, which for Underwood (1997) is precisely what is needed to fully understand the impact of sex on emotion regulation. On the other hand, in longitudinal designs one does not know whether the results depend on age, cohort, or period (Loeber & Farrington, 1994; Rutter, 1995). Therefore, the present study could be viewed as limited in that it was based on single birth cohort born mainly in 1959 in central Finland. In order to answer the question justifiably posed by Baltes, Cornelius, and Nesselroade (1979) of whether findings observed in one set of data can be generalized to other data sets, replications with different age groups as well as cross-cultural samples are needed.

4.3 Future directions

In the present study, I focused on the regulation of the subjective experience of emotion, as defined by Eisenberg (1996, 1998; Eisenberg, Fabes, et al., 1997, 2000). The findings concerning the explanatory role of prior personality characteristics and the mediating effects of current mood and its cognitive evaluation were consistent with Underwood's (1997) conclusion that emotion regulation is determined by multiple, interacting factors. One *suggestion for future research* would be to examine whether the antecedents found in this study, in particular the sex differences, apply to the other types of emotion regulation, namely the regulation of emotion-related physiological processes and the regulation of emotion-related behaviour. In addition, as pointed out in the Introduction, research has mainly focused on situational, contextual, and physiological contributors to emotion regulation. This study attempted to combine dispositional (i.e., traits) and situational (i.e., current mood and its evaluation) factors within a single investigation. It might, however, be worthwhile to integrate the dispositional and situational approaches more radically in the future, by incorporating social factors into the study designs.

According to Mayer and Stevens (1994), the scales of the MRS measure states rather than traits. In fact, the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) was published a year later, while we were already carrying out our data collection. The fact that the present study used fairy stable personality traits and characteristics in relation to scales which measure states rather than traits raises several interesting questions about the continuity of the assessed strategies, or continuity in emotion regulation in general. It has been argued that emotion regulation is a stable individual difference with some situational variability (Walden & Smith, 1997); that individual differences in emotion regulation become characteristics of personality (Cole et al., 1994); that there is both substantial temporal stability and cross-situational consistency in coping strategy use (Watson, David, & Suls, 1999); and that emotion regulation strategies with the most satisfying outcomes generalize (Thompson et al., 1995). From a more neuroscientific perspective, it has been suggested that plastic changes in the prefrontal cortex and the amygdala (the central circuits for emotion) would emerge as a result of traitlike emotion regulation strategies over a long duration of time (Davidson et al., 2000). In line with these theoretical notions, empirical evidence reveals that some children's strategies are consistent over several years (Losoya et al., 1998),

and that their teacher-rated emotional (attentional) regulation shows homotypic continuity (Eisenberg, Guthrie, et al., 2000). Furthermore, behaviourally assessed inhibitory control (Kochanska, Murray, & Coy, 1997), lack of control (Pulkkinen, 1982; Caspi, Henry, McGee, Moffitt, & Silva, 1995), and such outcomes of emotion dysregulation as aggression (e.g., Hartup & van Lieshout, 1995), and anxiety (e.g., Canals et al., 1992) have been reported to show considerable continuity. On the other hand, the partial dependency of emotion regulation on contexts and situations has been emphasized (e.g., Eisenberg, Fabes, et al., 2000; Thompson et al., 1995; Underwood, 1997; Walden & Smith, 1997). At this point, in the light of the present findings, I can only speculate about the continuity of Repair, Dampening, Maintenance, Emotional Social Support, and Emotional Ambivalence. More will be known after the analysis of data collected at age 42 has been completed, later this year (2001), where the same emotion regulation and dysregulation measures have been included.

According to Bonanno (2001), the question of the (mal)adaptiveness of specific emotion regulation strategies is one of the most promising directions for future investigations. Apart from the link in men between the concurrent low use of Repair, Dampening, and Maintenance and anxiety, and the connection between concurrent low use of Repair and self-reported physical symptoms at age 36, the present study cannot properly resolve the question of whether the measured emotion regulation strategies enhance individuals' psychological and physical well-being or not. Although it has been theoretically argued that not every strategy is beneficial in the long run (Saarni, 1997); that the adaptiveness of a certain cognitive strategy may depend on the given situation (Garnefski et al., 2001); and that almost any strategy has both advantages and disadvantages for well-being (Thompson & Calkins, 1996), there are very few, if any, longitudinal studies on whether emotion regulation strategies predict significant long-term outcomes in terms of well-being. Our recent data collection in 2001 repeated some of the measures of psychological well-being used in 1995. It also included objective health measures, such as medical examinations and samples of blood and saliva, which in the future will enable us to take a closer look at the relationship between the emotion regulation strategies used at age 36 and psychological and physical well-being at age 42.

Does the present study have any *practical applications?* In general, knowledge on emotion regulation has probably been applied most effectively in the area of sport and physical activity (e.g., Hanin, 2000; Ntoumanis & Biddle, 1998; Raglin & Hanin, 2000; Smith & Crabbe, 2000). As noted by Salovey, Mayer et al. (in press) in relation to emotional intelligence, information concerning emotion regulation has also begun to be taken into account in interventions in education (see also Salovey & Sluyter, 1997), and in the workplace. For example, there are more than 300 curriculum-based Social and Emotional Learning (SEL) programmes in the United States alone (Cohen, 1999). The present findings on the role of prior personality characteristics in the use of certain emotion regulation strategies enhance our understanding of why adopting certain emotion regulation strategies is more difficult for one individual than it is for another. Learning more about the links between personality and the use of emotion regulation strategies would clearly benefit the teaching of emotion regulation, whether done in the school or work place. Similarly, the findings concerning low self-control of emotions, behavioural expression, health-related behaviour, and physical health provided by the present study could also be taken into account when tailoring health promotion interventions for people with different personalities.

TIIVISTELMÄ

Tunteiden säätelyllä tarkoitetaan tunteisiin liittyvien fysiologisten toimintojen tai sisäisten tunnetilojen esiintymisen, voimakkuuden tai keston aikaansaamista, ylläpitämistä ja muuttamista (Eisenberg, Fabes, Guthrie, & Reiser, 2000). Sillä pyritään estämään tunteiden kohoaminen stressiä aiheuttavalle tasolle, ehkäisemään häiriökäyttäytymistä (Cicchetti, Ackerman, & Izard, 1995) ja takaamaan vastuuntuntoinen mutta joustava tunne-elämä (Mayer & Salovey, 1997). Tunteiden säätelyn on havaittu olevan yhteydessä ennen kaikkea fysiologisiin, sosiaalisiin ja tilannesidonnaisiin tekijöihin, kuten eksekutiivisiin toimintoihin (LeDoux, 1996; Luu, Collins, & Tucker, 2000), turvalliseen kiintymystyyliin (Cassidy, 1994; Mikulincer & Florian, 1998), lapsuuskodille ominaiseen myönteisten tunteiden ilmaisuun (Garner, 1995) ja muiden ihmisten läsnäoloon (Friedman & Miller-Herringer, 1991; Zeman & Garber, 1996). Tähänastinen tunteiden säätelyn tutkimus on keskittynyt enimmäkseen lapsiotoksiin, poikkileikkausaineistoihin sekä biologisten ja ulkoisten tekijöiden selvittämiseen. Tunteiden säätelyn tutkimukseen on kaivattu persoonallisuuspsykologista ja pitkittäistutkimuksellista tutkimusotetta sekä aikuisaineistoja.

Väitöskirjani on tehty pitkittäistutkimuksellisella tutkimusotteella. Se lähestyi aikuisten tunteiden säätelyä pääasiallisesti tunteiden säätelystrategioiden näkökulmasta. Kognitiivisia tunteiden säätelystrategioita – tunteiden korjaamista, tukahduttamista ja ennallaan säilyttämistä – tutkittiin Mayerin ja Stevensin (1994) Meta-Regulation Scale -kyselylomakkeella. Lisäksi tarkasteltiin emotionaalisen sosiaalisen tuen käyttämistä tunteiden säätelystrategiana sekä heikosta tunteiden säätelystä kielivää emotionaalista ambivalenttiutta, jota arvioitiin Kingin ja Emmonsin (1990) Ambivalence Over Expressiveness Questionnaire -kyselylomakkeella.

Väitöskirjani oli osa professori Lea Pulkkisen aloittamaa ja edelleen johtamaa kolmikymmenvuotista Lapsesta aikuiseksi -pitkittäistutkimusta. Tutkimuksen alkuperäisen satunnaisotoksen muodostivat v. 1968 kansakoulun toisella luokalla olleet, kahdeksan vuoden ikäiset 196 poikaa ja 173 tyttöä. Heistä jopa 85% osallistui vuoden 1995 seurantatutkimukseen. Vielä 28 vuoden jälkeenkin tutkimukseen osallistuneet edustivat valikoitumattomasti sekä alkuperäistä satunnaisotosta että omaa vuonna 1959 syntynyttä ikäkohorttiaan mm. siviilisäädyn, lastenlukumäärän ja työttömyyden suhteen. Väitöskirjani perustui opettaja-arvioinnein ja kyselylomakkein vuosina 1968, 1974, 1986, 1992 ja 1995 koottuun materiaaliin, jota käsiteltiin pääasiallisesti rakenneyhtälömallien avulla. Muina tilastotieteellisinä menetelminä käytettiin mm. faktorianalyysiä (pääakselimenetelmä), kaksisuuntaista, monimuuttujaista varianssianalyysiä, t-testejä, ristiintaulukointia sekä Pearsonin tulomomenttikorrelaatioita.

Tutkimuksellani oli viisi ensisijaista tavoitetta. *Ensimmäiseksi* pyrittiin selvittämään, ovatko 8 vuoden iässä havaitut tunteiden heikkoa ja vahvaa itsesäätelyä heijastavat persoonallisuuden piirteet yhteydessä tunteiden kognitiivisten säätelystrategioiden käyttöön 36 -vuotiaana. Lisäksi tutkittiin, onko tunteiden itsesäätely heterotyyppisesti jatkuvaa ikävuosien 8 ja 36 välillä ja kuinka tunteiden kognitiiviset säätelystrategiat selittävät tätä jatkuvuutta. *Toiseksi* tarkasteltiin, ennustavatko 33-vuotiailta mitatut ns. viisi suurta persoonallisuuden piirrettä (neuroottisuus, sovinnollisuus, tunnollisuus, ekstraversio, avoimuus uusille kokemuksille) tunteiden kognitiivisten säätelystrategioiden käyttöä 36-vuotiaana suoraan tai epäsuorasti vallitsevan tunnetilan ja sen kognitiivisen arvioinnin välityksellä. *Kolmanneksi* keskityttiin 27- ja 33-vuotiailta mitattujen neuroottisuuden ja ekstraversion sekä

36-vuotiailta mitatun kognitiivisen korjaavan strategian, emotionaalisen sosiaalisen tuen ja emotionaalisen ambivalenttiuden välisiin yhteyksiin. *Neljäntenä* tavoitteena oli selvittää, kuinka 8- ja 27-vuotiailta mitatut tunteiden heikkoa itsesäätelyä heijastavat persoonallisuuden piirteet sekä vähäinen kielteisten tunteiden korjaaminen 36-vuotiaana olivat yhteydessä itseraportoituihin fyysisiin oireisiin 36-vuotiaina. *Viimeiseksi* tutkittiin 14-vuotiailta todettujen tunteiden heikon itsesäätelyn ja käyttäytymisen aktiivisuuden suoria ja epäsuoria yhteyksiä 36-vuotiaiden useilla erilaisilla itsearvioinneilla kartoitettuun fyysiseen terveyteen.

Ensimmäinen tutkimus osoitti, että 8-vuotiailta havaitut tunteiden heikkoa itsesäätelyä heijastavat persoonallisuuden piirteet olivat yhteydessä vähäiseen kognitiivisten säätelystrategioiden käyttöön 36-vuotiaana. Miehillä lapsuusiän aggressiivisuus, mielialojen vaihtelu ja tarkkaamattomuus olivat yhteydessä vähäisempään tunteiden korjaamiseen ja tukahduttamiseen. Naisilla puolestaan lapsuusiän aggressiivisuus ja mielialojen vaihtelu olivat yhteydessä vähäisempään tunteita säilyttävän strategian käyttöön. Miehillä tunteiden itsesäätely osoittautui heterotyyppisesti jatkuvaksi ikävuosien 8 ja 36 välillä, mitä selitti osittain kognitiivisten säätelystrategioiden käyttö. Lapsuudessa todettu mielialojen vaihtelu oli yhteydessä aikuisiän emotionaaliseen ambivalenttiuteen vähäisen tukahduttavan strategian käytön välityksellä. Lapsuusiän mukautuvuus oli puolestaan yhteydessä mm. vähäiseen aikuisiän ahdistuneisuuteen runsaamman korjaavan strategian käytön kautta.

Toisessa tutkimuksessa ilmeni, että 33-vuotiailta mitattujen ns. viiden suuren persoonallisuuden piirteen yhteydet kognitiivisten säätelystrategioiden käyttöön 36-vuotiaana olivat enimmäkseen epäsuoria, vallitsevan mielialan ja sen kognitiivisen arvioinnin välittämiä ja sukupuolesta riippuvaisia. Lisäksi paljastui, että varsinkin miehillä neuroottisuus, sovinnollisuus ja tunnollisuus olivat yhteydessä kognitiivisten säätelystrategioiden käyttöön enemmän kuin ekstraversio ja avoimuus uusille kokemuksille. Erityisesti neuroottisuus ennakoi vähäisempää tunteiden kognitiivista säätelyä.

Kolmas tutkimus keskittyi kognitiivisen korjaamisen lisäksi myös emotionaaliseen sosiaaliseen tukeen ja emotionaaliseen ambivalenttiuteen. 27- ja 33-vuotiailta mitattujen ns. kahden suuren persoonallisuuden piirteen, neuroottisuuden ja ekstraversion, yhteydet 36-vuotiaiden tunteiden säätelyyn osoittivat, että neuroottisuus ennusti vähäisempää tunteiden korjaamista ja runsaampaa emotionaalista ambivalenttiutta, kun taas ekstraversio ennusti suurempaa tukeutumista emotionaaliseen sosiaaliseen tukeen sekä vähäisempää emotionaalista ambivalenttiutta ja kykyä tunnetilan kognitiiviseen korjaamiseen.

Neljännessä tutkimuksessa havaittiin, että poikien 8-vuotiaana todettu tarkkaamattomuus oli yhteydessä korkeahkoon neuroottisuuteen 27-vuotiaana, mikä edelleen johti useampiin fyysisiin oireisiin 36-vuotiaana. Toisaalta 27-vuotiaan neuroottisuus johti myös vähäisempään kielteisten tunteiden korjaamiseen 36-vuotiaana, mikä edelleen oli yhteydessä fyysisiin oireisiin. Näin ollen miesten aiemman heikon tunteiden itsesäätelyn yhteys myöhemmän iän runsaampiin fyysisiin oireisiin välittyi osittain vähäisen korjaavan strategian käytön kautta. *Viides tutkimus* osoitti, että varhaisnuoruudessa todettu heikko tunteiden itsesäätely oli sekä miehillä että naisilla yhteydessä runsaaseen alkoholin käyttöön ja tupakointiin aikuisiässä, mikä edelleen johti useampiin vammoihin ja fyysisiin oireisiin.

Tulokset osoittivat lisäksi, että persoonallisuuden piirteiden, tunteiden säätelyn ja fyysisen terveyden väliset yhteydet olivat usein erilaisia miehillä kuin naisilla. Tutkimusten paljastamat olennaisimmat sukupuolierot voidaan tiivistää

seuraavasti. Aiemmat persoonallisuuden piirteet selittivät myöhempää tunteiden säätelystrategioiden käyttöä eri tavalla miehillä kuin naisilla. Yleisesti ottaen persoonallisuuden piirteet selittivät tunteiden säätelystrategioiden käyttöä useammin ja voimakkaammin miehillä. Lisäksi viiden suuren persoonallisuuden piirteen yhteydet tunteiden säätelystrategioihin olivat miehillä suuremmassa määrin epäsuoria, vallitsevan mielialan ja sen kognitiivisen säätelyn välittämiä. On myös huomattava, että naisten tunteiden itsesäätely ikävuosien 8 ja 36 välillä ei ollut heterotyyppisesti jatkuvaa. Naisilla alhainen korjaavan strategian käyttö ei välittänyt lapsuusiän heikon tunteen itsesäätelyn ja aikuisiässä itseraportoitujen fyysisten oireiden välistä yhteyttä eikä lapsuusiän käyttäytymisen aktiivisuus selittänyt aikuisiän itsearvioitua fyysistä terveyttä.

Väitöskirjani tulokset herättävät mielenkiintoisia jatkotutkimusaiheita mm. tunteiden säätelystrategioiden pysyvyydestä ja merkittävyydestä psyykkiselle ja fyysiselle hyvinvoinnille. Tuloksia voitaisiin käytännössä parhaiten soveltaa koulu- ja työmaailmassa sekä huippu-urheilijoiden psyykkisessä valmennuksessa. Tutkimuksen tarjoama tieto persoonallisuuden piirteiden ja tiettyjen tunteiden säätelystrategioiden käytöstä tulisi huomioida kehitettäessä tunteiden hallintaan tähtäävää koulutusta. Samalla tavalla persoonallisuuden piirteiden, terveyskäyttäytymisen ja fyysisen terveyden välisten yhteyksien lisääntynyt ymmärrys olisi hyödynnettävissä yksilöllisten terveyskampanjoiden suunnittelussa.

REFERENCES

Af Klinteberg, B., Schalling, D., & Magnusson, D. (1986). *Self-report assessment personality traits. Data from the KSP inventory on a representative sample of normal male and female subjects within a developmental project.* (Report No. 64). Department of Psychology, University of Stockholm.

Af Klinteberg, B., Schalling, D., & Magnusson, D. (1990). Childhood behavior and adult personality in male and female subjects. *European Journal of Personality, 4*, 57-71.

Amirkhan, J. H., Risinger, R. T., & Swickert, R. J. (1995). Extraversion: A hidden personality factor in coping? *Journal of Personality, 63*, 189-212.

Artistico, D., Baldassarri, F., Lauriola, M., & Laicardi, C. (2000). Dimensions of health-related dispositions in elderly people: Relationships with health behaviour and personality traits. *European Journal of Personality, 14*, 533-552.

Aro, H. (1988). *Stress development and psychosomatic symptoms in adolescence. Study of 14 to 16 year old school children.* Acta Universitatis Tamperensis ser. A 242.

Avia, M. D., Sanz, J., Sanches-Bernados, M. L., Martinez-Arias, M. R., Silva, F., & Grana, J. L. (1995). The five-factor model-II. Relations of the NEO-PI with other personality variables. *Personality and Individual Differences, 19*, 81-97.

Baltes, P. B., Cornelius, S. W., & Nesselroade, J. R. (1979). Cohort effects in developmental psychology. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 61-87). New York: Academic Press.

Batson, C. D., Shaw, L. L., & Oleson, K. C. (1992). Differentiating affect, mood, and emotion. *Review of Personality and Social Psychology, 13*, 294-326.

Barry, B., & Oliver, R. L. (1996). Affect in dyadic negotiation: A model and propositions. *Organizational Behavior and Human Decision Processes, 67*, 127-143.

Ben-Ze'ev, A. (2000). *The subtlety of emotions.* Cambridge, MA: MIT Press.

Bermudez, J. (1999). Personality and health-protective behaviour. *European Journal of Personality, 13*, 83-103.

Berry, D. S., & Pennebaker, J. W. (1993). Nonverbal and verbal emotional expression and health. *Psychotherapy and Psychosomatics, 59*, 11-19.

Billings, D. W., Folkman, S., Acree, M., & Moskowitz, J. T. (2000). Coping and physical health during caregiving: The roles of positive and negative affect. *Journal of Personality and Social Psychology, 79,* 131-142.

Bolger, N. (1990). Coping as a personality process: A prospective study. *Journal of Personality and Social Psychology, 59*, 525-537.

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: Wiley.

Bollen, K. A., & Long, J. S. (1993). Introduction. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 1-9). Newsbury Park, CA: Sage.

Bonanno, G. A. (2001). Emotion self-regulation. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 251-285). New York: Guilford Press.

Bonanno, G. A., & Mayne, T. J. (2001). The future of emotion research. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 398-410). New York: Guilford Press.

Breckler, S. J. (1990). Applications of covariance structure modeling in psychology: Cause for concern? *Psychological Bulletin, 107*, 260-273.

Bridewell, W. B., & Chang, E. C. (1997). Distinguishing between anxiety, depression, and hostility: Relations to anger-in, anger-out, and anger control. *Personality and Individual Differences, 22*, 587-590.

Brenner, E. M., & Salovey, P. (1997). Emotion regulation during childhood: Developmental, interpersonal, and individual considerations. In P. Salovey & D. J. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp. 168-192). New York: BasicBooks.

Brown, K., Covell, K., & Abramovitch, R. (1991). Time course and control of emotion: Age differences in understanding and recognition. *Merrill-Palmer Quarterly, 37*, 273-287.

Brummett, B. H., Babyak, M. A., Barefoot, J. C., Bosworth, H. B., Clapp-Channing, N. E., Siegler, I. C., Williams, R. W., & Mark, D. B. (1998). Social support and hostility as predictors of depressive symptoms in cardiac patients one month after hospitalization: A prospective study. *Psychosomatic Medicine, 60*, 707-713.

Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology, 63*, 452-459.

Buss, K. A., & Goldsmith, H. H. (1998). Fear and anger regulation in infancy: Effects of the temporal dynamics of affective expression. *Child Development, 69*, 359-374.

Calkins, S. D. (1994). Origins and outcomes of individual differences in emotion regulation. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 53-72). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Calkins, S. D., & Johnson, M. C. (1998). Toddler regulation of distress to frustrating events: Temperamental and maternal correlates. *Infant Behavior & Development, 21*, 379-395.

Canals, J., Marti-Henneberg, C., Fernandez-Ballart, J., Cliville, R., & Domenech, E. (1992). Scores on the state-trait anxiety inventory for children in a longitudinal study of pubertal Spanish youth. *Psychological Reports, 71*, 503-512.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L. Jr., & Clark, K. C. (1993). How coping mediates the effects of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology, 65*, 375-390.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*, 267-283.

Caspi, A. (1998). Personality development across the life course. In W. Damon (Editor-in-Chief) and N. Eisenberg (Volume Editor), *Handbook of child psychology: Social, emotional, and personality development* (5th ed., Vol. 3, pp. 311-388). New York: Wiley.

Caspi, A., Begg, D., Dickson, N., Harrington, H., Langley, J., Moffitt, T. E., & Silva, P. A. (1997). Personality differences predict health-risk behaviors in young adulthood: Evidence from a longitudinal study. *Journal of Personality and Social Psychology, 73*, 1052-1063.

Caspi, A., Henry, B., McGee, R. O., Moffitt, T. E.,& Silva, P. A. (1995). Temperamental origins of child and adolescent behavior problems: From age three to age fifteen. *Child Development, 66*, 55-68.

Caspi, A., & Roberts, B. W. (1999). Personality continuity and change across the life course. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 300-326). New York: Guilford Press.

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 228-249). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Catanzaro, S. J. (1997). Mood regulation expectancies, affect intensity, dispositional coping, and depressive symptoms: A conceptual analysis and empirical reanalysis. *Personality and Individual Differences, 23*, 1065-1069.

Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment, 54*, 546-563.

Catanzaro, S. J., Wasch, H. H., Kirsch I., Mearns, J. (2000). Coping-related expectancies and dispositions as prospective predictors of coping responses and symptoms. *Journal of Personality, 68*, 757-788.

Ciarrochi, J. V., Chan, A. Y. C., & Caputi, P. (2000). A critical evaluation of the emotional intelligence construct. *Personality and Individual Differences, 28*, 539-561.

Cicchetti, D., Ackerman, B. P., & Izard, C. E. (1995). Emotions and emotion regulation in developmental psychopathology. *Development and Psychopathology, 7*, 1-10.

Cicchetti, D., Ganiban, J., & Barnett, D. (1991). Contributions from the study of high-risk populations to understanding the development of emotion regulation. In J. Garber & K. A. Dodge (Eds.), *The development of emotion regulation and dysregulation* (pp. 15-18). Cambridge: Cambridge University Press.

Clark, L. A., & Watson, D. (1988). Mood and the mundane: Relations between daily life events and self-reported mood. *Journal of Personality and Social Psychology, 54*, 296-308.

Clore, G. L., & Ortony, A. (2000). Cognition in emotion: Always, sometimes, or never? In R. D. Lane & L. Nadel (Eds.), *Cognitive neuroscience of emotion* (pp. 24-61). New York: Oxford University Press.

Cohen, J. (Ed.) (1999). *Educating minds and hearts: Social emotional learning and the passage into adolescence.* New York: Teachers College Press.

Cole, P. M., Michel, M. K., & Teti, L. (1994). The development of emotion regulation and dysregulation: A clinical perspective. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 73-100). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Contrada, R. J., Cather, C., & O'Leary, A. (1999). Personality and health: Dispositions and processes in disease susceptibility and adaptation to illness. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality; Theory and research* (2nd ed., pp. 576-604). New York: Guilford Press.

Contreras, J. M., Kerns, K. A., Weimer, B. L., Gentzler, A. L., & Tomich, P. L. (2000). Emotion regulation as a mediator of associations between mother-child attachment and peer relationships in middle childhood. *Journal of Family Psychology, 14,* 111-124.

Cooper, M. L., Agocha, V. B., & Sheldon, M. S. (2000). A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality, 68,* 1059-1088.

Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO Personality Inventory Manual.* Odessa, FL: Psychological Assessment Resources.

Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. *Psychological Bulletin, 126,* 890-909.

Davidson, K. W., Prkachin, K. M., Lefcourt, H. M., & Mills, D. E. (1996). Towards a psychosocial mediator model of hostility and CHD. *Psychology and Health, 11,* 421-429.

Davies, M., Stankov, L., & Roberts, R. D. (1998). Emotional intelligence: In search of an elusive construct. *Journal of Personality and Social Psychology, 75,* 989-1015.

Dawson, I. J., Panagiotides, H., Klinger, L. G., & Hill, D. (1992). The role of frontal lobe functioning in the development of infant self-regulatory behavior. *Brain and Cognition, 20,* 152-175.

Deary, I. J., Scott, S., & Wilson, J. A. (1997). Neuroticism, alexithymia and medically unexplained symptoms. *Personality and Individual Differences, 22,* 551-564.

Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 73,* 1246-1256.

Duncan, T. E., Duncan, S. C., Strycker, L. A., Li, F., & Alpert, A. (1999). *An introduction to latent variable growth curve modeling; Concepts, issues, and applications.* London: Erlbaum.

Eisenberg, N. (1996). Meta-emotion and socialization of emotion in the family - A topic whose time has come: Comment on Gottman et al. (1996). *Journal of Family Psychology, 10,* 269-276.

Eisenberg, N. (1998). Introduction. In N. Eisenberg (Volume Editor) and W. Damon (General Editor), *Handbook of child psychology : Social, emotional, and personality development* (5th ed., Vol. 3., pp. 1 -24). New York: Wiley.

Eisenberg, N., & Fabes, R. A. (1992). Emotion, regulation, and the development of social competence. *Review of Personality and Social Competence, 14,* 119-150.

Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: Their role in predicting quality of social functioning. *Journal of Personality and Social Psychology, 78,* 136-157.

Eisenberg, N., Fabes, R. A., Karbon, M., Murphy, B. C., Wosinski, M., Polazzi, L., Carlo, G., & Juhnke, C. (1996). The relations of children's dispositional prosocial behavior to emotionality, regulation, and social functioning. *Child Development, 67,* 974-992.

Eisenberg, N., Fabes, R. A., & Losoya, S. (1997). Emotional responding: regulation, social correlates, and socialization. In P. Salovey & D. J. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp. 129-163). New York: BasicBooks.

Eisenberg, N., Fabes, R. A., & Murphy, B.C. (1995). Relations of shyness and low sociability to regulation and emotionality. *Journal of Personality and Social Psychology, 68,* 505-517.

Eisenberg, N., Fabes, R. A., Murphy, B.C., Karbon, M., Smith, M., & Maszk, P. (1996). The relations of children's dispositional empathy-related responding to their emotionality, regulation, and social functioning. *Developmental Psychology, 32,* 195-209.

Eisenberg, N., Guthrie, I. K., Fabes, R. A., Reiser, M., Murphy, B. C., Holgren, R., Maszk, P., & Losoya, S. (1997). The relations of regulation and emotionality to resiliency and competent social functioning in elementary school children. *Child Development, 68,* 295-311.

Eisenberg, N., Guthrie, I. K., Fabes, R. A., Shepard, S., Losoya, S., Murphy, B. C., Jones, S., Poulin, R., & Reiser, M. (2000). Prediction of elementary school children's externalizing problem behaviors from attentional and behavioral regulation and negative emotionality. *Child Development, 71,* 1367-1382.

Ekman, P. (1994). Moods, emotions, and traits. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion* (pp. 56-58). New York: Oxford University Press.

Emery, C. F., Huppert, F. A., & Schein, R. L. (1996). Health and personality predictors of psychological functioning in a 7-year longitudinal study. *Personality and Individual Differences, 20,* 567-573.

Endler, N. S., & Speer, R. L. (1998). Personality psychology: Research trends for 1993-1995. *Journal of Personality, 66,* 621-669.

Eriksen, H. G., Olff, M., & Ursin, H. (1997). The CODE: A revised battery for coping and defense and its relations to subjective health. *Scandinavian Journal of Psychology, 38,* 175-182.

Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of the Eysenck Personality Questionnaire.* London: Hodder & Stoughton.

Farrell, A. D. (1994). Structural equation modeling with longitudinal data: Strategies for examining group differences and reciprocal relationships. *Journal of Consulting and Clinical Psychology, 62,* 477-487.

Farrington, D. P. (1992). The need for longitudinal-experimental research on offending and antisocial behavior. In J. McCord & R. E. Tremblay (Eds.), *Preventing antisocial behavior: Interventions from birth through adolescence* (pp. 353-376). New York: Guilford Press.

Feldman Barrett, L., & Gross, J. (2001). Emotional intelligence: A process model of emotion representation and regulation. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 286-309). New York: Guilford Press.

Feldman, P. J., Cohen, S., Doyle, W. J., Skoner, D. P., & Gwaltney, J. M., Jr. (1999). The impact of personality on the reporting of unfounded symptoms and illness. *Journal of Personality and Social Psychology, 77,* 370-378.

Fergusson, D. M. (1997). Annotation: Structural equation models in developmental research. *Journal of Child Psychology and Psychiatry, 38,* 877-887.

Flett, G. L., Blankstein, K. R., & Obertynski, M. (1996). Affect intensity, coping styles, mood regulation expectancies, and depressive symptoms. *Personality and Individual Differences, 20,* 221-228.

Friedman, H. S. (2000). Long-term relations of personality and health: Dynamisms, mechanisms, tropisms. *Journal of Personality, 68,* 1089-1107.

Friedman, H. S., & Miller-Herringer, T. (1991). Nonverbal display of emotion in public and in private: Self-monitoring, personality, and expressive cues. *Journal of Personality and Social Psychology, 61,* 766-775.

Frijda, N. H. (1993). Moods, emotion episodes, and emotions. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 381- 403). New York: Guilford Press.

Frydenberg, E., & Lewis, R. (1993). *Adolescent coping scale: Administrators's manual.* Melbourne: ACER.

Folkman, S., & Lazarus, R. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21,* 219-239.

Fox, N. A. (1994). Dynamic cerebral processes underlying emotion regulation. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 152-166). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Garber, J., & Dodge, K. (1991). *The development of emotion regulation and dysregulation.* New York: Cambridge University Press.

Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences, 30,* 1311-1327.

Garner, P. W. (1995). Toddlers' emotion regulation behaviors: The roles of social context and family expressiveness. *Journal of Genetic Psychology, 156,* 417-430.

Gohm, C. L., & Clore, G. L. (2000). Individual differences in emotional experience: mapping available scales to processes. *Personality and Social Psychology Bulletin, 26,* 679-697.

Goldman, S. L., Kraemer, D. T., & Salovey, P. (1996). Beliefs about mood moderate the relationship of stress to illness and symptom reporting. *Journal of Psychosomatic Research, 41,* 115-128.

Goldsmith, H. H. (1994). Parsing the emotional domain from a developmental perspective. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion* (pp.68-73). New York: Oxford University Press.

Gomez, R. (1997). Locus of control and Type A behavior patterns as predictors of coping styles among adolescents. *Personality and Individual Differences, 23,* 391-398.

Gomez, R., Holmberg, K., Bounds, J., Fullarton, C., & Gomez, A. (1999). Neuroticism and extraversion as predictors of coping styles during early adolescence. *Personality and Individual Differences, 27,* 3-17.

Greenberg, M. T., & Snell, J. L. (1997). Brain development and emotional development: The role of teaching in organizing the frontal lobe. In P. Salovey & D. J. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp. 93-119). New York: BasicBooks.

Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development, 67,* 928-941.

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequenses for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74,* 224-237.

Gross, J. J. (1999a). Emotion and emotion regulation. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 525-552). New York: Guilford Press.

Gross, J. J. (1999b). Emotion regulation: Past, present, future. *Cognition and Emotion, 13,* 551-573.

Gross, J. J., Carstensen, L. L., Tsai, J., Skorpen, C. G., & Hsu, A. Y. C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging, 12,* 590-599.

Gross, J. J., John, O. P., & Richards, J. M. (2000). The dissociation of emotion expression from emotion experience: A personality perspective. *Personality and Social Psychology Bulletin, 26,* 712-726.

Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology, 64,* 970-986.

Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotions. *Journal of Abnormal Psychology, 106,* 95-103.

Gross, J. J., & Munoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science and Practice, 2,* 151-164.

Grossi, G. (1999). Coping and emotional distress in a sample of Swedish unemployed. *Scandinavian Journal of Psychology, 40,* 157-165.

Haapasalo, J. (1990). *Eysenckin persoonallisuuskyselyn ja Zuckermanin elämyshakuisuusasteikon faktorirakenteet ja pisteytys Suomessa (Factor structures and scoring of the Eysenck Personality Questionnaire and Zuckerman's Sensation Seeking Scale in Finland).* (Report No. 3111). Jyväskylä: University of Jyväskylä, Department of Psychology.

Halamandaris, K. F., & Power, K. G. (1999). Individual differences, social support and coping with the examination stress: A study of the psychosocial and academic adjustment of first year home students. *Personality and Individual Differences, 26,* 665-685.

Hanin, Y. L. (2000). Individual zones of optimal functioning (IZOF) model: Emotion-performance relationships in sport. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 65-89). Champaign, IL: Human Kinetics.

Hartup, W. W., & van Lieshout, C. F. M. (1995). Personality development in social context. *Annual Review of Psychology, 46,* 655-687.

Herman-Stahl, M. A., Stemmler, M., & Petersen, A. C. (1995). Approach and avoidant coping: Implications for adolescent mental health. *Journal of Youth and Adolescence, 24,* 649-665.

Higgins, J. E., & Endler, N. S. (1995). Coping, life stress, and psychological and somatic distress. *European Journal of Personality, 9,* 253-270.

Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158-176). Thousand Oaks, CA: Sage.

Hoyle, R. H., & Smith, G. T. (1994). Formulating clinical research hypotheses as structural equation models: A conceptual overview. *Journal of Consulting and Clinical Psychology, 62,* 429-440.

Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications* (2nd ed.). MI: SPSS Incorporation.

Jöreskog, K. G., & Sörbom, D. (1996). *LISREL 8: User's reference guide* (2nd ed.). Chicago: Scientific Software International.

Kagan, J. (1971). *Change and continuity in infancy.* New York: Wiley.

Karoly, P. (1993). Mechanisms of self-regulation: A systems view. *Annual Review of Psychology, 44,* 23-52.

Keith, T. Z. (1999). Structural equation modeling in school psychology. In C. R. Reynolds & T. B. Gutkin (Eds.), *The Handbook of School Psychology* (3rd ed., pp. 78-107). New York: Wiley.

Keltner, D., & Gross, J. J. (1999). Functional accounts of emotions. *Cognition and Emotion, 13*, 467-480.

King, L. A., & Emmons, R. A. (1990). Conflict over emotional expression: Psychological and physical correlates. *Journal of Personality and Social Psychology, 58*, 864-877.

Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development, 68*, 263-277.

Kokko, K., Pulkkinen, L., & Puustinen, M. (2000). Selection into long-term unemployment and its psychological consequences. *International Journal of Behavioural Development, 24*, 310-320.

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology, 25*, 343-354.

Labouvie-Vief, G., Hakim-Larson, L., DeVoe, M., & Schoeberlein, S. (1989). Emotions and self-regulation: A life-span view. *Human Development, 32*, 279-299.

Labouvie-Vief, G., Hakim-Larson, & Hobart, C. J. (1987). Age, ego level, and the life-span development of coping and defence processes. *Psychology and Aging, 2*, 286-293.

Lazarus, R., DeLongis, A., Folkman, S., & Gruen, R. (1985). Stress and adaptational outcomes: The problem of confounded measures. *American Psychologist, 40*, 770-779.

LeDoux, J. (1996). *The emotional brain: The mysterious underpinnings of emotional life.* New York: Simon & Schuster.

Leventhal, H., & Patrick-Miller, L. (1993). Emotions and illness: The mind is in the body. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 365-379). New York: Guilford Press.

Loeber, R., & Farrington, D. P. (1994). Problems and solutions in longitudinal and experimental treatment studies of child psychopathology and delinquency. *Journal of Consulting and Clinical Psychology, 62*, 887-900.

Losoya, S., Eisenberg, N., & Fabes, R. A. (1998). Developmental issues in the study of coping. *International Journal of Behavioural Development, 22*, 287-313.

Lu, L. (1994). University transition: Major and minor life stressors, personality characteristics and mental health. *Psychological Medicine, 24*, 81-87.

Lumley, M. A., Stettner, L., & Wehmer, F. (1996). How are alexithymia and physical illness linked? A review and critique of pathways. *Journal of Psychosomatic Research, 41*, 505-518.

Lutzky, S. M., & Knight, B. G. (1994). Explaining gender differences in caregiver distress: The roles of emotional attentiveness and coping styles. *Psychology and Aging, 9*, 513-519.

Luu, P., Collins, P., & Tucker, D. M. (2000). Mood, personality, and self-monitoring: Negative affect and emotionality in relation to frontal lobe mechanisms of error monitoring. *Journal of Experimental Psychology: General, 129*, 43-60.

MacCallum, R. C., Roznowski, M., & Necowitz, L. B. (1992). Model modifications in covariance structure analysis: The problem of capitalization on chance. *Psychological Bulletin, 111*, 490-504.

Mangelsdorf, S. C., Shapiro, J. R., & Marzolf, D. (1995). Developmental and temperamental differences in emotion regulation in infancy. *Child Development, 66*, 1817-1828.

Manstead, A. S. R., & Fischer, A. H. (2000). Emotion regulation in full. *Psychological Inquiry, 11*, 188-191.

Matthews, G., Derryberry, D., & Siegle, G. J. (2000). Personality and emotion: Cognitive science perspectives. In S. E. Hampson (Ed.), *Advances in personality psychology* (Vol.1, pp. 199-237). Hove, East Sussex: Psychology Press.

Mayer, J. D., Caruso, D. R., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence, 27*, 267-298.

Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology, 55*, 102-111.

Mayer, J. D., & Salovey, P. (1995). Emotional intelligence and the construction and regulation of feelings. *Applied and Preventive Psychology, 4*, 197-208.

Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. J. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp. 3-31). New York: BasicBooks.

Mayer, J. D., Salovey, P., & Caruso, D. (2000). Models of emotional intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 396-420). Cambridge, England: Cambridge University Press.

Mayer, J. D., & Stevens, A. A. (1994). An emerging understanding of the reflective (meta-)experience of mood. *Journal of Research in Personality, 28*, 351-373.

Mayne, T. J. (1999). Negative affect and health: The importance of being earnest. *Cognition and Emotion, 13*, 601-635.

Mayne, T. J. (2001). Emotions and health. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 361-397). New York: Guilford Press.

McCall, R. B., & Appelbaum, M. I. (1991). Some issues of conducting secondary analyses. *Developmental Psychology, 27*, 911-917.

McCrae, R. R., & Costa, P. T., Jr. (1986). Personality, coping, and coping effectiveness in an adult sample. *Journal of Personality, 54*, 385-405.

McNemar, Q. (1969). *Psychological statistics* (4th ed.). New York: Wiley.

Miller, T. Q., Smith, T. W., Turner, C. W., Guijarro, M. L., & Hallet, A. L. (1996). A meta-analytic review of research on hostility and physical health. *Psychological Bulletin, 119*, 70-94.

Mikulincer, M., & Florian, V. (1998). The relationship between adult attachment styles and emotional and cognitive reactions to stressful events. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 143-165). New York: Guilford Press.

Morales, M., & Bridges, L. J. (1996). Associations between nonparental care experience and preschooler's emotion regulation in the presence of the mother. *Journal of Applied Developmental Psychology, 17*, 577-596.

Murberg, T. A., Bru, E., Svebak, S., Aarsland, T., & Dickstein, K. (1997). The role of objective health indicators and neuroticism in perceived health and psychological well-being among patients with chronic heart failure. *Personality and Individual Differences, 22,* 867-875.

Nolen-Hoeksema, S., McBride, A., & Larson, J. (1997). Rumination and psychological distress among bereaved partners. *Journal of Personality and Social Psychology, 72,* 855-862.

Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7,* 561-570.

Ntoumanis, N., & Biddle, S. J. H. (1998). The relationship of coping and its perceived effectiveness to positive and negative affect in sport. *Personality and Individual Differences, 24,* 773-788.

Ondersma, S. J., Lumley, M. A., Corlis, M. E., Tojek, T. M., & Tolia, V. (1997). Adolescents with inflammatory bowel disease: The roles of negative affectivity and hostility in subjective versus objective health. *Journal of Pediatric Psychology, 5,* 723-738.

Parkinson, B., & Totterdell, P. (1999). Classifying affect-regulation strategies. *Cognition and Emotion, 13,* 277-303.

Pennebaker, J. W. (1990). *Opening up: The healing power of expressing emotions.* New York: Guilford Press.

Pennebaker, J. W. (1992). Inhibition as the linchpin of health. In H. S. Friedman (Ed.), *Hostility, coping, and health* (pp. 127-139). Washington, DC: American Psychological Association.

Pennebaker, J. W., & Traue, H. C. (1992). Inhibition and psychosomatic processes. In H. C. Traue & J. W. Pennebaker (Eds.), *Emotion, inhibition, and health* (pp. 147-163). Göttingen: Hofgrefe & Huber Publisher.

Posner, M. I., & Rothbart, M. K. (1998). Attention, self-regulation and consciousness. *Philosophical Transactions of the Royal Society of London, 353,* 1915-1927.

Poon, W-T., & Lau, S. (1999). Coping with failure: Relationship with self-concept discrepancy and attributional style. *Journal of Social Psychology, 139,* 639-653.

Porges, S. W., Doussard-Roosevelt, J. A., & Maiti, A. K. (1994). Vagal tone and the physiological regulation of emotion. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 167-186). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Ptacek, J. T., Smith, R. E., & Zanas, J. (1992). Gender, appraisal, and coping: A longitudinal analysis. *Journal of Personality, 60,* 751-770.

Pulkkinen, L. (1982). Self-control and continuity from childhood to adolescence. In B. P. Baltes & O. G. Brim, Jr., (Eds.), *Life-span development and behavior* (Vol. 4, pp. 63-105). Orlando, FL: Academic Press.

Pulkkinen, L. (1987). Offensive and defensive aggression in humans: A longitudinal perspective. *Aggressive Behavior, 13,* 197-212.

Pulkkinen, L. (1995). Behavioral precursors to accidents and resulting physical impairment. *Child Development, 66,* 1660-1679.

Pulkkinen, L. (1996). Female and male personality: A typological and developmental analysis. *Journal of Personality and Social Psychology, 70,* 1288-1306.

Pulkkinen, L. (1998). Levels of longitudinal data differing in complexity and the study of continuity in personality characteristics. In R. B. Cairns, L. R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 161-184). Beverly Hills, CA: Sage.

Pulver, A., Allik, J., Pulkkinen, L., & Hämäläinen, M. (1995). A Big Five personality inventory in two non-Indo-European languages. *European Journal of Personality, 9*, 109-124.

Raglin, J. S., & Hanin, Y. L. (2000). Competitive anxiety. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 93-111). Champaign, IL: Human Kinetics.

Rim, Y. (1993). Coping styles, schizotypy and the opposite directions-effect. *Personality and Individual Differences, 14*, 741-745.

Rosenbaum, M. (1980). A schedule for assessing self-control behaviors: Preliminary findings. *Behavioral Therapy, 11*, 109-121.

Rubin, K. H., Coplan, R. J., Fox, N. A., & Calkins, S. D. (1995). Emotionality, emotion regulation, and preschoolers' social adaptation. *Development and Psychopathology, 7*, 49-62.

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*, 790-803.

Rutter, M. (1989). Pathways from childhood to adulthood. *Journal of Child Psychology and Psychiatry, 30*, 23-51.

Rutter, M. (1995). Causal concepts and their testing. In M. Rutter & D. J. Smith (Eds.), *Psychosocial disorders and in young people: Time trends and their causes* (pp. 7-34). Chichester, England: Wiley.

Saarni, C. (1997). Coping with aversive feelings. *Motivation and Emotion, 21*, 45-63.

Salovey, P., Mayer, J. D., & Caruso, D. (in press). The positive psychology of emotional intelligence. In C. R. Snyder & S. J. Lopez (Eds.), *The handbook of positive psychology.* New York: Oxford University Press.

Salovey, P., Mayer, J. D., Goldman, S., Turvey, C., & Palfai, T. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. W. Pennebaker (Ed.), *Emotion, disclosure, and health* (pp. 125-154). Washington, DC: American Psychological Association.

Salovey, P., Rothman, A. J., Detweiler, J. B., & Steward, W. T. (2000). Emotional states and physical health. *American Psychologist, 55*, 110-121.

Salovey, P., & Sluyter, D. J. (Eds.) (1997). *Emotional development and emotional intelligence: Educational implications.* New York: BasicBooks.

Salovey, P., Stroud, L. R., Woolery, A., & Epel, E. S. (in press). Perceived emotional intelligence, stress reactivity, and symptom reports: Further explorations using the Trait Meta-Mood Scale. *Psychology and Health.*

Sandler, I. N., Tein, J., & West, S. G. (1994). Coping, stress and the psychological symptoms of children of divorce: A cross-sectional and longitudinal study. *Child Development, 65*, 1744-1763.

Seiffge-Krenke, I., & Schulman, S. (1990). Coping style in adolescence: A cross-cultural study. *Journal of Cross Cultural Psychology, 21*, 351-377.

Shadish, W. R., Jr., & Sweeney, R. B. (1991). Mediators and moderators in meta-analysis: There's a reason we don't let dodo birds tell which psychotherapies should have prizes. *Journal of Consulting and Clinical Psychology, 59*, 883-893.

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology, 33*, 906-916.

Shipman, K., Zeman, J., Penza, S., & Champion, K. (2000). Emotion management skills in sexually maltreated and nonmaltreated girls: A developmental psychopathology. *Development and Psychopathology, 12*, 46-62.

Smith, J. C., & Crabbe, J. B. (2000). Emotion and exercise. *International Journal of Sport Psychology, 31*, 156-174.

Smith, S. M., & Petty, R. E. (1995). Personality moderators of mood congruency effects on cognition: The role of self-esteem and negative mood regulation. *Journal of Personality and Social Psychology, 68*, 1092-1107.

Smith, T. W., & Williams, P. G. (1992). Personality and health: Advantages and limitations of the five-factor model. *Journal of Personality, 60*, 395-421.

Spain, J. S., Eaton, L. G., & Funder, D. C. (2000). Perspectives on personality: The relative accuracy of self versus others for the prediction of emotion and behavior. *Journal of Personality, 68*, 837-867.

Spruijt-Metz, D. (1999). *Adolescence, affect, and health.* Hove, England: Psychology Press.

Stansbury, K., & Gunnar, M. R. (1994). Adrenocortical activity and emotion regulation. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 108-134). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Stansbury, K., & Sigman, M. (2000). Responses of preschoolers in two frustrating episodes: Emergence of complex strategies for emotion regulation. *Journal of Genetic Psychology, 161*, 182-202.

Suls, J., Wan, C. K., & Costa, P. T. (1995). Depression, anxiety, hostility, and physical health. *Current Psychology, 13*, 69-82.

Thayer, R. E. (1996). *The origin of everyday moods: Managing energy, tension, and stress.* New York: Oxford University Press.

Thayer, R. E., Newman, J. R., & McClain, T. M. (1994). Self-regulation of mood: Strategies of changing a bad mood, raising energy, and reducing tension. *Journal of Personality and Social Psychology, 67*, 910-925.

Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Socioemotional development. Nebraska symposium on motivation* (Vol. 36, pp. 367-467). Lincoln, NE: University of Nebraska Press.

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (pp. 25-52). Monographs of the Society for Research in Child Development, 59 (2-3, Serial No. 240). Chicago: University of Chicago Press.

Thompson, R. A., & Calkins, S. D. (1996). The double-edged sword: Emotional regulation for children at risk. *Development and Psychopathology, 8*, 163-182.

Thompson, R. A., Flood, M. F., & Lundquist, L. (1995). In D. Cicchetti & S. L. Toth (Eds.), *Emotion, cognition, and representation. Rochester symposium on developmental psychopathology* (Vol. 6, pp. 261-299). Rochester, NY: University of Rochester Press.

Tice, D. M., & Bratslavsky, E. (2000). Giving in to feel good: The place of emotion regulation in the context of general self-control. *Psychological Inquiry, 11*, 149-159.

Tobin, R. M., Graziano, W. G., Vanman, E. J., & Tassinary, L. G. (2000). Personality, emotional experience, and efforts to control emotions. *Journal of Personality and Social Psychology, 79*, 656-669.

Totterdell, P., & Parkinson, B. (1999). Use of effectiveness of self-regulation strategies for improving mood in a group of trainee teachers. *Journal of Occupational Health Psychology, 4*, 219-232.

Ullman, J. B. (1996). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell (Eds.), *Using multivariate statistics* (3rd ed., pp. 709-811). New York: Harpercollins College.

Underwood, M. K. (1997). Top ten pressing questions about the development of emotion regulation. *Motivation and Emotion, 21*, 127-146.

Vollrath, M., Alnaes, R., & Torgersen, S. (1996). Differential effects of coping in mental disorders: A prospective study in psychiatric outpatients. *Journal of Clinical Psychology, 52*, 125-135.

Vollrath, M., Knoch, D., & Cassano, L. (1999). Personality, risky health behaviour, and perceived susceptibility to health risks. *European Journal of Personality, 13*, 39-50.

Vollrath, M., Torgersen, S., & Alnaes, R. (1995). Personality as long-term predictor of coping. *Personality and Individual Differences, 18*, 117-125.

Walden, T. A., & Smith, M. C. (1997). Emotion regulation. *Motivation and Emotion, 21*, 7-25.

Watson, D. (2000). *Mood and temperament*. New York: Guilford Press.

Watson, D., & Clark, L. A. (1994). Emotions, moods, traits, and temperaments: Conceptual distinctions and empirical findings. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion* (pp. 89-93). New York: Oxford University Press.

Watson, D., David, J. P., & Suls, J. (1999). Personality, affectivity, and coping. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 119-140). New York: Oxford University Press.

Watson, D., & Hubbard, B. (1996). Adaptational style and dispositional structure: Coping in the context of the five-factor model. *Journal of Personality, 64*, 737-774.

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review, 96*, 234-254.

Wiebe, D. J., & Smith, T. W. (1997). Personality and health: Progress and problems in psychosomatics. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 891-918). San Diego, CA: Academic Press.

Wilson, B. J. (1999). Entry behavior and emotion regulation abilities of developmentally delayed boys. *Developmental Psychology, 35*, 214-222.

Zapf, D., Dormann, C., & Freze, M. (1996). Longitudinal studies in organizational stress research: A review of the literature with references to methodological issues. *Journal of Occupational Health Psychology, 1*, 145-169.

Zeman, J., & Garber, J. (1996). Display rules for anger, sadness, and pain: It depends on who is watching. *Child Development, 67*, 957-973.

I

Emotion regulation strategies in relation to personality characteristics indicating low and high self-control of emotions

by

Marja Kokkonen & Lea Pulkkinen

Personality and Individual Differences, 27, 913-932.

https://doi.org/10.1016/S0191-8869(99)00040-9

II

Examination of the paths between personality, current mood, its evaluation, and emotion regulation

by

Marja Kokkonen & Lea Pulkkinen

European Journal of Personality, 15, 83-104.

https://doi.org/10.1002/per.397

III

Extraversion and neuroticism as antecedents of emotion regulation and dysregulation in adulthood

by

Marja Kokkonen & Lea Pulkkinen

European Journal of Personality (in press)

https://doi.org/10.1002/per.425

IV

Low self-control of emotions as an antecedent of self-reported physical symptoms: A longitudinal perspective

by

Marja Kokkonen, Lea Pulkkinen, & Taru Kinnunen

European Psychologist, 6(1), 26-35.

https://psycnet.apa.org/doi/10.1027/1016-9040.6.1.26

V

Direct and indirect effects of adolescent self-control of emotions and behavioural expression on adult health outcomes

by

Marja Kokkonen, Taru Kinnunen, & Lea Pulkkinen

Psychology and Health (in press)

https://doi.org/10.1080/08870440290025849