Effects of Positive Metacognitions and Meta-Emotions on Coping, Stress Perception and Emotions

DOCTORATE OF PHILOSOPHY

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References

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Study 1 **Adaptive metacognitive self-regulation and resilience-related assets in the midst of challenge – A qualitative analysis**

Beer, N. & Moneta, G.B. (2011). Adaptive metacognitive self-regulation and resilience-related assets in the midst of challenge: A qualitative analysis. In: Chatzi, V. *Psychology of Self-Regulation*, NOVA Publisher, USA [in press].

Investigation of adaptive self-regulation and functional resilience related assets. 14th European Congress of Work and Organizational Psychology (EAWOP), Santiago de Compostela, May 2009.

Study 3 **Corroboration of factor structure and assessment of concurrent validity (Construct and concurrent validity of the PMCEQ)**

Beer, N. & Moneta, G.B. (2010). Construct and concurrent validity of the Positive Metacognitions and Positive Meta-Emotions Questionnaire. *Personality and Individual Differences, 49*, 977-982.

Study 4 **Coping and perceived stress as a function of positive meta-cognitions and positive meta-emotions**

Beer, N. & Moneta, G.B. (2010). Coping and perceived stress as a function of positive metacognitions and positive meta-emotions. *Individual Differences Research*, accepted 09-05-2011

Coping and perceived stress as a function of positive metacognitions and positive meta-emotions. 15th European Congress of Work and Organizational Psychology (EAWOP), Maastricht, May 2011.

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AD	Anxiety Disorder
ADCOPE	Adaptive Coping (conceptualised latent variable)
ANXIET	Anxiety (conceptualised latent variable)
BDI	Beck Depression Inventory
CANTAB	Cambridge Neurophysiological Automated Battery
CAS	Cognitive Attentional Syndrome
CBT	Cognitive Behavioural Therapy
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
COPE	Brief Coping Questionnaire
DEPRES	Depression (conceptualised latent variable)
EFA	Exploratory Factor Analysis
fMRI	Functional Magnetic Resonance Imaging
GAD	Generalised Anxiety Disorder
GFI	Goodness of Fit Index
HADS	Hospital Anxiety and Depression Scale
LISREL	Linear Structural Relations (Software program, Version 8.80)
MACOPE	Maladaptive Coping (conceptualised latent variable)
MCT	Metacognitive Therapy
MCQ (-30)	Metacognitions Questionnaire (-30)
MDD	Major Depressive Disorder
OCD	Obsessive-Compulsive Disorder
PCA	Principal Component Analysis
PMCEQ	Positive Metacognitions and Positive Meta-Emotions Questionnaire
PBRS	Positive Beliefs about Rumination Scale
PSS	Perceived Stress Scale
PSTRESS	Perceived Stress (conceptualised latent variable)
PTDS	Post Traumatic Stress Disorder
RCT	Randomised Controlled Trial
RMSEA	Root Mean Square Error of Approximation

SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual
S-REF	Self-Regulatory Executive Function
WHO	World Health Organisation
WPI	Work Preference Inventory

Abstract

Increasing empirical evidence within the last decade suggests that onset and maintenance of major depressive disorder and other psychological disorders share a metacognitive aetiology. Metacognition refers to self-knowledge, control and monitoring of one's own thinking processes and has by nature negative connotations in the context of psychopathological disorders. The core aims of this thesis comprised the development, validation and outcome-focussed test of a novel instrument for the assessment of adaptive metacognitive and meta-emotional self-regulation, as opposed to maladaptive metacognitive regulation within psychopathological models. The stimulus for this research was provided by a plethora of evidence that the reverse, i.e. maladaptive, metacognitions contribute to the aetiology of a range of psychological disorders. The rationale was that if the novel instrument of positive metacognitions and meta-emotions showed good psychometric properties, the underlying psychological constructs could inform clinical and coaching interventions or at least increase awareness of self-regulatory means for maintaining and sustaining psychological equilibrium in times of challenge, unpredictability and ambiguity.

Whereas models of maladaptive metacognitions (e.g. Wells and Matthews, 1994, 1996; Wells, 2000, 2009) have been empirically tested in the realm of psychopathology, no research has yet been conducted with regards to the psychological effects of adaptive metacognitions and meta-emotions. Core objectives of the five studies within this thesis encompassed the development of an instrument to measure positive metacognitions and meta-emotions, its subsequent statistical validation and the investigation of the impacts adaptive metacognitions exert on coping, stress perception and emotions.

Chapter 1 introduces the historical origins and fundamental conceptualisations of metacognitions, meta-emotions and relevant associated psychological constructs. It then describes Wells and Matthews' (1994, 1996) Self-Regulatory Executive Function (S-REF) model and Wells' (2000) metacognitive model of emotional disorders which provided the framework for deriving the inverse constructs of positive metacognitions and meta-emotions.

In Chapter 2 the qualitative Study 1 is described which attempted to derive positive metacognitive self-regulatory processes by extending Wells and Matthews' (1994, 1996) and Wells' (2000, 2009) metacognitive model of psychological and emotional disorders and blending it with adaptive assets within a positive psychology framework. Thirteen interviewees were recruited by purposive sampling based on their assumed positive metacognitions and adaptive personality assets. A semi-structured interview schedule was employed to elicit interviewees' recall of self-regulatory processes and also their accounts of adaptive assets when facing challenging tasks or projects. Transcripts were analysed utilising Hayes' (1997) Theory-led Thematic Analysis blended with a Grounded Theory approach. Results reflected that the majority of participants used adaptive metacognitions. The derived metacognitive framework of adaptive self-regulation during challenge comprised three factors: (1) Confidence in Extinguishing Perseveration, (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving and (3) Confidence in Setting Flexible and Feasible Hierarchies of Goals. In terms of assets, resilience emerged as a key theme with the two subordinate themes of agency and communion. Study 1 revealed that long-term challenge scenarios require a higher degree of resilience-related factors, whereas self-regulation appears to be crucial when the challenge is of a short-term nature. The

aforementioned confidence domains of adaptive metacognitive (and meta-emotional) self-regulation provided the framework for the item wording and the development of a questionnaire measuring adaptive metacognitive and meta-emotional beliefs in the midst of challenging situations.

Chapter 3 describes Study 2 which developed and validated the Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ) which taps individuals' adaptive metacognitive beliefs and regulation strategies when facing challenging situations. 313 participants completed a preliminary version of the questionnaire whose items were derived from the qualitative Study 1 in Chapter 2. Exploratory factor analysis identified three intercorrelated factors that accorded with the confidence categories that emerged in the qualitative analysis. The three-factor questionnaire was reduced from an initial item pool of 49 to a final 18 items, with each factor consisting of 6 items. The three factors (dimensions or subscales) of the PMCEQ will subsequently be referred to as PMCEQ-1, PMCEQ-2 and PMCEQ-3, respectively.

Chapter 4 describes Study 3, in which 475 participants completed the developed PMCEQ, Meta-Cognitions Questionnaire 30 (MCQ-30), and Work Preference Inventory (WPI), with the aim of establishing and assessing the concurrent validity of the PMCEQ. Confirmatory factor analysis corroborated the structure of the scale. Subscale scores had meaningful correlations with measures of maladaptive metacognition and intrinsic and extrinsic motivation. The findings indicate that the developed PMCEQ scale produces valid and reliable scores.

Chapter 5 outlines Study 4, Part A which explored the linear relationships between maladaptive metacognitions (MCQ-30) and PMCEQ factors as independent variables and adaptive coping strategies, maladaptive coping strategies and perceived

stress as outcome variables. A convenience sample of 212 participants completed the following questionnaires: PMCEQ, MCQ-30, Brief Coping Questionnaire (COPE), and Perceived Stress Scale (PSS). Due to fairly high intercorrelation between PMCEQ-2 and PMCEQ-3, with potential problems for SEM techniques, both factors were integrated into the aggregated PMCEQ-2* construct. Results showed that all hypothesised paths of the PMCEQ were significant and in line with the hypotheses: PMCEQ-1 – Confidence in Extinguishing Perseveration – was negatively predictive of maladaptive coping strategies and perceived stress. The composite and agency-related PMCEQ-2/PMCEQ-3 construct (PMCEQ-2*) – Confidence in Interpreting Own Emotions, Restraining from Immediate Reaction, and Mind-Setting for Problem-Solving with subsequent Confidence in Setting Flexible and Feasible Hierarchies of Goals – positively predicted adaptive coping strategies and negatively predicted perceived stress. Interestingly, the MCQ-30 showed no significant relationships with any of the three outcome variables in the final SEM model. These findings suggest that adaptation to challenging situations not only requires the absence of maladaptive metacognitive traits but, moreover, the presence of positive metacognitive and positive meta-emotional traits as measured by the PMCEQ.

Extending Study 4, Part A, Chapter 6 describes the final Study 4, Part B, using the same participants as Part A, in which the relationships between the PMCEQ and MCQ-30 as independent variables and anxiety and depression as outcome variables were assessed. Anxiety and depression were measured by means of the Hospital Anxiety and Depression Scale. PMCEQ-1 was strongly and negatively correlated with anxiety and depression; the same applied to PMCEQ-2 but to a lesser extent. The more agentic, rather than perseveration decreasing, PMCEQ-3 did not predict anxiety

or depression. In line with a plethora of previous research evidence the MCQ-30 positively and strongly predicted anxiety and depression.

Inherent strengths and limitations of the five studies comprising research and their implications for theory, research and practice are addressed in the General Discussion. Derived practice recommendations comprise treatment implications and interventions in clinical, counselling and coaching psychology.

Declaration

I hereby declare that to the best of my knowledge and belief, no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Copyright statement

Ethical Approval

The ethical principles stated by the British Psychological Society's Code of Ethics and Conduct and Supplementary Guidelines were strictly adhered to. For each of the five studies participants were recruited on a voluntary basis, received a written briefing and had to sign a consent form – emphasising confidentiality, anonymity and the right to withdraw – and could after participation opt for a debriefing. With the exception of Study 1, where interviewees were debriefed orally and immediately after the interview, participants received a written feedback.

The complete PhD research was ethically approved by the Research Ethics Review Panel of the School of Psychology within the Faculty of Life Sciences at London Metropolitan University. The School of Psychology also issued an Ethics Certificate on the 19th February 2010 (Dr Chris Cocking, Chair of the Psychology Ethics Committee).

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Chapter 1

Introduction

This introductory section will briefly outline the historical roots and conceptual development of the term "metacognition" and its proceeding constructs, followed by short accounts of the two relevant domains in theory, research and practice where metacognitions are at the focus: adaptive metacognitions have been researched in the areas of developmental and educational psychology, whereas metacognitions of maladaptive or dysfunctional nature are subjects of psychopathology and clinical research.[1] The metacognitive perspective will be augmented by meta-emotions and further psychological constructs being related to metacognitions. The chapter concludes with an outline of the core aims of the thesis.

1.1. Concept and historical development of metacognition

Semantically the term metacognition refers to the mental process of knowledge acquisition (Latin: Cognoscere, "to know", "to conceptualize") on a higher order or executive level (Greek: Meta, "beyond"). In its most rudimentary form and in various sources the psychological construct of metacognition has been ascribed to as "thinking about [one's own] thinking" or "cognition about [one's own] cognition" (e.g. Nelson, 2002). More explicitly emphasising the knowledge component and also accounting for a control factor, Brown (1987) proposed the definition "Metacognition refers loosely to one's knowledge and control of his/her cognitive processes" (p. 66).

[1] In the wider context within this thesis (and with reference to Study 3 and Study 4 Parts A and B) both types of metacognitions – the dysfunctional or psychopathological ones and the adaptive or positive ones inferred in this research – will be taken into account. This necessarily results from one core goal that this research will pursue: to test the assumption common in positive psychology (e.g. Wright & Lopez, 2002) that psychological stability and adaptation is not merely due to the absence of maladaptive dispositions but is also fostered by adaptive dispositions.

Yet, a more encompassing definition highlights that metacognition is a multifaceted concept comprising "knowledge (beliefs), processes and strategies that appraise, monitor and control cognition" (Wells, 2000, p. 7). Prior to revisiting and substantiating this wide and holistic definition, a brief historical account of relevant metacognition conceptualisations will be provided.

John Flavell, Stanford University, has been regarded as the foundation researcher in the field of metacognitions. Flavell (1976) proposed that metacognition comprised both monitoring and regulation processes: "In any kind of cognitive transaction with the human or non-human environment, a variety of information processing activities may go on. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective" (p. 232). The definition implies a core link between metacognition, problem solving and goal setting.

Although Flavell is often cited as the psychologist who coined the term metacognition first writings on metacognition can be traced back as far as the *Parva Naturalia* of the Greek philosopher Aristotle (384-322AD). Moreover, the Greek Stoic philosopher Epictetus (135-55AD) emphasized the importance of self-knowledge and logical reasoning (as opposed to irrationalities) for achieving happiness. The following two citations reflect the importance Epictetus attributed to individuals' interpretations or, in contemporary psychological jargon, the relevance of cognitions and interlinked appraisal processes: "Men are disturbed not by things, but by the view which they take of them." and "It is not external events themselves that

cause us distress, but the way in which we think about them, our interpretation of their significance."[2]

Adaptive metacognitions, those that are self-enhancing and constructive, have been investigated in terms of children's cognitive development and with regard to their acquisition of productive memory and learning strategies. The influential developmental psychologists Piaget (1973) and Vygotsky (1978, 1981) applied metacognitive theory to children's cognitive development positing that as children learn things, they also develop a gradually increasing understanding of their learning processes. These scholars also distinguished between two components of metacognitions: awareness of one's own thinking processes, i.e. cognitive monitoring, on one hand and controlling one's thinking and learning processes, i.e. metacognitive regulation on the other hand (Hacker, 1998). Increasing understanding of their own cognitive processes allows children to self-develop general or master plans, i.e. strategies to deal with memory and cognitive tasks. Gleitman, Fridlund and Reisberg (2004) provide a simple but intuitive example: a child taught to remember a set of names by reciting it aloud will, as a result of metacognitive learning, be able to apply this rehearsing strategy on his/her own to other tasks such as remembering items from a shopping list. Vygotsky augmented Piaget's work with a social component stressing the role of social interactions during (cognitive) development. Children are initially thought to develop knowledge and strategic regulations through interaction with more experienced children but gradually develop their own capability by means of autonomous self-regulation.

Based upon and expanding the growing fields of memory research in the 1960s and of information processing models in the 1970s psychologists – most

[2] Reference: http://www.getselfhelp.co.uk/epictetus.htm

importantly Flavell (1979) and Brown (1980) – put forward developmental metacognitive theories of children's thinking processes. Early memory researchers focussed on feeling of knowing states and memory monitoring, whereas subsequently developed information processing models emphasised executive control systems for the regulation of cognitive processes. The main impetus was provided by Flavell (1976) who first used the term "metamemory" applied to the knowledge children hold and gradually develop further about their memory processes. Expanding the concept of metamemory Flavell looked into the explicit role of metacognitions. He proposed a basic metacognitive model comprising the two components metacognitive knowledge (knowledge about one's own cognitions) and metacognitive regulation (regulation of one's own cognitions).

Metacognitive knowledge refers to the "knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises" (Flavell, 1979, p. 4). These factors comprise three categories: (1) the person category referring to self-knowledge and self-beliefs individuals hold as cognitive processors; (2) the task category relating to the available information about the object during a cognitive enterprise and (3) the strategy category referring to the acquired knowledge in terms of what strategies are likely to achieve what sort of goals. Unlike Flavell, who used the person-task-strategy taxonomy to conceptualise metacognitive knowledge, Brown (1987) emphasised that metacognitive knowledge is grounded in an individual's consciousness or awareness of metacognitive knowledge comprising declarative ("knowing what"), procedural ("knowing how") and conditional knowledge ("knowing why and when"). Metacognitive regulation as the second component refers to processes that coordinate cognition. It can be conceptualised as the ability of effective, self-regulated and strategic use of

metacognitive knowledge to achieve cognitive goals. As Boekaerts (1997) points out metacognitive regulation in the learning context consists of the selection, combination and coordination of effective strategies. The ability to transfer metacognitive knowledge and metacognitive regulation acquired in one situation (or domain) to another situation (or domain) characterises self-regulated successful learners (Panaoura, Philippou and Christou, 2001). The emphasised distinction between knowledge about cognition and regulation of cognition is commonly shared by educational psychologists with the viewpoint that such metacognitive knowledge and metacognitive regulation are interrelated.

More recently Wells and Matthews (1994, 1996) and Wells (2000) developed a comprehensive metacognitive model of psychological and emotional disorders focusing on how the underlying cognitive processes and mechanisms, rather than the content of individuals' thoughts, contribute to a plethora of psychological disorders.[3] Cognitive "locked-in states" characterised by cyclical, rigid and negative thinking patterns are hypothesised to obstruct the view of alternative, more constructive thoughts and subsequent actions. Wells' metacognitive model of emotional disorder provided a framework within this thesis to derive and develop a measure for metacognitions and meta-emotions of the opposite type, i.e. those being functional and adaptive. Therefore Wells' (2000) model will be described in the following section outlining how the hypothesised maladaptive processes contribute to psychological distress.

[3] It will be shown that emphasis on thought processes rather than thought content distinguishes Wells' corresponding Metacognitive Therapy (MCT, 2009) from traditional CBT approaches.

1.2. The role of dysfunctional metacognitions in psychopathology

The construct of positive self-regulatory processes investigated in this thesis has partially been derived from and is partially grounded in Wells and Matthews' (1994, 1996) Self-Regulatory Executive Function (S-REF) model and Wells' (2000, 2009) metacognitive model of emotional disorders. Wells and Matthews' model focuses on underlying cognitive mechanisms, as opposed to mere thought content, to explain their distinct contributions to psychological disorders. In the light of the provided research evidence and its suitability for deriving the reverse constructs of psychological stability, i.e. adaptive metacognitions and meta-emotions, Wells and Matthews' S-REF model will subsequently be described in some detail.[4] It should be reiterated that Wells and Matthews' (1996) valuable model does not comprise meta-emotions. Both authors follow the strict cognitive paradigm according to which emotions are claimed to be the mere results of evaluative or appraisal processes. Even though the viewpoint in this thesis is that emotions and meta-emotions have some distinct phenomenal properties, Wells and Matthews model (1994) provides the basis for deriving positive metacognitive (and meta-emotional) constructs. Hence, inclusion of (adaptive) meta-emotions extends and goes beyond Wells and Matthew's approach.

In Flavell's (1979) and Wells' (2000) conceptualisations, metacognitions refer to the beliefs, psychological structure and processes implied in controlling, interpreting and potentially modifying thinking itself. According to Wells' (2000) model three core varieties of metacognition are theorised as being central to the development and maintenance of psychological dysfunction and disorders:

(a) Metacognitive beliefs (self-knowledge) referring to the information individuals hold about their own cognition and internal states, and about

[4] The model will be applied in Study 1 (Chapter 2) in order to derive "categories" of positive meta-cognition that have partially informed the interview schedule by means of inferred themes.

subsequent coping strategies that impact on both (Brown, 1987; Wells and Matthews, 1994, 1996; Wells, 2000, 2009);

(b) Metacognitive experiences conceptualised as (valance) appraisal and interpretations of cognitive experiences (thoughts) at a conscious level;

(c) Metacognitive control and regulation comprising a range of executive functions, most importantly allocation of attention, monitoring, checking and planning (Brown, Bansford, Campione & Ferrara, 1983). In emotional disorders metacognitive control and regulation is prolonged and negatively biased with frequent, excessive self-focussed attention and threat monitoring (Wells & Matthews, 1994, 1996; Wells, 2000, 2009).[5]

The tenet of the metacognitive theory of psychological disorders is that the (maladaptive) metacognitive beliefs represent a vulnerability factor in predisposing individuals to develop dysfunctional response patterns to thoughts and internal states when such "vulnerable" individuals are confronted with difficult and challenging situations or tasks. Such maladaptive response patterns comprise not only elevated self-focussed attention with a tendency of threat monitoring but also rumination, i.e. recyclical thinking patterns, thought suppression and maladaptive coping strategies, e.g. behavioural disengagement or even avoidance. The described dysfunctional response patterns conjointly constitute a cognitive-attentional syndrome (CAS; Wells, 2000). Maladaptive metacognitions are theorised to trigger and, moreover, maintain the CAS and to become activated and, as will be shown below, perseverative whenever a "vulnerable" individual encounters prolonged problematic situations.

[5] The majority of researchers favour a central role for awareness in metacognition (metacognitive awareness). Others (e.g. Kentridge & Heywood, 2000), however, include unconscious knowledge, beliefs and processes as aspects of implicit or background information assuming that (some) metacognitive processes do not necessarily evoke awareness/consciousness.

The Self-Regulatory Executive Function (S-REF) model (Wells and Matthews, 1994, 1996) can be evaluated as a valuable attempt to identify underlying mechanisms and to explain the interactions by which the three metacognitive constructs – beliefs, experiences, and regulation – unfold and exert their dysfunctional effects resulting in the CAS which has recently been shown to be a core aetiological agent in a plethora of psychological disorders.[6] The architecture of the S-REF model comprises three distinct but interrelated levels of cognitive operations (Wells, 2000):

(a) The schema level stores self beliefs and self-knowledge in long-term memory and is theorised to be predominantly driven by top-down processing and to play a role in the selection of generic plans (control);

(b) The online controlled processing level at which conscious metacognitive self-regulation takes place by appraising events and utilising metacognitive control strategies; this level is regarded as the core element of the S-REF with a bidirectional relationship to the schema level. This bidirectionality refers to interdependencies between monitoring and control processes: the S-REF assesses self beliefs or schemata (monitoring) and self beliefs in turn inform the S-REF by selection of generic plans (control);

(c) The stimuli-driven lower level which contrary to the online-controlled processing level is regarded as automatic, predominantly unconscious and requiring minimal attentional resources.[7]

Online-controlled processing is the core metacognitive control strategy, taking place at the conscious level and hence being fundamental to the individual's self-

[6] An overview of core studies providing empirical evidence for the S-REF model is outlined at the end of this section and at the end of Section 1.2 with more reference to distinct maladaptive metacognitive factors or subscales.

[7] Wells and Matthews' three level architecture of their S-REF model extends Nelson and Naren's (1990) two level model comprising a meta-level and object-level. Nelson and Naren's meta-level/object-level raises "the question of what it is that controls the meta-level" (Wells, 2000, p. 8). The S-REF model has provided the potential explanation by means of the schema level.

awareness. The notion of consciousness and awareness incorporates the relevant aspect of implied intentionality. It can be inferred that the online controlled processing level of the S-REF model processes the kind of metacognitions which elicit or evoke consciousness. Maladaptive attentional styles, i.e. dysfunctional cognitive filtering (e.g. threat monitoring, monitoring for somatic cues and negative thoughts), are theorised to be associated with negative emotions due to detrimental and perseverative strategies (prolonged active worry and rumination). In general terms perseveration refers to the automatic and continuous repetition of a thought, action or other form of behaviour (Colman, 2009). The crucial dysfunctional effect of prolonged or perseverative S-REF activity lies in its induced disruption and/or prevention of engagements in functional cognitive processes which would potentially allow subsequent goal achievement or, alternatively, beneficial belief change (Wells, 2000).

It can be concluded from the outlined metacognitive architecture and its underlying processes that Wells' (2000) metacognitive model of emotional disorders proposes that prolonged, rigid and negatively biased control (perseverative S-REF) results in negative affective states and, subsequently, in maladaptive, inflexible and passive (maladaptive) coping strategies and behaviour, thus preventing belief change, utilisation of more adaptive and agentic coping strategies and consequently undermining goal achievement. Bouts of prolonged S-REF activity, which are typical of emotionally volatile individuals, specifically when they encounter challenging or difficult situations, are linked to the object mode of processing; in object mode distressing thoughts are regarded as (threatening) facts. Psychologically stable individuals, when encountering difficulty or challenge, by contrast display a high proportion of the functional metacognitive mode; in metacognitive mode distressing thoughts are not regarded as facts but as cues which require subsequent evaluation in

terms of potentially threatening impacts. Both modes of processing - object and metacognitive – are characterised in more detailed fashion below.

Wells and Matthews (1994, 1996) and Wells (2000, 2009) apply the above-mentioned crucial distinction between metacognitive and object mode which individuals can operate when confronted with a taxing situation or event. The metacognitive mode is functional and positively impacts on belief elaboration. In contrast the object mode is theorised to be dysfunctional because it triggers prolonged bouts of S-REF activity, i.e. perseveration, and is only advantageous in the presence of objective threats. When cognitively operating in object mode, an individual interprets somewhat worrying or distressing thoughts as facts, whereas when operating in metacognitive mode an individual interprets these thoughts just as events or cues that have to be subsequently evaluated. The object mode is theorised to be functional only in genuinely threatening situations, and to be dysfunctional in all other situations because it fosters perseverative thinking and hence maladaptive coping. The metacognitive mode is theorised to be functional across the board because it enhances evidence-based belief elaboration and hence adaptive coping and subsequent agentic behaviour.

A key prediction of the Wells and Matthews' (1994, 1996) and Wells' (2000, 2009) theory is that, compared with individuals who score highly on maladaptive metacognitive traits as measured by the Meta-Cognitions Questionnaire (MCQ; Cartwright-Hatton & Wells, 1997) [see Section 1.3], individuals with low scores on maladaptive metacognitive traits are more likely to operate in metacognitive mode when facing a problematic situation. The key distinguishing characteristic between both modes lies in the (non-reflective) reactivity of the disadvantageous objective mode as opposed to the reflectivity of the advantageous metacognitive mode.

Regardless of the fact that Wells and Matthews (1994, 1996) and Wells (2000) posit a trait concept of metacognitions it is argued here that increased self-awareness and consciousness might be means for individuals to more often "operate in the metacognitive mode". The possibility of cultivating the advantageous metacognitive mode is inherently implied in clinical applications of metacognitive theory in the form of Metacognitive Therapy (MCT; Wells, 2000, 2009).

Table 1 contrasts both modes in terms of corresponding metacognitions, goals, strategies or related actions and likely outcomes. The core difference between object and metacognitive mode is contrasted in the "Metacognitions" row. The object mode implies that any potential threat is perceived as real and subsequently requiring action; in metacognitive mode potential threats and associated thoughts are first evaluated in terms of genuine threat severity.

Table 1

Object versus metacognitive S-REF mode

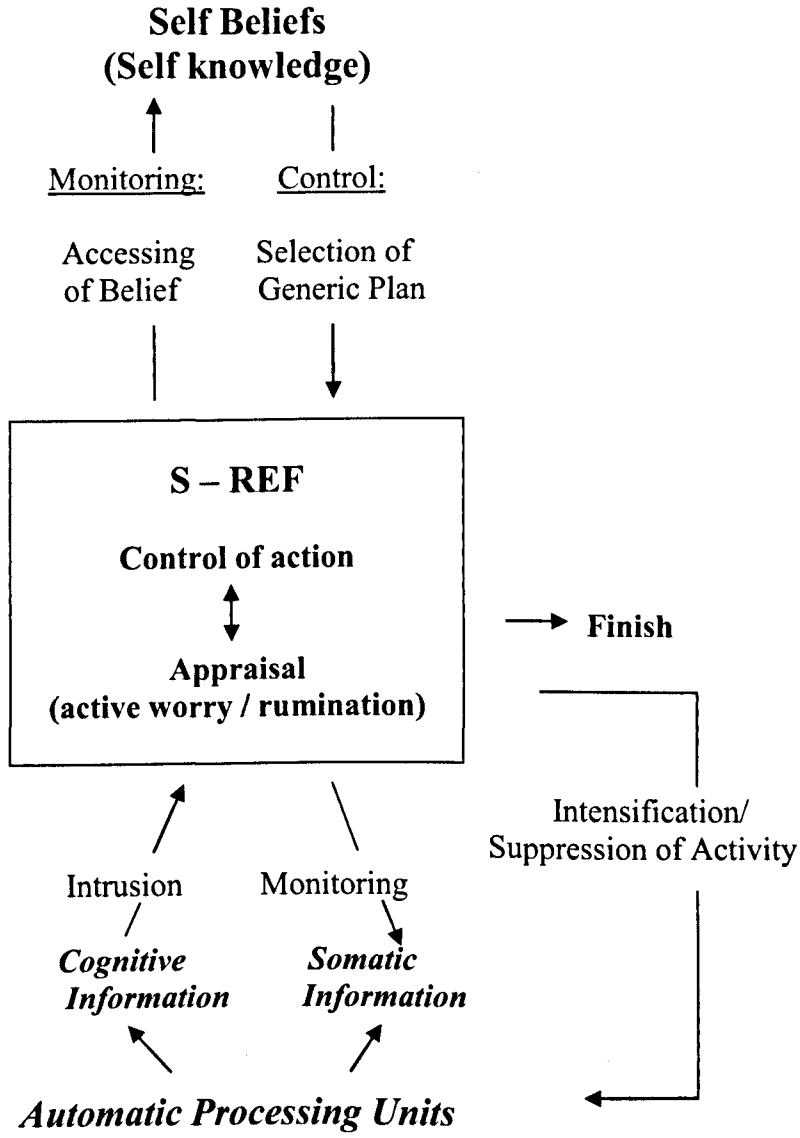
Following Wells (2000, p. 121)

	Object Mode (Reactive – usually maladaptive/dysfunctional)	**Metacognitive Mode** (Reflective – adaptive/ functional)
Metacognitions:	Thoughts are seen as depicting the reality with the perception that potential threats are "real" or objective; individuals feel the necessity to act upon these thoughts.	Thoughts are regarded as (initially) neutral "events" or cues rather than realities; potential threat is perceived as subjective and associated thoughts must be evaluated.
Goals:	Elimination of (perceived) threat.	Modification of thinking.
Strategies/ Actions:	The main strategy is threat (not thought) evaluation which executes threat-reducing behaviours (e.g. worry, threat monitoring).	The main strategy is thought (not threat) evaluation which executes metacognitive control (e.g. redirection of attention, suspension of both worry and rumination).
Likely outcomes:	Maladaptive knowledge is strengthened resulting in a manifestation of negative schemas.	Knowledge is restructured and new plans are developed; increased coping flexibility is employed.

A simplified version of Wells and Matthews (1994, 1996) S-REF model is depicted in Figure 1 which shows that psychologically stable individuals, as opposed to those vulnerable to psychological disorders, can terminate excessive self-regulatory activity rapidly. This reflects Wells and Matthews' (1994, 1996) emphasis on the crucial role of the online-controlled processing level in psychological disorders. The automatic processing level, driven by sub- or unconscious processes appears to comprise somewhat unclear mental mechanisms as reflected by potential "intrusion".

Figure 1

Simplified diagram of Wells and Matthews' (1994) Self-Regulatory Executive Function (S-REF) model



The remainder of this section looks concisely into the research evidence for Wells and Matthews' metacognitive theory (1994, 1996) and Wells' (2000) metacognitive model of emotional disorders. Empirical support for the link between individual dimensions of dysfunctional metacognition and psychopathology has been provided by a plethora of recent studies. Relationships between metacognitive constructs and psychological disorders have been found specifically for: pathological worry and generalised anxiety disorder (Cartwright-Hatton & Wells, 1997; Wells &

Carter, 2001); obsessive-compulsive symptoms (Wells & Papageorgiou, 1998); test anxiety (Spada, Nikčević, Moneta & Ireson, 2006); posttraumatic stress disorder (Roussis & Wells, 2006); problem drinking (Spada, Moneta & Wells, 2007; Spada, Zandvoort & Wells, 2006) and smoking dependence (Spada, Nikčević, Moneta & Wells, 2007).

The valid and reliable measurement instrument of dysfunctional metacognitions – Wells and Cartwright-Hatton's (2004) Meta-Cognitions Questionnaire 30 (MCQ-30) – has been widely applied in order to test the metacognitive model of emotional disorders in a variety of clinical and non-clinical settings. The next section will provide a succinct description of the questionnaire and its subscales (metacognitive factors) and also research evidence for the distinct role of the subscales/factors in psychological disorder.

The following brief outline of the treatment implications of Wells' (2000) metacognitive S-REF model of emotional disorders informs interventions with respect to the functional metacognitions under investigation in this thesis. A cornerstone of Wells' (2000, 2009) developed metacognitive therapy is that, rather than just challenging negative (automatic) thoughts, patients should be guided to dynamically create adaptive replacement self-knowledge which positively impacts upon the S-REF response to stress. Rather than focusing (merely) on the content of thoughts vulnerable individuals should be coached to replace maladaptive aspects of their cognitive processes, e.g. selective attention, threat monitoring and rigid thinking styles such as chronic worry and rumination, by more adaptive "plans". Modification of such dysfunctional plans is hypothesised to gradually result in more dynamic formulation of adaptive self-knowledge. Such more functional self-beliefs can be theorised to prevent or quickly extinguish excessive worrying and ruminative S-REF

activity. In essence Wells (2000) suggests that such techniques aimed at early blockage of perseverative thinking would increase subjective control over cognitive processing which in turn could "facilitate efficient disconfirmatory processing" (p. 102).

The metacognitive basis of psychological disorder and the corresponding main treatment implications valuably inform this thesis as it can be theorised that individuals displaying psychological well-being are characterised by the absence or low degrees of such dysfunctional processing. The core question which will be answered empirically in Chapters 2 to 6, comprising Studies 1 to 4 Part B, is whether stable individuals are merely characterised by such a lack of maladaptive traits or possess in addition specific positive trait characteristics above and beyond Wells' (reversed) metacognitive framework.

It is noteworthy that Wells and Matthew's (1994, 1996) S-REF model and Wells' (2000) metacognitive model of emotional disorder do not account for meta-emotions which is explained by their debatable tenet that emotions are (merely) determined by cognitive and metacognitive appraisal processes.

1.3. Measurement of metacognitions

There are domain-specific and fewer domain-general questionnaires for assessing metacognitions within the realm of educational psychology which measure metacognitions theorised as being relevant for learning and academic performance.

Of greater relevance for this thesis is the subsequently characterised Meta-Cognitions Questionnaire 30 (*MCQ-30*, Wells and Cartwright-Hatton, 2004) used for a differential assessment of dysfunctional metacognitive factors which have been shown to contribute to psychological disorders discussed in the previous section. The

subsequently described factors measured by the MCQ-30 either exert direct effects on psychopathological outcomes (e.g. depression and anxiety) or intervene in the relationship between pathological antecedents (e.g. pronounced stress perception) and the outcome under investigation as moderators or mediators. A study which found direct, meditational and moderational effects of dysfunctional metacognitions measured by the MCQ-30 is described at the end of this section.

The role of dysfunctional metacognitions in psychopathology has been investigated by means of the Metacognitions Questionnaire (*MCQ*, Cartwright-Hatton & Wells, 1997) and by its shorter version, the aforementioned MCQ-30. Both the MCQ and its brief version MCQ-30 are questionnaire measures to assess dysfunctional or maladaptive metacognitive beliefs, judgments and thought monitoring tendencies. The MCQ-30 consists of five replicable factors (with six items for each factor). The five distinct, yet intercorrelated, factors or subscales assess the following dimensions of maladaptive metacognition: (1) Positive Beliefs about Worry, which measures the extent to which a person believes that perseverative worrying thinking is useful (e.g. "Worrying helps me to get things sorted out in my mind"); (2) Negative Beliefs about Worry concerning Uncontrollability and Danger, which assesses the extent to which a person thinks that perseverative worry-focussed thinking is uncontrollable and dangerous (e.g. "When I start worrying, I cannot stop"); (3) Low or Lack of Cognitive Confidence, which assesses confidence in attention and memory (e.g. "I do not trust my memory"); (4) Beliefs about the Need to Control Thoughts, which measures the extent to which a person believes that certain types of thoughts need to be suppressed (e.g. "If I did not control a worrying thought, and then it happened, it would be my fault") and (5) Cognitive Self-Consciousness, which

assesses the tendency to monitor one's own thoughts and focus attention inwards (e.g. "I pay close attention to how my mind works").

Respondents are asked to rate on a 4-point scale the extent to which they "generally agree" with the statements presented, ranging from 1 ("Do not agree") through 4 ("Agree very much"). In terms of psychometric properties the MCQ-30 possesses good internal consistency and construct as well as convergent validity (Wells & Cartwright-Hatton, 2004)

The MCQ-30 plays a relevant role within this PhD research. The MCQ-30 will be used in Study 3 (Chapter 4) for validating the Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ) developed in this thesis in order to establish the concurrent validity of the PMCEQ. In addition the MCQ-30 will be utilised – alongside the PMCEQ – to test the effects of both dysfunctional and functional metacognitions on several outcome measures in Studies 3 and 4, Parts A and B. Furthermore a small number of MCQ-30 items have also informed item wording for the PMCEQ; however, the major source for item wording of the PMCEQ has been the thematic analysis in the (qualitative) Study 1.

Due to its essential role within this thesis Table 2 provides a summarising synopsis of the MCQ-30 with three example items for each of the five factors or subscales.

Table 2

Factors and example items of the MCQ-30

Factor	Example Items
MCQ-1: Positive Beliefs about Worry	- Worrying helps me to avoid problems in the future. - I need to worry in order to remain organised. - Worrying helps me to cope.
MCQ-2: Negative Beliefs about Worry concerning Uncontrollability and Danger	- My worrying is dangerous for me. - I could make myself sick with worrying. - When I start worrying, I cannot stop.
MCQ-3: Low Cognitive Confidence	- I have little confidence in my memory for words and names. - My memory can mislead me at times. - I do not trust my memory.
MCQ-4: Beliefs about the Need to Control Thoughts	- I should be in control of my thoughts all the time. - I think it's bad to think certain thoughts. - If I could not control my thoughts I would not be able to function.
MCQ-5: Cognitive Self-Consciousness	- I think a lot about my thoughts. - I monitor my thoughts. - I am constantly aware of my thinking.

Three relevant empirical studies which utilised the MCQ-30 and revealed direct and indirect (mediational and moderational) effects of distinct subscales on negative emotion will be briefly outlined. An abundance of studies have provided empirical evidence for the link between individual dimensions of metacognition measured by the MCQ-30 and psychopathology; e.g. Watkins and Moulds (2005) showed that depression-prone individuals tend to believe that excessive reflection upon and rumination about their past negative experiences and emotions had beneficial impacts for their future. This finding reflects the impact of Positive Beliefs about Worry (MCQ-1). Levitt, Brown, Orsillo and Barlow (2004) showed that individuals can become increasingly sensitive to their worries which can amplify mild

anxieties to episodes of severe panic; the underlying mechanisms were hypothesised to be due to increased Cognitive Self-Consciousness (MCQ-5).

Three dimensions of metacognitions have been found to be consistently implicated in various psychological disorders: Negative Beliefs about Worry concerning Uncontrollability and Danger (MCQ-2), Low Cognitive Confidence (MCQ-3), and Beliefs about the Need to Control Thoughts (MCQ-4). Spada, Nikčević,, Moneta and Wells (2008) showed that these three metacognitive factors significantly contributed to the positive relationship between perceived stress and negative emotion (anxiety and depression). They found that maladaptive metacognitions exerted direct effects on negative emotion (anxiety and depression) but also partially mediated the relationship between perceived stress and negative emotion. In addition maladaptive metacognitions moderated the relationship between stress perception and negative emotion. The findings were explained by inferring that Negative Beliefs about Worry (MCQ-2) and Beliefs about the Need to Control Thoughts (MCQ-4) are likely to foster persistent and negative interpretations of experience such that perceived stress results in more pronounced negative emotional outcomes. Similarly, Low Cognitive Confidence (MCQ-3) is also likely to contribute to an increased transmission of perceived stress on anxiety and depression by potentially reducing the awareness and choice of effective coping strategies.

1.4. Inherent limitations of, and methodological difficulties with, the concept of metacognitions

It appears inherent that different fields in applied psychology (e.g. educational psychology on the one hand and clinical psychology on the other hand) define and conceptualise metacognitions in slightly different fashions. The frequently aired argument that the term "metacognition" lacks clarity, however, is debatable. As a

common denominator the vast majority of metacognitive concepts distinguish between metacognitive knowledge, comprising self-knowledge and information about the task or problem at hand, and metacognitive executive functions, i.e. metacognitive control and regulation.

Yet, there appears to be no clear-cut distinction between the mental constructs and underpinning processes of cognition and metacognition. Flavell (1976), the pioneer researcher in the domain of metacognition, used the example that asking oneself questions about a book chapter could function either to improve one's knowledge (a cognitive function) or as a means to monitor the knowledge improvement (a metacognitive function). The example implies that there are potential interdependencies between cognition and metacognition but also reflects the more complex executive function of metacognition compared to cognition.

Another valid argument refers to the necessity of inferential and indirect measurement. Metacognitions depict unobservable mental constructs and processes which (as opposed to, for example, memory capacity and duration) are hardly amenable to experimental research. This implies limitations in terms of inferring cause-and-effect relationships. In addition to the characterised questionnaire-based measurements, further assessment tools for metacognitions and meta-emotions comprise verbal self-reports, thinking aloud techniques in combination with observations and also clinical interviews. Even though multiple method approaches would serve as an important and validity-increasing triangulation method, cost and time aspects point to employing cross-sectional and questionnaire-based survey designs.

Measuring metacognitions by means of questionnaires is by nature subject to commonly raised criticisms of survey research because of potentially inaccurate retrospective recall and biased responses in the light of social desirability.

An interesting question, which is currently attracting attention, refers to the degree of consciousness and intentionality of metacognitions. Brown emphasised in his (1980) conceptualisation that conscious and deliberate control of one's own cognitive activity constitutea metacognition, thus favouring the view of a conscious or explicit nature of metacognition. In line with Brown's (1980) notion the majority of researchers emphasise the fundamental role of awareness in metacognitions and even use the explicit term/construct of metacognitive awareness. Nisbett and Wilson (1977), however, pointed out early research evidence for unconscious or subliminal metacognitions resulting in individuals' unawareness of their choices, judgments and behaviour. They also emphasised resulting inaccuracies when people are asked to recall and verbally account for their metacognitive experience. Other researchers (e.g. Kentridge & Heywood, 2000) also include implicit metacognitions comprising highly unconscious beliefs, knowledge and processes. Kentridge and Heywood's review found that a few experimental studies provide evidence that cognitive and metacognitive schemata might develop without awareness. These unconscious metacognitive constructs are hypothesised as implicit or background information which in turn reflects the underlying assumption that some metacognitive processes neither require awareness nor evoke consciousness and consequently involve no metacognitive regulation per se.[8]

[8] Investigation of implicit learning is one of the few metacognitive research domains where experimental methods are employed. In recent years, however, there have also been the first attempts to uncover frontal lobe and executive brain functions being activated within conscious or intentional metacognitive engagement (Goldberg, 2001). A few fMRI studies reveal neuroplasticity and neurogenesis – previously unseen neural connections – in the response to experience (Begley, 2007).

Interestingly Wells and Matthews' (1994, 1996) architecture of the S-REF model accounts for both explicit and implicit metacognitions: whereas the online controlled processing level is theorised as the core executive construct where conscious metacognitive regulation takes place, the stimuli driven lower level is theorised as being more automatic where predominantly unconscious processes unfold. Maladaptive prolonged and excessive S-REF functioning in Wells and Matthews' (1994, 1996) and Wells' (2000) model is predominantly explained by reference to the conscious online processing level.

This thesis will follow this viewpoint by deriving adaptive and functional mechanisms with the predominant focus on the online processing level in Study 1, described in the following Chapter 2. However, the qualitative analysis in Study 1 will occasionally refer to what appears to be positive metacognitive processing at a subconscious or implicit level.

1.5 The concept of meta-emotions and its integration with metacognitions

The main argument for including emotions in addition to cognitions, and meta-emotions in addition to metacognitions, is anchored in substantial empirical evidence that the vast majority of psychological disorders are accompanied by high volatility in mood or affect. This finding does not only account for mood disorders, e.g. major depressive disorder and bipolar disorder, but also for other psychological and psychopathological disorders, e.g. generalised anxiety disorder and obsessive compulsive disorder. In contrast it would be expected that psychologically stable individuals lack such (pronounced) fluctuations in emotions and find faster routes to get out of potential emotional downward spirals despite experiencing temporarily low moods when encountering highly taxing demands.

The term and concept of meta-emotion is of fairly recent origin. Gottman, Katz and Hooven (1996) developed a theory of meta-emotion when they investigated ways parents discuss emotions about their children and associated feelings about their own emotions. On face validity meta-emotions appear to represent a straightforward dimension conceptualised in analogy to metacognitions as "emotional reactions about one's own emotions" (Mitmansgruber, Beck, Höfer & Schüßler, 2009, p. 448). It will be shown that the construct of meta-emotion is somewhat difficult to conceptualise by starting with a brief review of emotion which already is a concept that has historically "proven utterly refractory to definitions" (Reber & Reber, 2001, p. 236). Subsequently, it will be argued on what grounds it seems essential to take meta-emotions in addition to metacognitions into account. Somewhat surprisingly Wells and Matthews' (1994, 1996) and Wells' research (2000) apply a pure metacognitive framework, not explicitly addressing meta-emotions. This is grounded in their inherent cognitive and appraisal-related explanation of emotions implying that emotions are purely results of evaluative thought processes.

Damasio's (1999) conceptualisation characterises emotions as positive or negative reactions to a remembered or perceived object, circumstance or event but also highlights that emotions are accompanied by subjective feelings. This definition within Damasio's (1999) approach, which is interestingly of neuroscientific nature, implies one reason for the aforementioned difficulties in providing a clear-cut concept – the inherent subjectivity and experiential uniqueness of feeling states. A second reason can be identified in the existence of blended emotions. Apart from core basic emotions – anger, fear, sadness, disgust, shame, guilt, pride, joy and happiness – there are combinations and overlaps of these basic emotions with complex or blended emotions. Blended emotions are derived from (different combinations of) a small

number of basic emotions. The uniqueness and subjectivity of emotional states is attributable to their range on a spectrum of blended emotions and in addition to different levels of intensity. As intuitive examples of blended emotions Plutchik (1984) proposed that optimism is a combination of joy and anticipation; whereas remorse is comprised of the two basic emotions of sadness and disgust. It appears intuitively self-explanatory that the psychological construct "optimism" incorporates predominantly cognitive-evaluative elements; other emotions, however, e.g. disgust or passion, seem to lack cognitive components. It is noteworthy here to emphasise the evolution-related predominance of negative over positive basic emotions; in the taxonomy above there are six negative as opposed to only three positive emotions.[9] With regards to psychologically and emotionally stable individuals intentionality and awareness of their own emotions and their ability to positively self-regulate them appear to play a crucial role. Such conscious awareness potentially fosters functional self-regulation in terms of emotions and the subsequently characterised meta-emotions.

Meta-emotions have been defined in an analogous fashion to metacognitions. Jäger and Bartsch (2006) conceptualise meta-emotions as emotions individuals have about their own emotions; similarly Mitmansgruber et.al. (2009) describe meta-emotions as emotional reactions about one's emotions and they emphasize the role that meta-emotions play in emotional regulation. In analogy to metacognitions two kinds of meta-emotions – adaptive and maladaptive ones – can be distinguished. As a measurement instrument for the fairly new research of meta-emotions the (2009) Meta-Emotions Scale (MES) has been developed by Mitmansgruber et al. as the first instrument to assess both positive and negative meta-emotions. The 38-item scale

[9] The evolutionary account for basic emotions refers to an underlying biological basis of emotions; corresponding early empirical evidence has been provided, e.g. by spontaneous facial expressions of congenitally blind children (Eibl-Eibesfeldt, 1973).

comprises the six factors of anger, compassionate care, interest, contempt/shame, tough control and suppression.

Maladaptive or dysfunctional meta-emotions (e.g. anger, anxiety and shame) reflect non-acceptance in the forms of experiential avoidance or suppression (Neff, 2003). Dysfunctional meta-emotions potentially contribute to a plethora of psychological disorders despite the fact that they are not explicitly accounted for in clinical metacognitive models. Wells and Cartwright-Hatton (2004) propose that as emotions, meta-emotions go beyond meta-cognitions and Wegner (1994) highlights that these might produce vicious circles and rebound effects. A classic example for a distressing emotion-about-emotion occurrence is the "fear-of-fear" phenomenon (Reiss, Peterson, Gursky and McNally, 1986). Somewhat surprisingly Wells and Matthews (1994, 1996) and Wells (2000, 2009) do not take meta-emotions into account on the grounds of their postulation that emotions are purely determined by (meta-) cognitive processes – a view that will be subject to criticism in this thesis.

Examples of adaptive or positive meta-emotions include joy, compassion, curiosity and interest. Such adaptive meta-emotions reflect and support one's own emotions with potentially well-being-enhancing effects (Neff, 2003). Based upon their (2009) study Mitmansgruber et al. concluded that "to maintain well-being it might be rewarding to minimize negative meta-emotions and to have an accepting stance towards one's own emotions (i.e. mindfulness/acceptance...)" (p. 453).

Whereas there is no distinction between positive and negative metacognitions in terms of their effects on psychological well-being in the current research literature, this distinction has been made in reference to meta-emotions as previously mentioned. The core discriminant effects of adaptive versus maladaptive meta-emotions can be summarised as follows: (1) Neffs' (2003) proposition that positive meta-emotions

foster acceptance of one's own emotions implies that meta-emotions of a positive nature can elucidate processes of mindfulness or psychological acceptance which in turn contribute to mental well-being and (2) dysfunctional meta-emotions exert their negative effects on psychological stability and well-being through experiential avoidance in the sense of being non-accepting towards mental events (Mitmansgruber et al., 2009).

This thesis attempts to investigate the effects of both cognitions and emotions and, moreover, their meta-constructs. Such an integrative approach, however, is daunting since the "cognition-emotion debate" has still not been resolved in psychology. Cognitive appraisal theories of emotions posit that emotions are determined by and are the direct outcome of evaluation or appraisal processes: "Cognitive appraisal (of meaning or significance) underlies and is an integral part feature of all emotional states" (Lazarus, 1982, p. 1021). Such a radical viewpoint being rooted in pure cognitivism has more recently also been displayed by Nussbaum's (2004) assertion that "emotions can be defined in terms of judgment alone" (p. 196). If this definition were true there would be no necessity and no scope for taking emotions and meta-emotions into account. In contrast to the outlined appraisal theories Zajonc (1984) and more recently Jäger and Bartsch (2006) argue that emotions incorporate phenomenal qualities and that judgments involved in cognitions are neither necessary nor sufficient for experiencing certain emotions: "Affect and cognition are separate and partially independent systems and... although they ordinarily function conjointly, affect could be generated without a prior cognitive process" (Zajonc, 1984, p. 117). This thesis applies the view that, regardless of potential overlaps between cognitions and emotions (and between their meta-

constructs), there appears to be evidence for at least some emotions and meta-emotions which are triggered by other than (purely) cognitive factors.

In conclusion theory and corresponding research evidence suggests that metacognitions and meta-emotions are relevant mental constructs for self-regulation. Metacognitions and meta-emotions of a maladaptive nature have been identified as aetiological agents in the onset and maintenance of a phalanx of psychopathological disorders. Oversimplified it can be argued that a metacognition or a meta-emotion elicits a subsequent thought or emotion, respectively (Wilding and Milne, 2010). Depending on their nature or the individual's trait of adaptive versus maladaptive metacognitions and meta-emotions they can either facilitate or inhibit functional self-regulation and psychological well-being.

1.6. Psychological constructs related to positive metacognitions

The rationale for including psychological dimensions hypothesised to be associated with the novel construct of positive metacognitions and meta-emotions is twofold: (1) the qualitative Study 1, described in Chapter 2, aims at deriving the framework for the subsequent PMCEQ instrument, i.e. to infer functional cognitive, emotional and behavioural processes and response patterns to stress and challenge. As a means of triangulation this initial qualitative study will also investigate whether emotionally stable individuals posses adaptive personality assets related to their positive metacognitions, and (2) Study 3, described in Chapter 4, will evaluate the concurrent validity of the novel PMCEQ by using two sets of conceptually related traits: (a) maladaptive metacognitive traits (Wells & Cartwright-Hatton, 2004) and (b) intrinsic and extrinsic metacognitive traits (Amabile, Hill, Hennesey & Tighe, 1994).

Beyond providing a means of triangulation, the stimulus for taking personality-related factors (assets) into account has been the additional research question whether a distinction can be made between the importance and relative contributions of positive metacognitive and meta-emotional factors on one hand, and personality assets on the other hand, in the challenge scenarios interviewees reported and referred to in Study 1. Hence, such assets also guided the development of the semi-structured interview schedule utilised in Study 1 in order to prime interviewees' recall of assets in addition to positive metacognitions and meta-emotions. The investigated assets can be categorised in three interrelated groups: (1) autonomy-related assets (e.g. agency, persistence, need for achievement and goal-setting); (2) communion-related assets (e.g. need for affiliation and emotional intelligence); and (3) mindfulness-related constructs (e.g. psychological acceptance and frustration tolerance).

Metcalfe & Greene (2007) not only establish a link between metacognition and agency but suggest that agency, the feeling that individuals are agents who intentionally can make things happen by their autonomous actions, is metacognitive in nature. In this sense agency is regarded as fundamental to our understanding of ourselves and to functional self-regulation, expressed by Metcalfe and Greene's term "metacognition of agency" (p. 184). In Chapter 2 it will be shown that agency is linked to the need for achievement, conceptualised as a desire to accomplish tasks and attain standards of excellence (McClelland, 1985). Research has provided evidence that agency is a functional and adaptive asset that fosters self-regulation and goal setting. Zimmerman (2000) conceptualises self-regulation as systematic efforts to direct thoughts, feelings and, crucially, actions towards goal attainment. The definition reveals the inherent link between self-regulation and goal-setting which,

with reference to Schunk (1995), can be seen as bidirectional as he stresses empirical findings that self-set goals enhance self-regulation and motivation. The link between goal-setting and conscious, purposeful metacognition is also implied in Locke, Saari, Shaw and Latham's (1981) conceptualisation of goals. They define a goal as an envisaged outcome an individual is trying to accomplish and explicitly refer to the similarity with the concept of intent or purpose. In their (1987) functional theory of emotions Oatley and Johnson-Liard established a core link between emotions, goal perception and goal-focussed behaviour as depicted in Table 3. It should be emphasised that only the positive emotion of happiness is linked to the advantageous behavioural pattern of either goal continuation or flexible goal modification, the latter arising when the primary goal(s) cannot be achieved.

Table 3:

Emotions and associated goals

Emotion	Juncture of current plan	Behaviour / Response
Sadness	Loss of active goal/ Failure of major plan	Doing nothing/ Search for alternative plan
Anxiety	Threat to self-perception goal	Stop, attend vigilantly to environment and/or escape
Anger	Frustration of active plan	Try harder or aggress
Happiness	Achievement of sub-goals	Continue with current plan/ Modify flexible if necessary

Wilson (2001) argues that metacognitions respond to context and task features and are activated when difficulties are encountered and routines are not working. Similarly, Hudlicka (2005) stresses that metacognitions are activated by challenge: "In general metacognition is involved in strategy selection for complex problems requiring resource tradeoffs for dealing with unsatisfactory situations and for troubleshooting" (p. 56). In addition to the challenge component it is argued within this research that the aforementioned context features, more often than not, imply a

social context. For this reason communion-related personality factors will be investigated in addition to agency-related ones in Study 1. Communion has been described as expressivity and fellowship referring to relatedness and reflecting the need for interpersonal relationships (Wiggings & Broughton, 1985). Whereas individuals engage in agency when they are dissatisfied with the environment, they display communion when they experience acceptance and love for the environment (Bakan, 1966).

In situations which incorporate social interactions, emotional intelligence, which can be subsumed under the constructs of communion and affiliation, has been shown to be a functional and empowering asset. In their original (1990) model of emotional intelligence Salovey and Mayer conceptualised the construct as comprising knowledge of one's own emotions, handling personal relationships in an adaptive fashion and using emotions as a self-regulatory tool to increase one's own motivation. In their subsequently refined (2000) model Mayer, Caruso and Salovey put forward that emotional intelligence results in a better understanding of the complexity of frequently transient emotions and contributes to an increased ability to self-regulate emotions. In line with the aforementioned conceptualisations Salovey and Mayer (1990) define emotional intelligence as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (p. 189). Interestingly, Goleman (1996) emphasises the role of self-awareness with respect to both metacognition and meta-mood (meta-emotion). He posits that the ability to develop awareness of the emotional states of ourselves and of others is a central tenet of emotional intelligence.

Assets which can be subsumed under mindfulness or psychological acceptance appear to be relevant in situations where goal achievement is temporarily blocked

(e.g. by obstacles within the current environment). Kabat-Zinn (1990) has described mindfulness as a process of ascribing a beneficial quality of attention to moment-to-moment experiences in a relaxed and non-judgmental fashion. According to Bond and Bunce (2000) mindfulness refers to the acceptance of one's strengths and limitations and to the capability of accepting undesirable thoughts and yet still pursuing formulated goals. In recent years the relevance of mindfulness has even been acknowledged by clinicians and psychiatrists as they have augmented traditional Cognitive Therapy (CT) and CBT treatments by explicitly taking mindfulness-based aspects into account: Mindfulness-based Cognitive (Behavioural) Therapy (Segal, Williams & Teasdale, 2002) combines training in mindfulness with CT or CBT. Incorporating mindfulness or psychological acceptance was driven by increasing evidence that mindfulness is a self-empowering means to adaptively regulate negative emotional states. Several studies have provided empirical evidence that mindfulness is effective in reducing perceived stress, anxiety and depression (Waring, 2008). As discussed in Section 1.5 positive meta-emotions are associated with mindfulness-related acceptance.

Sugiura (2003) emphasises detached mindfulness as a beneficial detached attitude that potentially ameliorates clinical anxiety and/or depression. Regardless of the fact that detached mindfulness approaches are currently being used as treatment techniques for pathological anxiety and worry, such techniques might also be effective for non-clinical applications, specifically as coaching interventions, when individuals are faced with profound challenge. In this context Roger, Jarvis and Najarian (1993) pointed out that detached mindful processing is a distinct mode of adaptive coping comprising: not taking things personally, feeling clear-headed about solutions and deciding that it is useless to get upset.

This chapter will close with a conceptualisation of intrinsic motivation as a positive trait which is hypothesised to be positively correlated with functional metacognitive and meta-emotional dispositions and which will be used in Study 3, described in Chapter 4, to establish convergent validity of the novel PMCEQ instrument. Deci & Ryan (1985, 2000) found a positive correlation between self-determination and intrinsic motivation and conceptualised the latter as a profound tendency to engage in tasks because one finds them challenging, interesting and enjoyable, as opposed to extrinsic motivation which is predominantly driven by task-unrelated factors such as reward. The construct or trait of intrinsic motivation comprises appreciation of complexity as an opportunity to acquire mastery when engaging in demanding activities, and a tendency to engage in deep level cognitive processing. The resulting prediction here is that as such, intrinsic motivation should foster adaptive metacognition, which in turn should further strengthen intrinsic motivation.

1.7. Scope, rationale and aims of the thesis

The chapter ends with a concise discussion of the scope and rationale for deriving adaptive metacognitions and adaptive beliefs about emotions embedded in the introduced evidence-based theoretical framework developed in the previous sections. Based upon the scope and rationale, the core aims of this thesis being pursued in five studies will be outlined.

1.7.1. Scope and rationale for deriving positive metacognitions

Regardless of the frequent acknowledgement of detrimental, neutral and beneficial metacognitions (e.g. Paris, 2002), the latter ones have been investigated

only with regards to cognitive development and learning, as shown above. Whereas detrimental metacognitions are at the research focus within psychopathology (as discussed in Section 1.2), no research has been conducted until now that investigates the effects of functional metacognitions and meta-emotions on adaptive coping strategies, decreased stress perception and emotion. Investigating such potentially adaptive effects, utilising the positive psychology paradigm (e.g. Seligman, Steen, Park & Peterson, 2005), is at the heart of this thesis. Compton (2005) uses a wide definition of positive psychology as a domain that "uses psychological theory, research, and intervention techniques to understand the positive, the adaptive, the creative, and the emotionally fulfilling elements of human behavior" (p. 3).

Partially based upon and reversing the S-REF model it can be inferred that psychologically stable individuals, when confronted with profound challenge or unpredictability, should display online S-REF activity of only short duration. Rather than getting into perseverative and ruminative bouts they would shift fairly quickly from object to the more functional metacognitive mode. This adaptive shift is hypothesised to either result in task and problem focus or alternatively in belief modification. In essence, functional metacognitive processes during encounters of challenging situations, tasks or projects, should be characterised by running appropriate and adaptive S-REF operations with the metacognitive mode being predominant. At least highly functional individuals would incorporate the capability of terminating object mode processing fairly quickly.

In addition it is predicted that psychologically stable individuals display predominantly adaptive coping strategies and, moreover, coping and goal flexibility: Even in cases where external demands and circumstances prevent goal achievement the S-REF activity can be moderated by abandoning the primary goal and developing

achievable sub-goals. Such adaptive and economic coping and goal flexibility is theorised to buffer stress perception and detrimental emotional states, i.e. anxiety and depression. A detailed synopsis of adaptive self-regulatory processes and coping strategies, derived from Wells and Matthews' (1994, 1996) and Wells' (2000, 2009) model of maladaptive cognitive self-regulation, will be provided in the Introduction to Study 1 in Chapter 2.

1.7.2. Aims of the thesis

This first aim of this PhD research lies in the development of a novel questionnaire instrument to assess functional and adaptive metacognitions and meta-emotions and subsequent investigation of correlations between these functional dimensions and related psychological constructs. To the author's knowledge this will be the first questionnaire measuring metacognitions of adaptive nature; adaptive refers to being functional in terms of self-regulation and psychological well-being when exposed to challenge.[10] The construction and application of psychological dimensions, that measure positive metacognitive beliefs about cognitive and emotional processes when facing challenging situations, are grounded in a positive psychology approach. The underlying philosophy of this research follows the positive psychology approach of shifting the focus from pathology to productive and fulfilling processes.

Study 1 will apply a semi-structured interview template designed to elicit adaptive metacognitions and interviewees' predominant thoughts, feelings and actions when being confronted with a challenging task or project. Interviewees will be asked to account for tasks or projects that started with profound difficulties but which they eventually successfully resolved. The core aims of Study 2 are the development and

[10] The existing Metacognition Questionnaires (MCQ and MCQ-30) assess exclusively maladaptive metacognitions; the very recent (2009) Meta-Emotion Scale (MES) comprises both positive and negative meta-emotion but does not include items to assess metacognitions (see Section 1.4)

subsequent rigorous validation of the Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ), the items of which will be derived from the qualitative Study 1. The PMCEQ attempts to measure functional and adaptive beliefs about cognitive and emotional processes when facing situations of challenging or unpredictable nature. Study 2 will establish the construct validity of the PMCEQ, whereas Study 3 will be dedicated to exploring its concurrent validity. Study 4, Part A aims to test empirical relationships between the PMCEQ subscales, adaptive and maladaptive coping strategies, and participants' levels of perceived stress. Study 4, Part B will explore how the PMCEQ subscales correlate with measures of negative emotion conceptualised as anxiety and depression.

The subsequent Chapters 2 to 6, comprising Studies 1 through 4, Part B, are structured in a similar fashion by encompassing a very concise "Scope and Rationale" section and also a brief initial "Executive Summary". Each chapter will put the reader in the picture without the necessity of reading a previous chapter – regardless of the fact that the studies presented in separate chapters represent an interrelated research sequence. In parts the introductions concisely reiterate arguments provided in a previous chapter; however, they develop these further with a focus on the study under investigation.

Chapter 2

Study 1

Derivation of Positive Metacognitions

2.1. Scope and rationale

The first study is of qualitative nature and pursues the core aim of identifying cluster themes and corresponding sub-themes of adaptive cognitive, emotional and behavioural self-regulation in the midst of challenging and taxing tasks or projects. Since the focus is on adaptive and functional self-regulation, participants were purposefully recruited on the basis of their assumed adaptive metacognitions and meta-emotions. The rationale was that if there were emerging commonalities in terms of functional metacognitive and meta-emotional self-regulation these could be used as a framework for item wording for the envisaged PMCEQ development. Since the participants were recruited on the basis of their assumed functional and adaptive metacognitions (and meta-emotions) this procedure incorporated the two inherent biases of investigator expectations and interviewees' answering in the light of social desirability. Controls for these two potential biases were, however, employed by the subsequent rigorous validation of the developed PMCEQ, derived from this Study 1, within the large-scale quantitative Studies 2 and 3 in Chapters 3 and 4.

2.2. Executive Summary

This study attempts to derive positive metacognitive self-regulatory processes by amending and extending Wells and Matthews' (1994, 1996) and Wells' (2000) metacognitive model of psychological and emotional disorders and blending it with adaptive assets within a positive psychology framework. Thirteen interviewees were

recruited by purposive sampling based on their assumed positive metacognitions and adaptive assets. The participants were high-profile executives and known to the researcher due to work-related contacts. A semi-structured interview schedule using positive metacognitive priming techniques was employed to elicit interviewees' recall of functional self-regulatory processes and also their accounts of adaptive personality factors (assets) when facing mid- to long-term challenging tasks or projects. The verbatim interview transcripts were analysed by employing Hayes' (1997) Theory-led Thematic Analysis with focus on "keyness" rather than prevalence of themes or categories. In an attempt to discover novel themes, potentially emerging above and beyond the framework of the interview schedule, the Theory-led Thematic Analysis was blended with Glaser and Strauss' (1967) Grounded Theory approach. Results showed that the majority of participants used predominantly functional metacognitive modes of information processing (Wells & Matthews, 1994, 1996), preventing potentially maladaptive metacognitive processing.

Beyond Wells and Matthews' framework participants also accounted for adaptive meta-emotional processes, e.g. mindfulness, frustration tolerance and refraining from inappropriate overreaction. In terms of assets, resilience (Masten & Reed, 2005) emerged as a key factor or theme with the two subordinate themes of agency and communion (Wiggins & Broughton, 1985). A number of additional, more specific adaptive factors were identified, e.g. persistence, optimism, frustration tolerance and the ability to experience positive emotions in the midst of high challenge (Folkman & Moskowitz, 2000).

The study's overall results supported challenge models of resilience. With regard to the duration of the challenge scenarios the following distinction resulted: very long-term challenge scenarios required a higher degree of resilience-related

personality factors, whereas metacognitive and meta-emotional self-regulation was crucial when the challenge was of short- or medium-term nature. Results can potentially inform intervention programmes to effectively cope with and functionally adapt to challenge and unpredictability in occupational and other life domains.

Keywords: Adaptation to challenge; Agency; Communion; Metacognitive self-regulation; Persistence; Resilience.

2.3. Introduction

Metacognition(s) can be conceptualised as knowledge and beliefs about one's own cognitive processes (Flavell,1979) and the individual's ability to deconstruct and understand their own cognitive processes involving reflection and awareness of various types of problem solving (Milne, 2003). As discussed in the introductory Section 1.1 the concept of metacognition has been applied to educational settings with positive connotation, e.g. Wang's (1992) metacognitive competence as the ability to reflect and exhibit advantageous self-regulation (self-regulated learners) and Sternberg's (1984) link between metacognition and adaptive behaviour.

In psychopathology the focus has been on maladaptive metacognition – extending schema theory, which predominantly emphasises content rather than explaining mechanisms. Wells and Matthews' (1994, 1996) Self-Regulatory Executive Function (S-REF) Model has been a valuable and novel attempt to uncover the underlying cognitive processes in psychological disorders. Wells and Matthews' potential explanation of dysfunctional metacognitive beliefs and processes provided the basis for amending, i.e. partially reversing, this model to derive and test a theoretical framework for core beliefs and processes with respect to adaptive metacognition (and meta-emotions) within this study.

Yet, two limitations of existing metacognitive models in the realm of psychopathology can be inferred: (1) focus on exclusively cognitive constructs and processes which lacks investigation of the social environment and (2) not accounting for personality-related factors, specifically for adaptive assets. Research into assets has recently been conducted within positive psychology in order to counterbalance the disorder-focussed view in psychopathology and psychiatry (Seligman, Steen, Park & Peterson 2005; Cloninger, 2006). Similarly, work and organisational psychologists emphasise the need for "effective application of positive traits, states, and behaviours of employees in organizations" (Bakker & Schaufeli, 2008, p. 147).

This study attempts to derive and test adaptive self-regulatory processes individuals display when coping with challenging tasks or projects and to identify self-empowering assets or personal resources "cultivated" within stressful encounters.

2.3.1. Adaptive metacognitive self-regulation

The construct of positive self-regulatory processes is grounded in Wells and Matthews' (1994) S-REF Model and Wells' (2000) metacognitive model of emotional disorders by investigating core mechanisms of *functional* metacognitive and meta-emotional self-regulation.[11] In accordance with Flavell (1979), Wells (2000) posits that metacognition refers to beliefs, psychological structure and cognitive processes implied in the control, interpretation and potential modification of thinking itself. However, in Wells' (2000) model metacognitions have by nature predominantly negative connotations because of their role in emotional and other psychological disorders.

[11] The S-REF model has been outlined in detail in Section 1.2 (The role of dysfunctional metacognitions in psychopathology). Maladaptive metacognitive predictions, resulting from theory and research evidence for the S-REF model, will be subsequently introduced with the aim of inferring the opposite, i.e. adaptive, metacognitive (and meta-emotional) self-regulation.

Three metacognitive constructs are relevant for understanding psychological disorders, e.g. major depressive disorder (MDD), generalised anxiety disorder (GAD) and obsessive-compulsive disorder (OCD):

(a) Metacognitive knowledge (beliefs) referring to individuals' information about their own cognition and about task factors and learning strategies affecting this knowledge;

(b) Metacognitive experiences conceptualised as core appraisals of meanings of mental events, i.e. interpretations of cognitive experiences (thoughts) at a conscious level;

(c) Metacognitive control and regulation comprising a plethora of cognitive functions, e.g. (deliberate) allocation of attention, monitoring, checking and planning (Brown, Bansford, Campione & Ferrara, 1983). In emotional disorders metacognitive control and regulation is prolonged and negatively biased, manifested for example by excessive self-focussed attention and threat monitoring by means of sustained attention to internal and external cues for threat (Wells & Matthews, 1994; Wells, 1995, 2000).[12]

The tenets of the S-REF model as an information-processing model for a range of psychopathological disorders are perseverative and ruminative negative thinking, dysfunctional attentional strategies filtering negative appraisals and subsequent maladaptive behaviours (Wells, 2000). The emphasis on processes, rather than merely content, of negative thoughts and attributions reflects the crucial attempt to extend the content focus of Beck's (1967, 1976) schema theory.

[12] The majority of researchers favour a central role for awareness in metacognition (metacognitive awareness). Others (e.g. Kentridge & Heywood, 2000), however, include unconscious knowledge, beliefs and processes as aspects of implicit or background information assuming that (some) metacognitive processes do not necessarily evoke awareness/consciousness.

The S-REF model comprises three distinct but interrelated levels of cognitive operations (Wells, 2000):

(a) The schema level which stores self beliefs and knowledge in long-term memory;

(b) The core online-controlled processing level at which metacognitive self-regulation takes place by appraising events and utilising metacognitive control strategies; this level comprises the core S-REF with a bidirectional relationship to the self-belief or schema level: The S-REF accesses self-beliefs (monitoring), whereas self-beliefs in turn inform the S-REF by selecting generic plans (control);

(c) The stimuli-driven lower level which is regarded as automatic, predominantly unconscious and requiring minimal attentional demands.

Online controlled processing is the core metacognitive control strategy, taking place at the conscious level and hence being fundamental for the individual's self-awareness. Maladaptive attentional styles, i.e. dysfunctional cognitive filtering (e.g. threat monitoring, monitoring for somatic cues and negative thoughts) is associated with negative emotions and detrimental perseverative strategies (active worry and rumination). More importantly such a perseverative S-REF disrupts and/or prevents engagement in functional cognitive processes allowing for goal achievement (Wells, 2000).

Wells' (2000) metacognitive model of emotional disorders more specifically posits that rigid and negatively biased control by means of perseverative S-REF results in both negative affective states and maladaptive, inflexible and passive coping behaviour preventing adaptive belief change, functional coping change and goal achievement. Bouts of prolonged S-REF activity, which are typical for emotionally

volatile individuals, are linked to the predominant object mode of processing. Psychologically stable individuals, on the other hand, display a high proportion of the functional metacognitive mode of processing.

Wells and Matthews (1994) and Wells (2000) apply a crucial distinction between metacognitive and object mode. The metacognitive mode is adaptive and impacts positively on belief elaboration by functionally informing the schema level; contrariwise the object mode is dysfunctional and triggers prolonged bouts of S-REF activity. The object mode is advantageous only in genuinely threatening situations as opposed to mere threat perception often displayed by individuals with vulnerability to psychological disorder. [13]

An inherent confusion might occur since metacognitions in the context of psychological disorders have negative and dysfunctional connotations, whereas the characterised metacognitive mode reflects adaptive and functional self-regulation – as opposed to the maladaptive and dysfunctional object mode. This study's focus will be on the derivation of adaptive and functional S-REF predictions which are hypothesised to be inverse to the maladaptive and dysfunctional S-REF predictions in Wells' (2000) psychopathological model.

Table 4 (first column) shows the core maladaptive self-regulatory processes of the S-REF model and their implications with regard to alternative adaptive self-regulation. Adaptive self-regulation (Table 4, second column) and subsequently reviewed assets (Table 5) provided the theoretical frameworks for this study

[13] Both adaptive metacognitive and maladaptive object modes of cognitive processing have been described in detail, compared and contrasted in Section 1.2,

Table 4: ***Maladaptive versus adaptive self-regulatory processes in taxing and challenging situations***

Maladaptive cognitive self-regulation and strategies S-REF Model (Wells & Matthews, 1994, 1996; Wells, 2000)	**Adaptive self-regulation and strategies Derived implications of the S-REF Model**
Perseverative S-REF activity, i.e. chronic state of S-REF readiness with active worry, excessive self-focussed attention, threat monitoring and rumination which conjointly constitute a cognitive attentional syndrome (*CAS*; Wells; 2000). In extreme cases of emotional disorders (e.g. MDD, GAD and OCD) the S-REF is in a state of nearly permanent readiness.	Short S-REF activity resulting in self-regulatory goal achievements. Such adaptive S-REF routines allow goal achievement when dealing with stress/challenge by: - Task-focussed and flexible coping - Coping flexibility - Modification of beliefs (in cases where the envisaged goal cannot be objectively achieved due to current environmental limitations).
Predominant object mode of processing (thoughts are depicted as reality) with the following maladaptive outcomes: - Strengthening of maladaptive self-knowledge - Increasing occurrences and scope of negative automatic thoughts (NAT) - In turn further fostering negative self-schemata.	Prevalence of metacognitive processing mode (thoughts are seen as "events" or cues which have to be evaluated) resulting in executing functional metacognitive control strategies (suspension of worry and redirection of attention) with the following adaptive outcomes: - Restructuring of knowledge by means of cognitive restructuring and reappraisal - Agentic goal setting (including attainable sub-goals) - Development of alternative plans - Coping flexibility for pursuing (alternative) goals.
Situations where external demands prevent goal achievement trigger activation of perseverative S-REF activity (worry and rumination) instead of (adaptive) coping flexibility.	In situations where external demands (temporarily) prevent the envisaged goal achievement individuals display goal and coping flexibility: S-REF activity can be moderated by abandoning or modifying not (instantly) achievable goals and developing achievable sub-goals.
Inflexibility: Holding rigid and inflexible beliefs, goals and, moreover, impairments in the flexibility of coping and control of processes.	Flexibility in terms of both goal-setting and coping strategies (with the aforementioned ability to formulate achievable sub-goals).
Continued p. 63	

Maladaptive cognitive self-regulation and strategies ***S-REF Model (Wells & Matthews, 1994, 1996; Wells, 2000)***	***Adaptive self-regulation and strategies*** ***Derived implications of the S-REF Model***
Setting unrealistic (not achievable) goals which are prone to activate repeated instances of S-REF activity, as a failure to meet goals repeatedly activates S-REF processing aimed at (unsuccessful) discrepancy reduction. In addition inability to substitute unrealistic goals by achievable sub-goals (see above).	*Setting realistic (achievable) goals or implementing goal correction:* - Ability to break goals down into "economic" and achievable sub-goals. - Flexible corrections in case of unachievable goal formulation.
Emotions are interpreted as reliable indicators of how close an individual is to problem solving or achieving important personal goals.	Emotions or "feeling states" are appropriately interpreted or appraised as short emotional states and not potential indicators of goal achievement "stage".
Effects of the "locked-into states" (active worry, threat monitoring and rumination) block cognitive restructuring and functional cognitive reappraisal. Perseveration of S-REF activity blocks the adaptive restructuring of (self-) beliefs and results in corresponding decrease of (cognitive) resources.	Even within challenging encounters two core abilities incorporate more adaptive routines for dealing with (perceived) threat: - Cognitive restructuring (resulting in freeing up resources) - Positive reappraisal (focusing on the good that is happening and discovering opportunities for growth).
Patients diagnosed with an emotional disorder frequently report dissociations between intellectual ("cold") and emotional ("hot") beliefs in the sense that he/she rationally knows that the belief is false but still has the "feeling state" that it is correct.	Predominant absence or only very briefly experienced episodes of dissociations between cognitive and emotional beliefs.
Albeit not specifically addressed by Wells and Matthews: Holding irrational beliefs in the sense of Ellis' (1987) "musts", "oughts" and "shoulds".	Absence of irrational belief in the sense of Ellis' (1987) conceptualisation.
Low tolerance for negative emotions: Activating events or environmental stimuli, that (temporarily) block realistic desires are regarded and described as "awful, horrible, and terrible" (Ellis, 1987) → Low frustration tolerance.	Healthy tolerance levels for negative emotions: Activating events or environmental stimuli, that (temporarily) block realistic desires are merely regarded and described as "unfortunate and unfavourable" (Ellis, 1987) → Healthy level of frustration tolerance

2.3.2 Functional resilience-related assets

Despite Wells and Matthews' (1994, 1996) and Wells' (2000) novel and evidence-based contributions to explaining underlying processes in the onset and maintenance of psychopathological disorders three possible limitations can be identified:

(a) The nearly exclusive focus on cognitive processes and the debatable tenet that negative emotions are exclusively resulting from biased, dysfunctional cognitive processing and appraisal;

(b) Not accounting for the role of social components and processes on psychological functioning and well-being[14];

(c) Not explicitly addressing positive personality-related factors or assets (e.g. resilience and persistence), which might intervene in (mediate) or moderate the relationship between challenging situations and (more adaptive) psychological functioning.

Masten and Reed (2005) conceptualise assets as measurable personality-related characteristics which predict positive future outcomes in terms of an outcome criterion – protective factors predict such positive outcomes in situations of risk or adversity. Diverse outcome criteria or indicators have been used in resilience research, e.g. psychological well-being or stability and academic, professional and social achievements. This study utilises Masten and Reed's (2005) hierarchical approach with resilience as the highest-ranking asset: they emphasise that assets, protective factors, external resources and corresponding processes have been investigated in attempts to explain resilience.

[14] The neglect of social factors is somewhat surprising in the light of the well-established diathesis stress model of emotional disorders and empirical evidence of the buffering effects of social support (Cohen & Wills, 1985).

The link between (adaptive) self-regulation and resilience can be based on Luthar, Cicchetti and Becker's (2000) findings that resilience is a dynamic and complex process of displaying positive behavioural adaptation during encounters of risk, adversity or even trauma. Within these lines Masten and Reed (2005, p. 75) conceptualise resilience as "a class of phenomena characterized by patterns of positive adaptation in the context of significant adversity or risk"; similarly Luthans (2002, p. 702) conceptualises resilience as the "capacity to rebound ... from adversity, uncertainty, conflict, failure or even positive change." Beneficial implications of low to moderate levels of risk exposure – in this study challenging tasks and projects – are suggested by Challenge Models of Resilience since moderate challenge levels might induce steeling effects, provide opportunities for mobilising resources and practising problem-solving skills (Rutter, 1987; Masten, Hubbard, Gest, Tellegen, Garmezy and Ramierez, 1999).

Werner (1995) and Werner & Smith (2001) provided empirical evidence from their high-risk children studies for the following six core components in resilience-forming processes:

(a) Distancing from unsupportive or even detrimental relationships (healthy defence mechanism) and finding other supportive individuals;

(b) Developing functional and adaptive coping styles as a balanced combination of autonomy (agency) and support-seeking (communion);

(c) Developing competence in activities (occupational and leisure-related) resulting in a sense of pride;

(d) Tendency to attribute positive meaning to crucial events (cognitive restructuring and positive reappraisal);

(e) Ability to generate and use positive emotions (especially in the light of challenge) as positive emotions fuel resilience (Tugade & Fredrickson, 2004);

(f) Creativity (implying flexibility in goal-setting, problem-solving and coping).

In addition to direct adaptation-enhancing effects of resilience, there is empirical evidence from the aforementioned research that exhibiting resilience is associated with a plethora of other protective factors or assets residing within individuals, e.g. optimism, self-efficacy, self-determination and positive affect.

Further core assets being investigated in this study are agency and communion (Bakan, 1966; Wiggins & Broughton, 1985) which can be subsumed under resilience since findings support the hypothesis that resilient individuals tend to be more active (agentic) and socially more responsive (communal) compared to those exhibiting less resilient coping patterns (Werner & Smith, 1982). The core view taken here is that these assets, despite residing within the individual, are not purely predetermined, trait-like dispositions but constructs that can be cultivated within adaptation processes. "People can learn to flourish and to be more self-directed by becoming more calm, accepting their limitations and letting go of their fears and conflicts" and "People can learn to be more cooperative by increasing in mindfulness and working in the service of others" (Cloninger, 2006, p. 71). This approach emphasises the relevance of a balance between self-directedness (agency) and cooperativeness (communion).

The terms agency and communion were coined by Wiggins & Broughton (1985) based on their findings that dominance is strongly associated with instrumentality and nurturance is correlated with expressivity, and they renamed these as agency and communion, respectively. Agency can be conceptualised as dissatisfaction with the environment (cause), tension reduction (goal) and modification of the environment in order to reduce its dissatisfactory properties;

communion is seen as a liking, i.e. acceptance or love, of the environment (cause), union (goal) achieved predominantly by establishing interpersonal relationships.

Beyond such adaptive constructs residing within the individual (health assets), potentially stabilising or buffering effects of factors external to the individual (resources), specifically social support networks have to be taken into account. Social support, the ongoing availability of supportive relationships, refers to the comfort, caring and esteem one individual receives from others (Wallston, Alagna, DeVellis & DeVellis, 1983; Cobb, 1976). Social support exerts either direct (main) effects, i.e. beneficial effects on psychological and physical well-being regardless of the existence of stressors, or stress-buffering (indirect) effects. The latter effects only unfold in the presence of high stress (challenge) and are attributed to emotionally-induced beneficial effects on the cardiovascular, endocrine and immune system (Cohen & Wills, 1985). Sarason & Sarason (1985) also provided evidence for the positive impact of social networks and embeddedness on individuals' physical and mental well-being.

Core resilience-related assets which, alongside metacognitive and meta-emotional self-regulation, provided the second categorical framework for analysing the interview transcripts by means of Theory-led Thematic Analysis are shown in Table 5.

Table 5: **Resilience-related assets**

Asset ⇨ Related constructs	**Conceptualisation & Associated Assets**
Resilience ⇨ Agency ⇨ Communion ⇨ Hardiness	"Patterns of positive adaptation in the context of significant adversity or risk" (Masten & Reed, 2005, p. 75). Rutter's (1987) challenge model proposes that moderate levels of risk exposure or challenge imply beneficial steeling effects providing chances to develop problem-solving skills and resource mobilisation.
Agency/ Metacognition of agency ⇨ Persistence ⇨ Need for achievement	Feeling that we are agents who intentionally can make things happen by means of our own actions; foundational to our understanding of ourselves and thus metacognitive in nature (Metcalfe & Greene, 2007). Attributes: autonomous, self-confident and resilient; not giving up easily which implies persistence (Wiggins & Broughton, 1985).
Communion ⇨ Need for affiliation ⇨ Emotional intelligence	Expressivity and fellowship referring to a relatedness and reflecting the need for interpersonal relationships, with being empathetic and rich in emotions as core attributes (Wiggins & Broughton, 1985).
Persistence	Striving against opposition and obstacles; adaptive behaviour continuing in times when the initiating stimulus is no longer present (Reber, 2001).
Need for achievement ⇨ Goal-setting ⇨ Intrinsic motivation	Refers to a desire to accomplish tasks and attain standards of excellence (McClelland, Atkins, Clerk & Lowell, 1953, McClelland, 1985). Elliot & Church (1997) distinguish mastery goals, reflecting intrinsic motivation, and performance goals, involving social comparison and competitiveness.
Need for affiliation	The counterpart to achievement motivation referring to rewarding intimate and social relationships regarded as essential for well-being (Reis & Gable, 2003).
Self-determination	Internally controlling one's behaviour and acting on the basis of personal beliefs and values rather than on the basis of social norms and group pressure (Reber, 2001). Related to self-efficacy (Bandura, 1977, 1997; Maddux, 1999), internal locus of control (Rotter, 1966) and sense of personal control (Peterson, 1999).
Emotional intelligence	Ability to perceive, appraise and express one's and others' emotions accurately; ability to access and evoke emotions when they facilitate cognition (Solovey & Meyer, 1990).
Mindfulness/ Psychological acceptance	Mindfulness refers to acceptance of one's strengths and limitations, to accepting undesirable thoughts and still pursuing set goals (Bond & Bunce, 2000).
Optimism	Expectation that things (at least in the long run) will turn out well. According to Carver & Scheier (2005) optimists display a habitual tendency to experience life's difficulties with less distress.
Coping flexibility	Cheng & Cheung's (2005) differentiation and integration in stressful situations – relatively more monitoring in controllable situations.
Confidence and ability to generate positive emotions in the midst of stress	Predominantly achieved by means of positive reappraisal as a cognitive process by which people focus on the good of what is happening, resulting in personal growth (Folkman & Moskowitz, 2000). Positive emotions fuel resilience (Tugade & Fredrickson, 2004) and result in increased flexibility and creativity.

2.3.3. Aims of the study

This study attempts to expand and augment self-regulatory explanations of Wells and Matthews' (1994, 1996) S-REF model by deriving and investigating *adaptive* metacognitive and meta-emotional processes. In addition psychological constructs (assets and resources) that potentially enhance such positive self-regulation will be investigated. In cases of partially dysfunctional or labile cognitive and emotional self-regulation such assets might counterbalance detrimental impacts of dysfunctional self-regulation – in analogy to Fredrickson and Joiner's (2002) undoing hypothesis, which suggests that positive emotions contribute to regaining an equilibrium after the impact of negative emotions.

This study has three core aims. The first aim is to utilise the S-REF model in order to investigate adaptive metacognitive self-regulation and its impacts on psychological functioning. Furthermore, the additional adaptive role of personality-related assets will be examined by utilising the resilience-focussed framework. The final aim comprises the examination of potential interactions between functional self-regulation and self-empowering assets as adaptive constructs in the light of challenge (potentially negative change).

Rather than taking a purely cognitive approach, this study tries to use a more holistic conceptualisation comprising cognitive, emotional and behavioural factors and mechanisms. The applied systemic approach requires a social-cognitive rather than a purely cognitive perspective which has been the underlying rationale for taking communion-related personality factors, specifically affiliation and emotional intelligence, into account within the semi-structured interviews.

A genuinely holistic approach would also examine potentially underlying biological factors of positive metacognitive and meta-emotional regulation, which is

beyond the scope of this PhD research. It should, however, be mentioned that there is recent research evidence that advanced and complex frontal lobe functions play a core role in purposeful and adaptive self-regulation (Goldberg, 2001). Hemispheric shifts in prefrontal brain activity have also been linked to mindfulness which in turn is regarded as a powerful means to self-regulate negative emotions (Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, Santorelli, Urbanowsky, Harrington, Bonus & Sheridan, 2003).

2.4. Method

A purely qualitative method was utilised in order to gain in-depth and rich accounts. Semi-structured interviews were conducted using a metacognitive profiling template which was developed to elicit and capture adaptive metacognitions and linked functional assets. Interviewees were asked to provide narrative accounts of their challenging projects or major tasks which started with profound difficulties but worked out well in the end. The questions were aimed at priming participants to provide reflective accounts of how they mastered challenge or even risk and adversity in cognitive, emotional and behavioural respects.

2.4.1. Participants

Thirteen participants (five males and eight females) were recruited using a purposive sampling method – all of them were academic professionals, the majority working as research-active university lecturers. Participants, known to the researcher within occupational contexts, were selected on the assumption that they would display functional and adaptive metacognitive self-regulation and hold adaptive personality

assets. With 13 out of 14 participants agreed to take part in the study the response rate was high (92%).

The Ethical Guidelines of the British Psychological Society were strictly adhered to particularly with regard to informed consent (see Appendix 1), assurance of confidentiality and the right to withdraw at any time from the study. Prior to the interview participants received a short written briefing (see Appendix 2); after completion of the interview participants were fully debriefed about the purpose of the study by means of face-to-face discussions.

Core demographic properties and brief descriptions of the individual challenge scenarios of the 13 interviewees are shown in Table 6. Interviews 1 to 8 were subjected to detailed qualitative analysis and will be presented in a case study format in the Results section with reference to their corresponding Case number in Table 6.[15]

[15] Three out of the 13 interviewees could not provide substantial outlines of experienced challenge and – as will be shown – did consequently not account for corresponding adaptive metacognitions and functional personality assets. Further two interviewees only accounted for low challenge scenarios with merely weak to moderate indication of elicited adaptive metacognitions and displayed functional assets. On these grounds only the analysis results of the eight most substantial interviews are reported in the rich case study fashion.

Table 6: **Interviewee demographics and problem scenarios**

PS (I)	**Core Interviewee Demographics** (M =Male; F = Female)	**Theme or Topic (Challenge Scenario)** (Order in accordance to reportage in Results)
1	F, Mid 30s, Psychology Teaching Assistant and PhD student.	First seminar teaching session in Psychology. **Case 1**
2	M, late 40s, PhD, Lecturer and Researcher in Psychology.	Undertaking his PhD (accounting for the process – rather than 'doing' a PhD). **Case 2**
3	M, mid 50s, Professor, Lecturer & Researcher in Psychology.	Conducting and coordinating a large-scale research project in the biomedical sciences on motion sickness lasting ten years. **Case 3**
4	F, mid 40s, Psychologist, Training on the 'MSc in CBT'.	Ongoing struggle to get her planning permission for converting a bought barn into a family home. **Case 4**
5	F, early 30s, BSc, MSc Psychology and PhD student.	Training and preparation for a London marathon as a charity run. **Case 5**
6	F, early 30s, Conversion Diploma in Psychology part-time student.	Adjustment to severe impacts resulting from major surgery at the age of twelve because of severe spinal scoliosis. **Case 6**
7	F, late 20s, Psychologist, Postgraduate training on the 'MSc in CBT'.	Negotiating reduction of working hours in order to conduct her one-year 'MSc in CBT' studies. **Case 7**
8	M, early 60s, PhD, Psychology Lecturer	Application process for university recognition of a 'Research Centre'. **Case 8**
9**	M, 60s, Researcher and retired Professor of Psychology.	Chairing a charity (for sickle cell disease).
10**	F, mid 30s, PhD, Lecturer in Psychology.	Undertaking her PhD.
11*	F, mid 30s, PhD, Postgraduate training on the 'MSc in CBT'.	Smoking cessation (after year-long contemplation).
12*	M, early 50s, PhD, Lecturer and Researcher in Psychology.	Setting up and coordinating the CLaSS project (Cognitive Learning Strategies for Students).
13**	F, early 40s, BSc Psychology, Visiting Lecturer & Researcher in Psychology.	Reassuring a distressed student in her seminar group who violated ethical guidelines.

*) Included in analysis but not reported in Case Study Format.
**) Excluded from analysis and reportage in Results Section.

2.4.2. Interviews and Interview Design

Applying a tailored metacognitive profiling/priming template to the successful mastery of mid- through long-term challenge scenarios, participants were asked to recall and give narrative accounts of their mid- and long-term tasks or projects which started with profound difficulties but which they eventually managed to resolve. Interviewees were primed to recall their predominant thoughts, emotions and subsequent behaviour when dealing with their challenging encounters. Asking them to account for stages and possible identification of the turning point were attempts to get an insight into underlying metacognitive and meta-emotional processes as well as the potential role of applied personality strengths (assets) and available resources.

The interviews took place within two university settings in London and lasted between 25 and 40 minutes. The recorded interviews were transcribed verbatim within a day of each interview and the audiotapes (files) were deleted after transcription. The 13 transcripts can be made available on request.

The utilised interview schedule was based on a metacognitive priming template which was developed and tailored for this Study 1 with the primary focus on eliciting and capturing adaptive metacognitions as well as associated functional assets. The semi-structured interview schedule comprised the initial question in terms of a brief description of the nature of the challenging task or project. The subsequent questions, which attempt to elicit participants' recall of both functional self-regulation and adaptive personality constructs, were:

1. Can you recall your predominant thoughts and feelings when you first sensed the taxing or challenging nature of this task?

2. Did you think you could do something actively – intentionally make things happen by your self-directed actions when you first sensed the challenging nature of the task?
3. Did you also choose a more contemplative, listening approach? For example did you seek support or approval from other people involved in the tasks?
4. In addition to acting independently and/or relying on others, did you try to step back in the sense of 'listening to yourself', trying to increase your self-awareness and thus 'relying on yourself'?

Please try now to think about the 'turning point' and the impacts of your thoughts, emotions and actions:

5. When and how did you realise that you coped successfully or at least came closer to achieving your goals?
6. In hindsight, to what extent do you feel the successful outcome was due to external factors and to internal factors, i.e. your thoughts, determination, and emotions?
7. Can you give an account of the importance of the following motives:
    a. Need for achievement and/or the need for power?
    b. Need for affiliation and/or reassurance?
    c. A combination of both. If yes, how did you find the balance?

2.4.3 Data Analysis

Data were analysed by utilising an integrative qualitative approach blending Hayes' (1991) Theory-led Thematic Analysis with Glaser and Strauss' (1967) Grounded Theory. The latter technique was used in order to accommodate novel (non-category bound) findings emerging from the data.

Following Braun & Clark's (2006) framework, this study utilised the following specification of Hayes (1997) Theory-led Thematic Analysis:

(a) Emphasis on relevance or "keyness" rather than prevalence of themes;

(b) Preference for a rich description of the whole data set (comprising the 13 verbatim interview transcripts) rather than providing a detailed account of one particular aspect;[16]

(c) Deductive approach since the structured interview schedule and the analyses were widely theory-driven;

(d) Focus on manifest (semantic) themes – however, partial analysis of latent themes to identify possible implicit metacognitions.

Adaptive self-regulatory processes (Table 4) and resilience-related assets (Table 5) provided the core background categories, in which primary coding was grounded. Secondary coding focussed on more detailed accounts of potential subcategories. Importantly, rather than prevalence of themes the focus was on crucial themes capturing "keyness" (Braun & Clarke, 2006) following Hayes' (2000) argument that prevalence or frequency of mentioned themes does not necessarily convey its relevance.

In order to account for non-category-led, unexpected findings emerging from the data, the second phase of the analysis utilised a Grounded Theory (inductive) approach beyond the scope of the thematic categories.

2.5. *Results and Discussion*

The section will provide an initial summarising account of shared findings or commonalities in terms of both resilience-related personality factors and adaptive

[16] As aforementioned only 11 interview transcripts were included in the analysis due to the exclusion of two transcripts which lacked the required substance.

self-regulation which interviewees reported with reference to their challenge scenarios. Subsequently the analysis results of eight cases will be reported and discussed in depth. Derived from the overall analysis of the individual interviews an integrative metacognitive framework of adaptive self-regulation in times of challenge, ambiguity and unpredictability will be presented. Finally the section addresses a reflexive outline of the study's inherent limitations.

2.5.1. Summary of crude commonalities

Ten out of the 13 interviewees (I) were able to provide detailed and substantial recollections of their challenging long-term tasks or projects. All interviewees, with the exception of I 2, had read and reflected upon the briefing sheet, which they had received at least two days prior to the interview. However, I 2 was orally briefed within the interview session and could, after a very brief reflection, identify 'Conducting his PhD' as a suitable and his most recent long-term challenge scenario.

It is noteworthy that participants were given free choice with regard to the challenge scenario they wanted to focus on; five (out of 13) referred to a task or an obstacle within their private life, the remaining eight interviewees all discussed occupational or academic challenges.

All interviewees displayed high levels of agency, self-determination and persistence and the majority were able to successfully achieve the envisaged result or overcome the obstacle. When task (project) completion or overcoming the obstacle was not (yet) achievable, the majority of interviewees replaced unrealistic task-focussed coping with adaptive belief alteration and/or plan modifications. Participants predominantly displayed functional metacognitive rather than dysfunctional object

mode of cognitive processing. In addition, overall analysis revealed that the majority of participants had a strong sense of meaning and purpose.

Accounts with regard to question 2 (agency) and question 7a (need for achievement) corresponded for each interviewee in the sense that both psychological constructs were interlinked. There was analogous consistency between interviewees' "ratings" in terms of questions 3 (communion) and 7b (need for affiliation). Investigating pair-wise correspondences between the related questions was a means of triangulation with the finding that intra-interviewee consistency was high.

Analysis of I 9 showed that his, albeit long-term, task did not incorporate profound challenge. His challenge perception of the task at hand was rather low, not necessitating demanding self-regulation or adaptive resilience-related assets: *I can't think of an instance where there was a major problem or a major setback which would have clearly required me to sit and think "How do we handle this?"* I 9 was thus excluded from analysis because his accounts could not contribute to the research questions under investigation. On similar grounds I 10 and I 13, reporting merely very low levels of challenge, unpredictability or risk perception, were also excluded from in-depth analysis and reportage.

The remaining ten interviewees recalled moderate to severe challenge (perception) necessitating substantial self-regulatory processes and utilisation of adaptive resilience-related constructs in order to maintain psychological stability and to achieve the envisaged goal. The eight most interesting and substantial interview accounts will subsequently be reported in depth and in a rich case study format.

Despite the briefing asking interviewees to account for a task or project of fairly long duration, a minority of interviewees accounted for a short-term task, e.g.

I 1 (facing her first ever teaching session). A common discriminant pattern in terms of the challenge duration could be identified:

(a) The long-term scenarios (cases 2, 3, 4 and 6) required by their nature a higher degree of resilience-related factors, e.g. persistence, determination and frustration tolerance – compared to metacognitive and meta-emotional self-regulation;

(b) The short- and mid-term scenarios (cases 1, 5, 7 and 8) accounted for utilisation of several metacognitive and meta-emotional self-regulatory processes – to a higher extent than relying on personality assets.

Core findings of the eight most substantial and in-depth interviews will subsequently be reported in a case study format since both self-regulation and resilience factors were investigated as context-bound processes; the nature and context of each single case scenario will be briefly summarised before reporting the main individual findings and providing concise conclusions for each analysed case.

2.5.2 Case Results

Reportage, analysis and discussion of each of the eight interview cases are structured in equal fashion: a) Case Summary, b) Case Results and Discussion and c) Case Conclusions. Verbatim interview citations are presented in italics.

2.5.2.1. Case 1: First teaching session – Adaptive self-regulation

a) Case Summary

I 1, a female PhD student and psychology teaching assistant in her mid-thirties, provided substantial and insightfully reflected narrative accounts of her first ever teaching session (Research Methods workshop for Psychology undergraduates). She

appeared to be extraordinarily well-prepared for the interview on the basis of the briefing sheet. She emphasised that she perceived her first delivered seminar session as a challenge because she herself had just completed her MSc degree and had some doubts whether or not she would be sufficiently qualified to deliver seminar sessions: *But I think in the back of my head I had the thing "I am a bit like a fraud" ... I had just finished the course, I had no teaching experience.* Her second concern was speaking in public because her prior jobs in theatre production and for a literature agent required predominantly one-to-one communication. She emphasised having invested a lot of time and effort to be optimally prepared for her first and subsequent teaching session(s).

b) Case Results and Discussion

The participant reported negative feelings (not being qualified enough, fear of failure and specifically 'disclosure to students') just before entering the classroom for her teaching and public speaking debut. Remarkably she could within seconds suppress bouts of active worry, excessive self-focussed attention and threat mentoring. Rapidly ruling out the (costly) alternative of not facing the challenge by quickly and consciously rationalising her fear reflected a core self-regulatory strategy for merely short S-REF activity and a quick transition from object to adaptive metacognitive mode of processing:

The most vivid memory I've got was standing outside the classroom and hearing the voices of the students inside and actually having stood by the door prior to walking in ... I thought "I can't do this, really can't do this – this is silly I am not going to do it – I am going to tell R. [module leader of the Research Methods course] I am sorry [laughs], I made a mistake".

I mean it wasn't a long thing, these things happen in four, five seconds although it feels like a lifetime – and I just stood there and you think: "What's worse, facing the class that I was scared standing in front of or facing the person who has employed me to do the task and going downstairs and saying: 'Not only can I not do it but I have given you no notice that I cannot do it?'" So actually I was more scared of that than of the class and I walked in.

Her metacognitive awareness and instant and conscious shift from threat-focussed object to task-focussed metacognitive S-REF mode, which resulted in a positive mood or even a flow-like state, is further underpinned:

So that was the kind of negative feelings; and I suppose the first time I walked in there was probably that kind of butterfly feeling. And then I think you go into performance mode and kind of the adrenaline kicks in and you give the session. And like I said at the end of the first session there was some really nice comments and I remember feeling on a real high after it, probably because I was so tensed up beforehand and I remember walking out with a kind of big grin on my face "Yes! I got through that - that was ok! I didn't get found out [laughs]". So, yeah, I remember having been on a real high that evening.

The interviewee then addressed the reinforcing effect of her first successful session on follow-up sessions with regards to self-efficacy and motivation. There appeared to be a bidirectional link between agency, achievement and intrinsic motivation on one hand and functional self-regulation on the other hand. She reported prudent preparation for the first session (and subsequent sessions), thoroughly reflecting on lecturers she had perceived as good and poor as a student (modelling), and also taking note of verbal and non-verbal feedback from students (e.g. fidgeting when bored). Such inherent agentic skills, preparedness and modelling might have

contributed to displaying the adaptive metacognitive self-regulation, specifically prior to and within her first teaching session.

By addressing less successful or enjoyable teaching sessions the subsequent excerpt reflects her functional and discriminant monitoring, adaptive (external) attributionary style and, in parts, detached mindfulness:

I think you do know when you have performed well and when you have performed badly and everybody has times when they think "I wasn't really in form today, I wasn't really in the mood and I wasn't as good as I could have been". And there are times and you know that you have done ... And it can go both ways, you can give an average performance, and you can have good outcomes because the group happens to be kind of positive and engaged and they experience this [performance] as good.

And other times you can think that you have put in loads of effort, you have done lots of preparation, you really know your stuff, you have been keen and enthusiastic and this drippy group keeps on [inaudible] and you think "That was about them [the students], it wasn't about me".

c) Case Conclusions

The interviewee's in-depth and rich account supported the inverse metacognitive prediction derived from Wells' S-REF model that adaptive online processing, i.e. predominance of metacognitive over object mode, implies mood-stabilising or even enhancing effects. Above and beyond Wells' metacognitive prediction adaptive online processing here also fostered subsequent goal-setting and goal achievement.

2.5.2.2. Case 2: Process of undertaking a PhD – Adaptive self-regulation and personality factors

a) Case Summary

I 2 was the only participant who had not read the briefing sheet prior to the interview but at the beginning of the interview session he could "instantly" identify his PhD as his most recent, long-term challenging task. Within the subsequently analysed account he emphasised that undertaking a PhD was a process as opposed to "doing a PhD": *It's a process – you cannot do a PhD.* Interestingly, although referring to a long-term (six-year lasting) project both adaptive self-regulatory processes and resilience related assets were found and interdependencies between functional self-regulation and assets could be identified.

b) Case Results and Discussion

In the very beginning I 2 stressed his crucial perception of the PhD as a process ... *not a thing that can be done ... it certainly is a process. So thinking of it that way just made it like a hurdle of an enormous magnitude because you are thinking of it as a PhD rather than a series of steps.*

His corresponding approach or strategy comprised adaptive self-regulation by means of breaking the huge PhD goal down into a set of smaller and achievable sub-goals (as opposed to unrealistic ones with the inherent risk of activating maladaptive S-REF prevalence). This strategy also resulted in high self-efficacy, motivation, self-determination and perception of agency and optimism in terms of goal-striving, regardless of the coexisting negative perception of the *'hurdle of enormous magnitude'* of the complex nature of pursuing PhD research. The following core links between metacognitive self-regulation and stability-enhancing personality factors could be identified:

Contemplation – all the time, but there is a couple of tactics, I mean, I used to get over that idea of the magnitude of the task: One lesson I learned from the army ... "when you have to climb a mountain, if you go up a steep hill, you take smaller steps". ... Take smaller steps because it saves energy, all you have to do is take them because it takes you wherever you are going. That's why I had never any doubt that I would complete my PhD. ... I mean whenever you are faced with a task that's long, complicated and involved or in any other way challenging – in order to start it you have to have some belief that you can complete it, otherwise you wouldn't start it!'

I 2 also utilised a second crucial element of functional metacognitive self-regulation by allocating activities and energy to controllable domains and not trying to control those beyond effective control. Applying Wells' (2000) model this can be interpreted as the conscious attempt to prevent bouts of S-REF activity/worry, i.e. predominance of adaptive metacognitive over dysfunctional object mode. In this context I 2 reflected highly functional self-beliefs and metacognitive awareness in terms of different degrees of controllability and adaptive, functional online processing:

Yes, there are a huge number of things that we do, the outcomes of which or the acceptability of the outcomes is not for us to say. So for example as what I tell third-year project students who, once they've posted their project, continue to worry about it – but it's out of their control and subsequent thought is taking up resources they could better spend on other things. But the idea of acknowledging and thinking about it and clearly defining the element that is not in your control is basically saving effort because once you've defined it you can close it off – ignore that. If you can't control it and you intend to do so, it's a waste of effort, better spent on things you can control.

This cognitive and behavioural pattern is consistent with Cheng and Cheung's (2005) concept of coping flexibility with greater monitoring in controllable, and less monitoring in uncontrollable situations.

Referring to the anticipation of his Viva Voce and the corresponding involvements of his examiners I 2 also identified this as being largely out of his control: *The only remaining grey area was whether or not what had been completed other people would find acceptable.* In this context he also showed impressive authenticity and agency reflecting his intrinsic motivation with regard to his PhD research area: *In any science, just because you are being assessed, do you present what your research shows or do you present what you think the assessors want to see? You got to be a scientist; you present what you find and not what you think what somebody else wants to read.* His self-determination, outstanding need for authenticity and honest self-reflection is even more strongly underpinned: *But I wouldn't let the idea of being assessed determine what would have to be explained because I had only the results to go by.*

c) Case Conclusions

I 2 displayed highly functional self-regulatory metacognitive strategies combined with resilience-related stabilising personality attributes. His apparent striving for authenticity combined with his strong intrinsic motivation promoted the underlying psychological needs for autonomy and competence in the sense of Ryan and Deci's (2000) self-determination theory. His outstanding confidence and self-efficacy is accounted by: *After the trouble I had with "How to do a PhD" I never had a problem with thinking "Can I do it?" It never occurred to me that I couldn't.*

2.5.2.3. Case 3: Conducting and coordinating a large-scale and long-term biomedical research project - Persistence

a) Case Summary

I 3 provided an interesting account of his longest ever research project which lasted approximately ten years and required his coordination of several involved researchers and the difficult access to appropriate apparatuses (long tracks for accelerating participants in order to conduct the research into motion sickness). He emphasised the extraordinary length of his project several times in the interview. In addition to their outstanding duration the experimental trials were complex and required a high degree of persistence: *It was probably the longest-term experiment I have ever done, I had to sustain it over many years in different contexts and different laboratories*. Subsequently reported results show pronounced predominance of interwoven adaptive personality factors, e.g. agency, intrinsic motivation, persistence, self-determination but also communion, over and beyond adaptive self-regulatory mechanisms. The self-explanatory argument lies in the extraordinary duration of ten years which required resilience-related factors (specifically persistence). The very long nature of the trials might have implied slightly biased recall in the sense of overemphasising the relevance of personality constructs in comparison to adaptive short-tem self-regulatory processes.

b) Case Results and Discussion

In light of the extremely long duration and complexity of the novel experiment, persistence and high intrinsic motivation appeared to have been the crucial psychological constructs of I 3, which in turn had positive effects on successful goal-setting. He expressed awareness and distinction between short- and long-term tasks: *Because the thing ... is to sustain your attention for a number of*

years. It's very different from setting short-term goals. Persistence and formulation of flexible and attainable goals were specifically required because he reported frequent obstacles in terms of accessing the required apparatuses and getting the full cooperation of scientific staff involved in the lengthy trials:

I could see it was feasible, albeit difficult, and I could sense that my motivation went up and down but eventually I pushed it through! I meant there were gaps when I just did other things when there was no more progress to be made. In that sense I suppose the self-awareness is that you maintain the long-term goal in the back of your mind and when you see different possibilities you identify opportunities.

Continuously keeping the long-term goal in mind can in self-regulatory terms be interpreted as implicit metacognition in the sense of – from the very beginning – anticipating a successful outcome and the corresponding emotion of elevation: *I think the self-awareness almost came towards the end in the sense of pleasure and completion, the feeling that you have actually accomplished something that has lasted for many years.*

Optimism – the expectation that things in the long run will turn out well (Carver & Scheier, 2005) – and hope with explicit agency and pathway thinking (Snyder, Rand & Sigmon 1995) could clearly be identified. Furthermore I 3 supported Chang and Bridgewell's (1998) findings that optimists show fairly high frustration thresholds: *On the negative side I suppose was the frustration of not being able to get the equipment to work or sometimes not being able to get access to facilities.*

In addition to agency and other autonomy-related factors the interviewee also accounted frequently for communion and its associated positive affect: *The affiliation, the enjoyment of working in teams which is actually good fun, working in teams – is also important.* In the light of the fact that I 3 was the leader of the whole research

project, he also reflected a healthy balance between agency and communion which is underpinned by his remark: *I think the core positive emotion is that research is often a shared activity, although you do quite a lot of contemplation and thinking things through yourself and trying to work on new ideas.*

c) Case Conclusions

I 3 displayed fundamental characteristics of persistence, agency and communion enabling him to maintain focus and successfully complete his complex experimental research which lasted literally a decade. His outlined personality-related factors moderated the potentially detrimental impacts of experienced negative emotions. In addition it can cautiously be inferred that potentially implicit metacognitive awareness played a role with respect to anticipating a successful completion from the very start of his project.

Adaptive personality assets to a higher degree than adaptive metacognitions appeared to have stabilising and smoothing effects on fluctuating perceptions of challenge and also enabled frustration tolerance: *It's very difficult, you go through peaks and lows and it's a question of long-term goal-setting and sticking to it.*

2.5.2.4. Case 4: Years-long attempt to get a crucial planning permission – Functional self-regulation and adaptive personality factors

a) Case Summary

Ten years ago I 4 and her husband bought a huge piece of land (2.5 acres with a barn) with no planning permission on it, intending to convert the barn into a family house. They had sold their family property in order to fund the land purchase and moved into a caravan, which had been supposed to serve only as temporary accommodation. Receiving the necessary planning permission became a troublesome

(still ongoing) "battle" with the planning authorities, which have been continuously demanding adjustments to plans for the envisaged family home. The family (interviewee, her husband and two children) are still living in their caravan as interim accommodation! *We are still in the caravan. It's now ten years but we are on the way to finishing the project.*

This case was distinct from all the others because of its potentially devastating financial impact since not receiving the planning permission would have left the family with an effectively worthless piece of land. In terms of duration the case is identical to Case 3 (around 10 years) – however, with the core difference that the goal, i.e. receiving the all-important planning permission, has not been achieved yet.

b) Case Results and Discussion

After her first attempt to get the – what was expected to be easily obtainable – planning permission I 4 experienced several months of unsuccessful negotiations with the planning authority, who repeatedly demanded successive submissions of modified plans and drawings. She then realised both the unanticipated and unpredictable reluctance of the planning authority *(there wouldn't be a sense of acknowledgement that we were working towards a goal)* and the implied and severe financial threat: *So I went from being very enthusiastic and excited, not being aware of any difficulties, to being really overcome with a sense of "This is potentially disastrous"!*

She reported the onset of feeling helpless and overwhelmed but she could fairly quickly overcome her severely depressed mood by displaying personal agency and corresponding problem-focussed coping. She could prevent the S-REF from becoming perseverative by what appeared to be linked to a protective personality characteristic in the sense of not suppressing anger and worry and additionally seeking agency-enhancing feedback: *And I think one of my basic characteristics is*

that I don't bottle things up. I talk about this with people in general actually, so I get feedback. The concise statement also provides evidence that seeking support and the general social context potentially play a role in adaptive self-regulation. The subsequent quotation reflects this overlap of self-regulatory shift form object to metacognitive processing and her functional personal agency:

I was very, very depressed. And at that point then, I have a tendency, a sort of family motto which is "There are no problems, there are only solutions". And I sort of switched off into that and I said "Right, how do we get out of this?" So I started then looking at understanding a lot of planning law. ... I could then actually start asking for meetings [with the planning commission] to address particular issues.

Interestingly, despite being depressed over the (objective) threat imposed by the dilemma, she displayed only a short bout of Wells' object mode of processing and apparently had pronounced metacognitive awareness of her capability to voluntarily "switch off", i.e. to engage in productive metacognitive mode of online processing.

In another meeting where she was joined by her husband the relationship with the planning officer deteriorated from what I 4 described as *negotiating mode into confrontational mode.* Her reaction to what she perceived as a *personal rather than professional challenge* was requesting a meeting with the head of the planning department. After familiarising herself with the planning legislation at that time she prepared a document comprising counterarguments to the planning officer's standpoint: *I knew I had to give him [head of planning department] something.* Rather than overreacting by severe confrontation with the planning officer, i.e. refraining from acting impulsively, I 4 displayed the capability to originate and direct problem-focussed actions for the given purpose; a reflection of personal agency (Zimmerman & Cleary, 2006).

I 4 also accounted for communion or need for affiliation expressed by seeking emotional support from her mother and having a mutually supportive relationship with her husband: *My husband and I generally are a very united front.* However, she did not overly rely on support or communion (*that was purely for emotional support because there was no other way how she [mother] could have helped us).* Rather than becoming highly sociotropic (McBride, Bacchiochi & Bagdy, 2006) her motives for healthy affiliation were to obtain positive stimulation and receive emotional support (Hill, 1987), thus not undermining her personal agency and functional instrumentality outlined above.

In addition early social learning processes (Bandura, 1977a, 1977b, 1997) had apparent stabilising effects: I 4 referred to her mother as an agentic role model, having observed her adaptive coping styles in challenging situations: *But I think I also have a bit of a family motto in that my mother is a very proactive person, so I have got that sort of model. ... And I saw her take charge of a difficult family situation when I was still a child. ... So I think I had a model of actually being quite active, so that was helpful.*

A further resilience-reflecting and -enhancing characteristic was her ability to generate positive emotions in the midst of challenge by means of positive reappraisal (Folkman & Moskowitz, 2000): *Very consciously I made the decision to turn it into a positive experience rather than a negative.* Importantly, "consciously" making the decision reflected her adaptive and pronounced metacognitive awareness in terms of voluntarily making this decision.

The subsequent quotation reflects detached mindfulness or psychological acceptance as a metacognitive and meta-emotional concept operating above the level

of immediate experience (Donaldson, 2003) and, according to Roger, Jarvis and Najarian (1993), being more adaptive than avoidance and emotional coping:

Being mindful? Only in the sense that I had to question some of my assumptions of a regular lifestyle. I was aware that, in order to achieve this, the ultimate goal obviously was to have the family house, not to get it through the planning permission process. And it was really looking whether I was prepared to live in a caravan with my children in order to achieve it.

c) Case Conclusions

In analogy to Case 2 this case showed several interdependencies between adaptive self-regulation and protective personality-related factors. With regards to the latter I 4 showed a psychologically healthy and stable balance between agency and communion with no tendencies of becoming overly agentic or sociotropic.

In terms of self-regulation this case revealed the ability to reduce perseverative and ruminative S-REF activities to brief episodes (to exert effective control) and subsequent successful implementation of adaptive metacognitive mode.

The unobservable metacognitive mode could be derived from the interviewee's reflective and rich narrative accounts; moreover, her adaptive processing was manifested in agentic actions and communal seeking for support – reflecting the interplay between self-regulation and adaptive personality assts.

2.5.2.5. Case 5: Preparing for a charity marathon run – Functional self-regulation and anticipation of beneficial impacts on other life domains

a) Case Summary

I 5 – a female PhD student in her early thirties – provided an in-depth account of the cognitive, emotional and behavioural strategies she applied to optimise her preparation for a London marathon. She reported two prior participations in marathons but emphasised the challenging nature of this one because it was a charity run: ... *on this third one I was actually running for a charity – so there was a lot at stake.* She accounted for both motivation-enhancing self-regulation and functional personality factors. The distinctiveness of this case was that she anticipated beneficial effects from the training and ultimately from the successful completion of the crucial marathon above and beyond the inherent physical and psychological benefits with regards to other life domains.

b) Case Results and Discussion

I 5 expressed high motivation and dedication to raise money for the charity but also showed clear awareness of the challenging nature of her goal (completing the marathon within the given time limit), which would require rigour, discipline and strategy as means for efficient preparation. She reported self-motivation and *keeping the charity in mind* as core initial strategies at the beginning of her 16 weeks' training schedule.

However, she also experienced feelings of anxiety at not managing the required marathon preparation because of other commitments in her life at that time: *And then that really made me anxious and I kind of got self-absorbed in those feelings and it got to a point where as soon as I was thinking about running for a charity, I had to get up and think about this more sensibly. So I had been thinking in terms of*

my nutrition, in terms of my potential and how I could get through this. Within her constructive contemplation she identified *thinking more positively in terms of what I can achieve, in terms of what is more realistic* as effective means for goal achievement.

Still, at the beginning of the interview she also reported *feelings about just losing self-confidence,* which she tried to control and rationalise by seeking support from her more experienced fellow runners.

With regards to her reported attempts to seek social support two features are noteworthy: (1) similar to I 4 she did not overly rely on this support and (2) she looked for informational support in terms of a guideline for "normal" experiences of other runners: *Just to find out what experiences are normal and what I should normally be thinking. ... So by knowing what is normal and what is not normal kind of helped me to focus a lot more.* Within Wells and Matthews' (1994, 1996) metacognitive model her seeking for "normality feedback" could be interpreted as an adaptive metacognitive strategy for optimal resource allocation – facilitating the required preparation by focusing on the training schedule rather than worrying about possibly not meeting the required time limit in the final run. This was supported by her subsequent remark: *Yes, the motivation to see just how much I can go and just using strategies like maybe putting relaxing music on while I am running and focusing on that.*

When asked whether she could clearly identify a turning point, which gave her the confidence to meet the time limit in the charity run, she pointed to serendipity; towards one of her final training runs she got lost and then realised that she had actually run an additional three miles, 22 miles rather than the 19 miles she meant to run – but within the set time limit for the envisaged 19 miles. She expressed that this

experience resulted in an enormous confidence boost: *Even though I was very angry with myself for getting lost, at that point I actually realised "If I can do 22 [miles] then I can definitely do the extra four [miles]".*

I 5 could also give a rich account of a reciprocal interplay between self-regulation and personality-related assets in terms of maintaining her training commitments: anticipated future transfer, instrumentality and expressivity. The following extract provides evidence for her corresponding metacognitive awareness:

All these aspects made me realise I could probably transfer this into other areas – just individual things like maybe that I kept motivated, that I kept focussed on the particular task on hand, that I had people around me who were able to support me, as long as I kept relaxed and not make it the main, not to dominate my life.

She also expressed clear metacognitive awareness in terms of a psychologically adaptive balance between agency (instrumentality) and communion (expressivity): *This kind of using those aspects like this support from friends and the family, knowing that I can actually push myself to a further level of ability, just being aware of those things and that this can easily be transferred to other areas in my life.*

The anticipated transfer of increased self-efficacy into other life domains expressed highly functional flexibility, in turn potentially facilitating successful coping with and adjusting to future challenges in different situations and encounters. This transfer – reflecting adaptive online processing and high metacognitive awareness – informed (and was informed by) her belief system; in Wells & Matthews' (1994, 1996) S-REF model this was manifestation of the reciprocal link between online processing and the schema level. The following quotation provides evidence that her corresponding and increasing metacognitive awareness built up in a process-like fashion:

Initially I thought the most important point was crossing the line and that I was actually going to raise money for the charity, but in fact it was an overall belief that, if I am capable to put my mind to something, keep motivated and keep self-conscious about a period of that time, that I then could probably transfer this kind of focus to other areas of my life that are not particular physical.

The anticipated synergy effects – transfer of focus into distinctively different life domains – reflected her flexibility: *I might use these aspects in other areas – maybe my studies or going for a new job or maybe when I have got doubts whether I can do something or not. Then I might actually use these experiences I have learned through a physical process for other processes.*

c) Case Conclusions

I 5 – who completed the marathon well under the required time limit – showed an adaptive balance between agency and communion. She also had functional metacognitive awareness which she could even increase in the light of the challenge perception. She appeared to have a high sense of personal control but, moreover, this personal control as conceptualised by Peterson (1999) had effects on increasing emotional, motivational, psychological and behavioural vigour.

She provided narrative evidence for metacognitive awareness, functional metacognitive processing and a plethora of resilience-related assets, e.g. achievement and intrinsic motivation, persistence and clearly hardiness comprising commitment to different domains, personal control and perceiving changes as challenges (Maddi, 1998; Maddi & Kobasa, 1984).

2.5.2.6. Case 6: Coping with severe spinal scoliosis – Ongoing adaptations and thriving in the light of early experienced health adversity

a) Case Summary

The female interviewee in her early 30s addressed a major health-related challenge or even adversity. Currently in employment and also a part-time Psychology student she had been diagnosed with spinal scoliosis at the age of 12 and had to undergo a series of operations over a two-year period. The short-term implications of the operation were that she had to live in a body brace during this two-year period. Her narrative account starts with her difficult decision-making process in terms of whether to undergo or not to undergo the potentially risky operation. Interestingly her parents tried to encourage her to consciously make this decision herself at that young age. I 6 then provided insight into the continuous adjustments – specifically emotionally – she had to make to her condition.

Among all thirteen (and the eight reported) cases this was the most severe due to the plethora of ongoing adjustments I 6 had to and still has to make. It was a case of severe health adversity requiring resilience as conceptualised by Luthar, Cicchetti and Becker (2000) as a dynamic process of positive adaptation exhibited by individuals when they are confronted with significant adversity or trauma. The personality-related strengths (assets) she mobilised in order to cope with her illness-implied handicaps – and her capability to even thrive amid this adversity – are outlined and discussed in the following section.

b) Case Results and Discussion

I 6 had to make her most daunting decision when she was diagnosed with severe spinal scoliosis at the young age of twelve. She accounted for having been honestly informed about her options by the consulting surgeon: not undergoing the

operation would have incorporated the inherent risk of ending up in a wheel-chair; the operation, however, implied some risk. She recalled vividly at this stage not feeling in control because of her limited understanding of the condition, feeling different from her healthy peers and also due to her anxiety with regard to a possible HIV infection because the operation required blood transfusions.

The surgeon suggested a time frame of one month for her to weigh up the pros and cons and her supportive parents showed her more the advantages of undergoing the operation but, yet, did let her make this crucial decision: *But surprisingly they [her parents] didn't dictate what I have to do – they did allow me the choice!*

This can be interpreted as an insightful guidance by her parents who at the same time gave her some feeling of autonomy and control. Due to her young age and the severity of both the illness and the decision-making process she was heavily relying on her family's support: *I feel that I didn't have a healthy inner voice because I was going through a big crisis and so I was heavily dependent on my family.* She experienced the crucial emotional support and crisis support (Cohen & Wills, 1985; Brown, Andrews, Adler & Bridge, 1986) but – as her later accounts showed – this did not result in over-dependency or sociotrophy.

In the process of having to cope with the diagnosis and making this all-important difficult decision, I 6 displayed an impressive ability to generate positive emotions in the midst of high stress or even distress (Folkman & Moskowitz, 2000) by means of positive reappraisal or, more specifically here, by a sense of early maturation and character development: *Although it was daunting, I think a positive sense was that it made me aware and grow up very quickly.*

She then reported that an additional source of distress and crisis was that her parents were breaking up (about three years after the successfully carried out

operation). Again, her ability to generate positive emotions amid the simultaneously experienced distress could be derived from her reflection on all the positive focus and emotional support she had been receiving from her parents: *I mean it could have been the other way, they [her parents] could have been negative, and then I think I would have followed that through.*

She identified the support subsequently received from her friends and peers, the feeling of belonging and having been fully accepted as a person, and not having been stigmatized as the crucial turning point:

I think having really loving friends ... I was very fortunate of at school having really loving friends and I was always in the popular group. So I was really fortunate to have that support from my friends: They would come to the hospital in their lunch break, you know, even though I was away from school for a year, they would come and visit me, so my peers were wonderful, they didn't see me, they wouldn't class me as being disabled, or being different or wouldn't treat me differently. I was "A" [initial changed] who had gone through the operation and they wanted to support me. Yeah, they were real friends and that was the turning point and that motivated me and I really wanted to go back to school. ... So I had a really good turning point in that my friends hadn't abandoned me.

In terms of her friends' support she also said: *I think that really helped me to rehabilitate and really take control* which suggests that meeting her need for affiliation served at the same time as a catalyst for gaining agency and instrumentality. This was supported by her accounts at the end of the interview when having been asked how relevant she rated the need for achievement, she emphasised that achievement along with affiliation played a very big role in her life.

When talking about achievement she also addressed impressive resilience in terms of overcoming insecurities – reflecting the steeling effects her health-related adversity have had:

I still have insecurities in achieving – I always doubt myself. But that helps me as a driving force to proof myself "Actually you can do it". ... And it's something I am kind of learning to deal with, kind of the belief "You have achieved a lot, look, now you're doing your second degree". ... There is probably still the insecurity as a child within me – even though I am 33 years now. But I think probably one of the drives is: "Everything I have been through as a young child is a motivator for me, I can get through this - I can do this".

c) *Case Conclusions*

Case 6 was distinct from all other cases in three respects. First, the interviewee reported the most severe challenge of the group, close to health-related adversity. Moreover, she provided a life-span account from childhood through adolescence and early adulthood of her required and ongoing adaptations. Finally, for her, provision of not over-protective but, yet very committed, support from family, friends and peers appears to have fuelled agency, commitment and "drive".

The last aspect supported the hypothesis that people can thrive and flourish even in adversity. In addition her narratives reflected character development, which according to Cloninger (2006) results in greater self-awareness leading in turn to greater happiness. She clearly expressed remarkable self-awareness with respect to her maturation process: *Although it was daunting, I think a positive sense was that it made me aware and grow up very quickly.*

2.5.2.7. Case 7: Difficult negotiation with employer to gain working hours reduction in order to pursue a part-time MSc – Anger as a cue for determined action

a) Case Summary

The female interviewee in her late twenties was working in a mental health setting. In order to pursue an envisaged MSc in Cognitive Behaviour Therapy (CBT) she had to negotiate with her employer to take time off work. Initially the employer rapidly declined her request without any room for discussion. I 7 reported feelings of frustration and anger. Rather than impulsively overreacting these negative affects resulted in her determination to insist on a specific discussion with her employer in which she achieved her envisaged part-exemption in order to pursue her MSc course.

b) Case Results and Discussion

As emotional reactions to her employer's rigid refusal to discuss her request I 7 reported anger, active worry and depressive perseveration lasting for about a week: *I think initially I just accepted the 'No' and I was feeling quite angry, upset and depressed about it because I couldn't see myself doing this job after that – I mean without the chance of doing the envisaged CBT training.*

Although she had anticipated difficulties in getting the partial job release her employer's uncompromising refusal fuelled her ongoing negative emotions. Noticeably, however, rather than overreacting by immediately confronting her employer, I 7 first sought informational support by discussing the obstacle with her partner, friends and trusted work colleagues. She looked for feedback from important others about whether or not her request was *"justifiable or permissible to even ask about it"*. It appears that the encouraging support she received combined with her pronounced anger extinguished her worry and these became the catalysts for gaining self-awareness of her cognitive dissonance induced by her employer's instant turning

down of a possible compromise: *And I guess it made me quite angry, it made me kind of realise that they didn't care... and if there wasn't another option I wouldn't have continued the job. So when I thought I am not going to do it, either I look for another job or I'll do everything to get that training and I think that was the turning point – before that I was just kind of thinking "Oh, no, they won't do it, it's not justified" and I was kind of probably even ruminating about it.*

A week after the initial refusal she firmly insisted on a meeting and discussion with her line manager and achieved her envisaged part-exemption in order to pursue her MSc course.

In her case the negative emotions of frustration, worry, rumination and depression resulted in constructive anger, empowering her to seek the determined and challenging negotiation with her employer.

c) Case Conclusions

The case reflects a sequence of constructive self-regulation from worry through to constructive anger with the latter then empowering her to calmly but in a highly determined fashion confronting the challenging negotiation with her employer. The crucial transition from worry through clarifying anger and subsequent mind-setting for tackling the negotiation appeared to have freed up potentially maladaptive attentional resources: ... *it was also liberating to become active for myself and to make the decision.*

2.5.2.8. Case 8: Daunting application process for university recognition as a 'Research Centre'– Frustration tolerance and refraining from overreaction

a) Case Summary

I 8 provided a detailed account for – what appeared to be a straightforward – recognition of a university "Research Centre". What was thought to be a simple criteria-driven application process developed into a bureaucratic 18 months lasting endeavour which required reformulations of previous applications and continuous negotiation and persuasion. By virtue of the fact the application did not have any financial and resource implications, he reported high levels of frustration and his conscious attempts to refrain from possible overreaction.

b) Case Results and Discussion

This case resembles Case 4 (Ongoing attempt to get a planning permission for a barn conversion) because in both cases no initial problems were expected; but unlike the long-term nature of Case 4 this Case 8 was of medium duration (18 months). The required frustration tolerance was another shared property of both cases. Both cases, alongside with the previous Case 7 (Negotiation with employer to gain partial work release) also required restraint from inherent overreactions.

I 8 stressed several times that the increasing bureaucratic obstacles were particularly frustrating in light of the fact that the envisaged "Research Centre" recognition did not imply any financial or other resource commitments for the university: *Well the negative emotions were a kind of frustration. I guess the frustration arose because in obtaining, let's say, centre status, there were no resource implications to the university what so ever, it was purely the university formally recognising a group as a centre. ... So there was this element of frustration in a sense that there seemed this overly bureaucratic kind of stance and argument or debate...*

The developing obstacles and induced feelings of frustration casted doubts on whether it was still worth the required effort to achieve the envisaged recognition: *And I guess, just as an extension that frustration led to a point at times "Is it really worth is?" – I mean "Is it really worth putting in all the time and efforts you put in and getting other people's support and cooperation reformulating the application?"... "'Well what was the point really at the end of the day?" So it was a kind of frustration.*

The required persistence in light of the increased frustration perception implied the potential risk of impulsive overreaction of which I 8 was aware and from which he could refrain: *And I suppose biting one's tongue and saying "Don't overreact to the system and, in a persistent but requiring way, find out what is required, respond to the requests in a constructive manner and, you know, kind of feel your way through to a conclusion". ...Well I suppose listening to oneself was part of this deciding not to react adversely in terms of frustration with bureaucracy – I could sound off with my colleagues but in a sense I refrained and restrained from sounding off with the system in that conversation.*

In a summarising reflection of his contributions to the eventually successful 'Research Centre' recognition the interviewee again emphasised the crucial restraint from overreaction: *Well I think it was probably a combination of a number of things. On reflection I think that strategy I stated "Don't overreact to the system, feel your way through, explore the possibilities and work towards the solution".*

c) Case Conclusions

I 8 provided a vivid account of persistent frustration tolerance which was required due to the developing bureaucratic obstacles. It can be inferred from his narrative account that his self-awareness and mindfulness provided essential cues for

persistence and, moreover, for refraining from potential overreactions to the system and to the relevant individuals involved.

2.5.3. *Discussion of the resulting integrative metacognitive framework of adaptive self-regulation in times of challenge, ambiguity and unpredictability*

Three cornerstones of functional self-regulation in the light of severe challenge emerged from the interview data; the corresponding constructs and processes were found to be interlinked. In addition to resilience-related factors the analysis focussed predominantly on functional metacognitions. Extending Wells' purely cognitive approach the study furthermore attempted to take meta-emotions into account. Wells and Matthews' (1994, 1996) and Wells' (2000) metacognitive model of emotional disorders predicts that vulnerable individuals display perseverative thoughts and rumination which in turn prevent effective mind-setting for problem-solving and subsequent goal achievement. Such dysfunctional cognitive, emotional and behavioural patterns are specifically triggered by ambiguous and unpredictable situations and by both short-term and long-term challenges.[17]

In contrast, emotionally stable individuals, when confronted with severe challenge, perceive confidence in rapidly getting out of worrying perseveration and depressive rumination, and furthermore in their ability to refrain from impulsive overreactions. Thus they have the capability to rationally assess and constructively interpret their emotional cues. Adaptive metacognitions and meta-emotions of this kind facilitate subsequent functional cognitive and behavioural responses comprising

[17] Several studies have provided empirical evidence that (maladaptive) metacognitions mediate the relationship between stress/challenge and psychological disorder (Spada and Wells, 2005; Spada, M., Nikcevic, A., Moneta, G.B. and Ireson, J. , 2006; Spada, M., Nikcevic, A.V., Moneta, G.B. and Wells, A. 2007). These studies measured metacognitions with Wells and Cartwright-Hatton's (2004) MCQ-30 comprising five factors: positive beliefs about worry, negative beliefs about worry regarding uncontrollability and danger, low cognitive confidence, need to control thoughts and cognitive self-consciousness.

mind-setting for problem-solving, achievable goal formulation and confidence in final goal achievement. More specifically stable individuals display the capability of setting flexible and attainable hierarchies of goals being particularly relevant when obstacles and unpredictable events require adjustments of sub-goals or when tasks are perceived as overwhelmingly huge.

2.5.3.1. Confidence in Extinguishing Perseverative Thoughts and Emotions

Severe challenge potentially incorporates overly taxing appraisals with possible onset of cognitive dissonance, ruminative negative thinking cycles and behavioural disengagement, as conceptualised by Wells and Matthews' (1994, 1996) perseverative S-REF. In turn these dysfunctions potentially result in even more pronounced filtering of negative appraisals with rigid attentional focus on threat and danger rather than surmountable challenge. Maladaptive self-regulatory processes of this nature inhibit or at least significantly delay problem-solving and subsequent goal achievement.

In contrast the psychological stable participants in this study accounted for their confidence in rapidly extinguishing perseverative thoughts and emotions. Interestingly, however, the interviewees reported that their experienced challenge scenarios frequently triggered brief cyclical negative thinking patterns. However, rather than getting into spirals of rumination and perseveration they could effectively and fairly quickly dispose of these. Successful cessation of rigid and passive perseveration provided adaptive attentional, cognitive and emotional resources resulting in confidence and persistence amid challenge. As aforementioned resilience and a sense of persistence played by nature a more important role in long-term challenge scenarios than in challenges of short duration. Interviewees frequently also

accounted for associated positive emotions such as pride, integrity or just relief due to dissolution of cognitive dissonance. In conjunction with reported problem-solving strategies and behavioural flexibility the findings suggest that confidence in the extinction of perseveration and rumination leads to positive emotions which in turn enhance persistent and flexible goal-striving. The outlined adaptive self-regulatory processes can be explained in the light of Fredrickson and Joiner's (2002) broaden-and-build theory of positive emotions. The core tenet of the broaden-and-build approach is the proposition that experiences of positive emotions empower momentary thought-action repertoires.

In terms of the time required for successful extinction or suppression of negative and potentially perseverative thoughts and emotions interviewees reported different timeframes depending on the duration and severity of the perceived challenge, and furthermore apparent individual differences. Interviewee 1 was confronted with nervousness and doubts when standing outside the classroom to deliver her debut university teaching session and could literally within seconds prevent the onset of negative and inhibitory thinking, allowing her to confidently enter the seminar room and faceing the challenge by delivering the teaching session: ... *these things [rationalisation of fear] happen within four, five seconds.* Interviewee 4 had to master 10-year long bureaucratic obstacles in getting a financially crucial planning permission. Continuously changing requirements of the planning authority and the provocative behaviour of the planning officer in charge necessitated frequent conscious efforts to prevent ruminative perseveration and to refrain herself from overreactions in order to focus on distinct and flexible actions to persistently pursue her primary goal.

Interviewee 7, who had to negotiate with her employer her request to take time off work in order to undertake her envisaged one-year MSc in CBT course, experienced intermediate bouts of rumination and depression (perseverative S-REF activity). After her employer's initial 'no' she reported active worry and perseveration over one week. Interestingly, her worry and subsequent anger became the catalysts for gaining self-awareness of her cognitive dissonance induced by her employer's instant refusal of a possible compromise. A week later she insisted on a meeting and discussion with her employer and achieved her envisaged part-exemption in order to pursue her MSc course. In her case the negative emotions of frustration, worry, rumination and depression resulted in constructive anger, empowering her to seek the determined and challenging negotiation with her employer: *Initially I just accepted the "no" and I was feeling quite angry, upset and depressed ... I got angry because they just said "no".* She expressed her feelings of relief and liberation when challenging her employer: *Maybe it was also liberating to become active for myself and to make the decision.* Her determination in turn was reflected by: *Then I thought, I have a choice here, and I think I was probably taking my feelings more seriously.* This was a convincing example of constructive and clarifying interpretation of emotional cues which is further discussed in the following section.

In conclusion, interviewees provided evidence for their confidence and ability to prevent themselves getting stuck in negative loops of preservation and rumination when facing difficult situations, but of varying time horizons. Although in the case of Interviewee 7 the potentially negative emotion of anger was reported, it was a constructive emotional cue for subsequently challenging her employer; moreover she did this without reacting overly impulsively. The ability to refrain oneself from

impulsive and potentially detrimental overreactions is further discussed in the following section.[18]

2.5.3.2. Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving

Above and beyond their confidence in controlling negative thoughts, psychologically stable individuals have an adaptive and distinctive style of how they attend to and deal with emotions. Goleman (1986) posits that such self-awareness results in some sophistication and clarity about their emotional lives. With emphasis on emotions rather than merely cognitions Goleman argues that such mindfulness protects against perseveration and rumination when experiencing brief episodes of low mood, thus contributing to their ability to get out of the bad mood sooner. Wells' (2000) refers to the functional awareness in terms of emotions being merely transient states rather than accurate reflections of reality. This awareness or clarity of one's own emotions can be interpreted as a form of adaptive meta-emotion and has the additional functional effect of preventing potential overreactions: "Self-awareness is not an attention that gets carried away by emotions, overreacting and amplifying what is perceived. Rather it is a neutral mode that maintains self-reflectiveness even amidst turbulent emotions" (Goleman, 1996, p. 47).

The aforementioned Interviewee 7 got angry but rather than this leading to impulsive overreaction her anger brought clarity and determination to seek discussion and negotiation with her employer. Her case highlights functional effects of affect recognition which Vaillant (2000) conceptualises as an adaptive mental health mechanism – reducing potential conflict and cognitive dissonance in the midst of

[18] It is argued here that Wells and Matthews (1994, 1996) and Wells (2000, 2009) do not take into account that such intermittent bouts of S-REF activity can exert potentially constructive and functional effects on problem-solving and goal achievement as shown by the interviewees in this study.

unpredictable or unanticipated change. Vaillant regards these mental health mechanisms as crucial for restoring psychological homeostasis. Interestingly, however, in the case of Interviewee 7 her intermediate episode of worry and rumination (the active S-REF in Wells' terminology) appeared to be a catalyst for her subsequent goal-directed negations.

The most vivid account for frequently required restraint from immediate reaction was provided by Interviewee 8. An anticipated straightforward university application for recognition as a Research Centre adversely progressed into an 18 months long administrative struggle. He reported increasing frustration specifically because *in obtaining centre status there were no resource implications for the university.* The interviewee's self-awareness or mindfulness with subsequent mind-setting for problem-solving is clearly reflected by his statement: *I suppose listening to oneself was part of this, deciding not to react adversely in terms of the frustration with the bureaucracy* and even more pronounced: *On reflection I think the strategy that I started to take was: Don't overreact to the system, feel your way through, explore the possibilities and work towards the solution.* This quotation reflects a high degree of frustration tolerance and, moreover, his underlying confidence in maintaining emotional and behavioural self-control (Gleitman, Fridlund & Reisberg, 2004), thus enhancing subsequent problem focus.

2.5.3.3. *Confidence in Setting Flexible and Feasible Hierarchies of Goals*

Theories of self-regulation propose an inherent link with goal setting and subsequent goal attainment. Zimmerman (2000) even conceptualises self-regulation as systematic efforts to direct cognitions, emotions and behaviour towards one's goal achievement. He posits that goals empower self-regulation by exerting positive effects

on motivation, self-efficacy and satisfaction. Goal formulation facilitates selection and application of efficient strategies and also enhances monitoring of goal progress (Schunk, 1995). The outlined positive effects imply adaptive synergy effects on psychological well-being and are more pronounced if individuals try to attain specific, proximal and self-set goals.

Schunk (1995) emphasises that potential difficulties occur when single goals are attainable in isolation but together are subject to conflict. Interviewee 7 accounted for the case of conflicting goals which she resolved by setting clear priorities, in her case favouring the envisaged MSc even at the expense of not getting the required work reduction and taking the inherent risk of job loss into account. Her previously reported anger and the resulting clarification of her emotions were the prerequisites for her determination to negotiate with her employer. Setting the two-fold hierarchy by weighing the MSc pursuit higher than maintaining her job can be interpreted as the final determinant in the outlined process of positive self-regulation and goal attainment. Her employer accepted her required job reduction; thus she achieved both of the two potentially conflicting goals simultaneously. It can be argued that a lack of confidence in extinguishing her initial, albeit one week long, rumination and worry could have easily resulted in confrontational overreactions to her employer with the likely outcome of not getting the requested job reduction.

The accounts of Interviewee 4 clearly identified various obstacles within her attempts over ten years to get the crucial planning permission. Regardless of her experienced frustration and short depressive episodes she could then sustainably focus on her overall goal and, more importantly, could identify adaptive and flexible strategies to achieve necessary sub-goals. These sub-goals comprised acquisition of competence by gaining substantial knowledge of planning permission law, not losing

emotional control in the light of ever-changing demands by the planning officer and eventually seeking crucial support from the head of the planning authority. It can be concluded that continuously keeping her long-term goal in mind required implicit metacognitions of anticipating goal achievement from the very beginning. Her mindset *I have a tendency ... which is: "There are no problems, only solutions"* provided the confidence and agency for her goal-directed and persistent actions.

Interviewee 2 perceived his PhD, which he pursued when being in full-time employment, as *a hurdle of an enormous magnitude* and conceptualised his PhD research as a process which had to be broken down into attainable steps or sub-goals: *When you have to climb a mountain, if you are going up a steep hill, you take smaller steps.* At the same time he had impressive confidence in his capability: *I never had a problem in thinking: Can I do it? It never occurred to me.* Moreover, he reported not having heavily relied on meetings with and feedback from his supervisor but utilising a genuinely scientific and prudent approach to his PhD research. This reflected a high degree of intrinsic motivation for a self-set goal which significantly enhanced functional self-regulation as aforementioned.

In conclusion for the majority of interviewees there appeared to be a self-regulatory sequence of related processes consisting of initial, but not necessarily immediate, extinction of worry, perseveration and rumination resulting in emotional control over frustration and restraint from overreactions This was followed by subsequent problem focus and further fostering of flexible and hierarchical goal setting and adjustments of sub-goals when necessary. As shown, the processes partially overlapped and did not necessarily follow strictly linear transitions. Interestingly brief bouts of frustration, depression and anger resulting from external obstacles are not necessarily counterproductive but might in fact serve as motivation-

increasing stimuli. This, however, requires metacognitive and meta-emotional competence and confidence in the sense of refraining from impulsiveness and at the same time flexible goal pursuit in the midst of challenge or even adversity.

2.5.4. Reflexivity and inherent limitations

The systemic qualitative study approach tried to investigate participants' cognitive, emotional and behavioural mechanisms by means of interviewees' retrospective narrative accounts. The selection of the purposive sample, interviewees known to the researcher and chosen based upon their assumed adaptive metacognitions, meta-emotions and personality assets, implies the following three major limitations with potential implications for the follow up studies.

Firstly, personal work-related contact of the interviewees with the researcher incorporates potential social response bias, i.e. favourable answers in the light of social desirability. Secondly, the sample "representativeness" is limited predominantly to the academic profession. Thirdly, the pragmatic approach of selecting interviewees by means of their assumed adaptive metacognitive self-regulation is less advantageous than alternative selection based upon prior objective assessment of their optimal functioning. However, selection of interviewees by means of prior psychological or even psychometric testing was beyond time and resource restrictions within this research.

In their entirety, the three aforementioned limitations potentially reduce the scope and validity of the measure developed in the subsequent qualitative studies. It can be assumed that a wider and more valid measure of positive metacognitions and meta-emotions was attainable by overcoming these limitations. However, the pragmatic compromises were required and appear to be justified in light of resource

and time restrictions within this PhD research. In addition subsequent statistical validation of the developed instrument within fairly representative validation samples will provide indications of the potential impacts of the outlined methodological weaknesses of the qualitative Study 1.

Apart from possible response bias and researcher expectations one has to anticipate slightly decreased validity due to potentially somewhat vague recall. However, the utilised positive metacognitive priming technique and the nature of the challenge scenarios – mid- to long-term with successful outcomes – should imply only minimal recall problems due to the personal significance of the challenge scenarios for each interviewee. Interviewee 2 who did not read the briefing prior to the interview, provided some evidence for the instant recall of such individually highly significant scenarios.

Finally, Study 1 could have been subject to inherent over-reliance of interviewees on their introspective judgments. This potential flaw will be indirectly addressed in the subsequent quantitative studies, which will comprise the derivation and rigorous statistical validation of the envisaged PMCEQ instrument.

2.6. *Conclusions*

To date hardly any research has been conducted on reversing evidence-based psychopathological models within a positive psychology approach and their applications in terms of psychological functioning, stability and well-being.

This in-depth study provided evidence that psychologically stable individuals display adaptation-enhancing metacognitive processes when confronted with challenging tasks. Results supported Wells and Matthews' (1994, 1996) and Wells (2000, 2009) inverse metacognitive predictions. The derivation of constructs underlying these functional metacognitions and meta-emotions, which will be

conducted in Study 2, could provide a better understanding of their stabilising mechanisms and effects.

Results also supported Challenge Models of Resilience with more pronounced utilisation of resilience-related assets and sub-assets (agency, self-determination, persistence and communion) in times of challenge, perceived unpredictability or even adversity. In addition to the (perceived) degree, the length of challenge (adversity or unpredictability) impacted on the necessary adaptation. As discussed above, in long-term challenge scenarios assets and resources appear to be more relevant than self-regulatory processes. Yet, Interviewee 3 with his ten year major research project expressed some awareness of the long-term nature and appeared to have been anticipating this long-term nature from the very beginning. His remarkable persistence and ongoing goal focus could have been attributable to "metacognitions of time-frameworks" – a worthwhile area for future research. This appears to be an example where metacognitive processes do not necessarily evoke full awareness in the sense of Kentridge and Heywood's (2000) unconscious metacognitions.

Interestingly, a certain degree of challenge also appears to be required to elicit awareness of adaptive self-regulatory processes. This could be established by comparing the "high challenge" with the "low challenge" scenarios interviewees accounted for. The latter group was excluded from in-depth analyses because they did not report consciousness of self-regulatory processes or necessity of stabilising personality factors.

The interviews also reflected the core role of awareness of volitional control in terms of both positive self-regulation and adaptive personality assets. Awareness of voluntary control appears to be a prerequisite for efficient use or "cultivation" of agency and communion as argued by Vaillant (2000), who postulated that seeking

social support (communion) and cognitive strategies (agency) are both under volitional control with huge self-empowering implications.

In line with Matthew and Wells' (1994, 1996) and Wells' (2000, 2009) (inverse) predictions, metacognitive awareness facilitated interviewees' adaptive self-regulation and emotional and psychological well-being. The interviews also supported the view that increased metacognitive and meta-emotional awareness potentially contributes to preventing or overcoming maladaptive self-beliefs (schemas). This is in line with Cloninger's (2006) argument that human consciousness is characterised by capacity for self-awareness and free choices not being completely determined by past experience.

Fostering and increasing mindfulness (psychological acceptance) has recently been integrated in Cognitive Behavioural Therapies. Moreover, psychological acceptance postulated in Bond and Bune's (2000) conceptualisation as the ability to accept negative emotions and still pursue one's aims implies agency in the form of goal focus – reflecting synergy effects between self-regulation and assets.

There is research evidence from several studies suggesting that resilience, the main asset under investigation, is potentially domain-specific. In this context Interviewee 5 provided an interesting account of her ability to transfer adaptive metacognitive beliefs and positive personality assets from the experienced (physical) domain into other anticipated life domains.

Finally the interviews supported the study's core hypothesis that, beyond Matthews and Wells' (1994, 1996) and Wells' (2000, 2009) purely cognitive perspective, social interactions play a crucial role in adaptive self-regulation. Cases 4 and 6 clearly showed that severe challenge and adversity also necessitate taking the social environment into account: Interviewee 4 provided evidence for the relevance of

social learning and modelling processes. Interviewee 6 accounted for core crisis support from significant others (parents, friends and even peers); the experiences of social and crisis support appeared to be crucial for persistent self-regulation and adaptation to the obstacles resulting from her illness.

On these grounds future investigations of positive metacognitions, resulting adaptive self-regulation and health assets for psychological stability should take into account people's embeddedness in their social contexts (Seligman & Csikszentmihalyi, 2000). This study explicitly accommodated for the social component by investigating the relevance of communion, but the social environment might have distinct impacts on metacognitive self-regulation that were not captured in the present investigation.

2.7. *Outlook on Study 2 in Chapter 3*

The main findings of Study 1 lend support to three commonly identified metacognitive constructs which foster psychological stability in the midst of encountering challenging endeavours. The three-fold integrative metacognitive and meta-emotional framework – (1) Confidence in Extinguishing Perseverative Thoughts and Emotions, (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving, and (3) Confidence in Setting Flexible and Feasible Hierarchies of Goals – will provide the basis for item wording of the envisaged Positive Metacognitions Questionnaire (PMCEQ). Whereas constructs (1) and (3) clearly refer to metacognitive beliefs and self-regulation, component (3) incorporates meta-emotional beliefs and self-regulation – at least in the sense of cognitive beliefs about one's own emotions.

The identified resilience-related personality assets will not be included within the PMCEQ items due to three reasons:

1. The primary aim of this thesis lies in the identification of positive metacognitive and meta-emotional beliefs facilitating self-regulatory processes and their subsequent operational transformation into PMCEQ items;
2. The inclusion of assets in Study 1 has predominantly been an important means of triangulation; this triangulation appeared necessary because there is no existing instrument to measure generic adaptive metacognitive and meta-emotional self-regulation.
3. Study 1 appears to suggest that resilience-related assets, specifically persistence, play a more relevant role in long-term challenge scenarios, whereas adaptive metacognitive and meta-emotional regulation is required for maintaining stability on a day-to-day basis to deal with shorter challenge scenarios.

In terms of the three identified confidence domains and their crude interpretation in the light of Wells and Matthews' (1994, 1996) S-REF model (outlined in Chapter 1.2) it can be said at this stage: The first confidence domain (Confidence in Extinguishing Perseveration) appears to tap reversed mechanisms of Wells and Matthews' hyperactive S-REF (specifically of the MCQ-2 dimension Negative Beliefs about Worry concerning Uncontrollability and Danger). The psychologically stable interviewees in Study 1 explicitly accounted for their capability to consciously extinguishing anxious and ruminative vicious circles. However, they accounted for abilities above and beyond stopping negative thinking spirals which appear not to be incorporated in Wells and Matthews' (1994, 1996) and Wells (2000)

models. Specifically the third confidence domain – Confidence in Setting Flexible and Feasible Goal Hierarchies when confronted with challenge – taps an agentic behavioural construct and somewhat surprisingly a lack or an inability to engage in these behavioural constructs has not been incorporated in the aforementioned clinical models. It will be shown in Study 2 that goal-setting theories provide evidence for the relevance of agentic constructs, e.g. intentionality and sense of purposefulness.

Chapter 3

Study 2

Development and Construct Validity of the Positive Metacognitions and Positive Meta-Emotions Questionnaire

3.1. Scope and rationale

Utilising the three metacognitive and meta-emotional dimensions identified in the qualitative Study 1, questionnaire items for the Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ) will be worded around these three constructs. The prototype of the PMCEQ will be tested within a large sample of 313 participants. Subsequent Exploratory Factor Analysis (EFA) will be conducted. The number of factors will be determined on conceptual grounds suggesting a three factor solution but, moreover, also based upon rigorous statistical criteria. The latter comprise the Scree-Plot and Eigenvalue decision rule and furthermore the advanced technique of parallel analysis. After determination of the optimal number of factors a battery of EFAs will be conducted in order to successively eliminate weekly or cross-loading items with the primary aim of developing an optimised and parsimonious final version of the PMCEQ instrument.

The final version of the PMCEQ will then be used in the subsequent studies, with Study 3 trying to establish its construct validity and Study 4, Part A using the PMCEQ to test a model of the linear relationships between metacognitions, coping strategies and perceived stress. Stress perception can be regarded as a short-term indicator of psychological outcome states. The final Study 4, Part B will use anxiety

and depression as explicit measures of negative emotions and test the hypothesis that adaptive metacognitions and adaptive meta-emotions are associated with low levels of the negative emotions of anxiety and depression.

3.2. *Executive Summary*

This study describes the development of the PMCEQ as a measurement instrument of adaptive metacognitive and meta-emotional beliefs and processes when facing profoundly challenging situations. A mixed convenience sample of 313 worker and student participants completed a primary version of the PMCEQ. Factor analysis of the exploratory type (EFA) supported the expected three-factor structure. Elimination of weakly and/or cross-loading item statements resulted in a reduction from the initial 49 to the final 18 items, with each of the three subscales comprising six items. The three PMCEQ factors of the questionnaire's final version accounted for 54.76% of the variance. The range of item loadings on the corresponding factors was as follows: 0.51 to 0.81 for Factor 1 (Confidence in Extinguishing Perseverative Thoughts and Emotions); 0.45 to 0.72 for Factor 2 (Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving), and 0.57 to 0.78 for Factor 3 (Confidence in Setting Flexible and Feasible Hierarchies of Goals). Cronbach's alpha coefficients were high with 0.85, 0.76, and 0.85 for Factors 1, 2, and 3, respectively. In all, the 18 items comprising the final version of the PMCEQ appears to have good construct validity and internal consistency.

3.3. Aims and Approach

The objective of this second study is to develop the Positive Metacognitions Questionnaire (PMCEQ) as a brief instrument to measure adaptive metacognitive and meta-emotional beliefs that people hold on their own cognitive and emotional processes when facing taxing or challenging situations. Item wording was informed predominantly by the results of the qualitative precursor Study 1 (described in Chapter 2). Employing an initial pool of 49 items it was an attempt to capture these positive beliefs and the functional thought and feeling processes that psychologically stable individuals employ in the midst of pronounced challenge, ambiguity or unpredictability. If the PMCEQ displayed good validity and reliability this would be the first instrument to measure positive metacognitive and positive meta-emotional traits.

Positive cognitive and emotional self-regulation as assessed by the PMCEQ is hypothesised to contribute to the selection and employment of predominantly adaptive coping strategies. In turn positive metacognitive self-regulation and selection of adaptive coping strategies should contribute to lower perceived stress compared to individuals that employ metacognitive regulation of maladaptive nature. The corresponding linear model of the relationships between positive metacognitions, coping strategies and perceived stress will be developed and tested in Study 4, Part A described in Chapter 5.

This Study 2, and similarly the subsequent Studies 3 to 4 Parts A and B, draw on an approach rooted in positive psychology which Gable & Haidt (2005) define as "the study of the conditions and processes that contribute to flourishing and optimal functioning of people, groups and institutions" (p. 103). The present study employs the assumption common in positive psychology (e.g. Wright & Lopez, 2002) that

psychological adaptation is not solely due to an absence of maladaptive dispositions, but is also fostered by adaptive dispositions. Therefore, the rationale is that if the objective were met to a satisfactory level, this study would provide scholars in the areas of personality and positive psychology with an assessment tool that allows testing whether adaptive metacognitive traits explain hedonic and eudaimonic processes and outcomes, controlling for maladaptive metacognitive traits.

The primary aim of developing an optimised brief PMCEQ will be pursued in a sequence of successive EFAs on data from a 313 participants comprising scale construction sample in order to: (1) determine the number of factors and (2) identify the most parsimonious instrument by successive elimination of weakly loading and/or cross-loading items.

3.4. Introduction

Wells and Matthews' (1994, 1996) theory of psychological dysfunction and Wells' (2000) model of emotional disorders define metacognitive beliefs as information about one's own cognition and internal states and about coping strategies that can influence both. The theory states that psychological dysfunction is maintained by (a) perseverative thinking, (b) maladaptive use of attention and (c) maladaptive coping, which conjointly constitute a cognitive-attentional syndrome (CAS; Wells, 2000). Maladaptive metacognitions are theorised to maintain the CAS, and to become active whenever an individual encounters a problematic, i.e. taxing or challenging, situation. It should be emphasised that the CAS would be adaptive only in objectively threatening situations. Only in genuinely risk-incorporating situations – as opposed to merely taxing or challenging situations – the CAS and its related object mode would be advantageous. In merely (as) challenging (perceived) situations and encounters,

which are at the focus of this PhD research, the metacognitive mode, preventing the onset of CAS processing, is advantageous across the board as outlined in the next paragraph.

Wells and Matthews' (1994, 1996) theory posits that when facing a problematic situation an individual can operate in two distinct modes: "object" and "metacognitive". In the object mode an individual interprets thoughts as facts, whereas in the metacognitive mode an individual interprets thoughts as events or cues that have to be subsequently evaluated. When referring to thoughts generated in the metacognitive mode, Wells and Matthews (1994, 1996) and Wells (2000) use the term "events"; it would appear to be somewhat clearer to use the terms "cues" instead. The object mode is theorised to be functional only in genuinely threatening situations, and to be dysfunctional in all other situations because it fosters perseverative thinking and hence maladaptive coping. The metacognitive mode is theorised to be functional across the board because it enhances evidence-based belief elaboration and hence adaptive coping. A key prediction of the theory is that, compared with individuals who score highly on maladaptive metacognitive traits, individuals who score low on maladaptive metacognitive traits are more likely to operate in metacognitive mode when facing a problematic situation. For further details and distinguishing criteria between object and metacognitive mode see Table 1 in Chapter 1.

It is worth reiterating that the majority of interviewees in Study 1 reported brief episodes of worry and rumination, i.e. transient object mode processing, at the beginning of their challenging situations or encounters. However, they accounted for quick transitions or shifts from the dysfunctional object mode to the functional metacognitive mode of processing. For some interviewees brief object mode related S-REF activity appeared to have even been productive, e.g. by contributing to

clarification and subsequent self-determination. The commonly identified metacognitive and meta-emotional process pattern comprised short perseverative S-REF activity, followed by a shift into problem-focussed metacognitive processing with subsequent agentic behaviour to solve the problem or task at hand.

Is mere absence of maladaptive metacognitions sufficient for (a) shifting from object mode to metacognitive mode of functioning and (b) successfully solving the problem at hand? The assumption of the present study is that pure absence of dysfunctional metacognitions is a necessary but not sufficient precondition for successful resolution of challenge. In addition to the absence or low levels of maladaptive metacognitions, success in challenging or unpredictable situations requires high levels of adaptive metacognitions. In particular, it is proposed that both object and metacognitive modes can contribute to success if they each are activated in an appropriate context and in a strategic sequential order that leads to turning setbacks into opportunities for mastery and success. Moreover, it is predicted that the adaptive use of object and metacognitive modes requires metacognitive beliefs of an autonomous and agentic type that support identification of alternative pathways and flexible goal restructuring. Finally it is proposed that such metacognitive beliefs require the meta-emotions of interest and curiosity (Mitmansgruber et al., 2009) in one's own primary emotional responses to challenges.

The goal of the present study is to develop a questionnaire that measures adaptive metacognitions and adaptive meta-emotions that were identified in the qualitative precursor Study 1 described in Chapter 2. Within the qualitative Study 1 semi-structured interviews were conducted on 13 highly self-regulated and resilient individuals in order to identify adaptive metacognitive beliefs that foster a metacognitive mode of functioning and successful problem solving in the midst of

challenge. Participants were asked to recall and give their accounts of professional or personal projects that started with profound difficulties and ended successfully. They were primed to recall their predominant thoughts, feelings and actions within the challenging encounters and they were also asked whether they could give an account of the turning point towards a successful outcome. In the early stages of their endeavours, the majority of participants appeared to have operated in object mode, characterised by excessive threat monitoring, perseverative thinking, and preparedness for fight-or-flight responses. The utilised Theory-led Thematic Analysis in conjunction with Grounded Theory revealed three main metacognitive components that helped them to move on and successfully tackle the challenge.

Firstly, participants reported their confidence in and ability to extinguishing ruminative and perseverative thoughts and emotions and awareness that by doing so, they would free up attentional resources and experience positive emotions. Secondly, participants reported their confidence in interpreting their own emotions as cues, refraining from impulsive and potentially dysfunctional overreactions when experiencing negative emotions, and subsequent mind-setting for problem-solving. Finally, participants accounted for their confidence in setting flexible and attainable or feasible hierarchies of goals, and awareness that by doing so they would have eventually succeeded, particularly in longer-term endeavours.

The first component targets a core construct of Wells and Matthews' (1994, 1996) and Wells' (2000) theory and hence might represent an inverse maladaptive metacognitive trait. The second component seems to capture meta-emotions that foster emotional intelligence, and in particular what Goleman (1996, p. 47) describes as "a neutral mode that maintains self-reflectiveness even amidst turbulent emotions". The third component appears to identify metacognitions that support a type of self-

regulation described by Zimmerman (2000) as systematic efforts to direct cognitions, emotions and behaviour towards one's goal achievement. The three components conjointly seem to describe a metacognitive and meta-emotional self-regulatory style that supports the flexible and resilient behaviour exhibited by individuals that Self-Determination Theory (Deci & Ryan, 1985) depicts as being high in autonomy orientation. In situations or environments that cannot easily be changed, these individuals are capable of volitional and flexible accommodation, tend to interpret setbacks as informational, keep seeking out opportunities to pursue their autonomous goals, and are less susceptible to losing intrinsic motivation as a result of lack of progress.

For the majority of interviewees there appeared to be a self-regulatory sequence of related processes consisting of initial, but not necessarily immediate, extinction of rumination and worry, resulting in restraint from overreactions, displaying mindfulness and task focus, and finally leading to a more flexible and hierarchical goal setting with subsequent adjustments of sub-goals whenever necessary. The processes partially overlapped and did not necessarily follow a strict linear transition. In all, the three components were found to be interlinked but sufficiently distinct to stand up as separate components of the overall construct of positive metacognitions. Therefore, on these conceptual and theory-derived grounds it is hypothesised that three correlated factors will be identified.

3.5 Method

3.5.1. Participants

A convenience sample of 313 participants was recruited comprising 157 (50.2%) students from various metropolitan universities in London, 119 (38.0%) workers from various occupations, and 37 (11.8%) individuals who did not report their student or worker status. The age range was 18 to 73 years (M = 30.68, SD = 11.52); 68 (21.7%) were males, 245 (78.3%) were females. The breakdown of gender by profession was: 26 male students, 131 female students, 38 male workers, and 81 female workers. Participants were approached individually, briefed about the study, and invited to sign an individual consent form (See Appendix 3); 72% of those approached participated.

3.5.2. *Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ)*

Items representing metacognitive beliefs about cognitive and emotional processes when facing challenging situations were derived (1) from the responses given by the interviewees of the qualitative Study 1 and (2) from deduction based upon theory. The Study 1 is reported in detail in Chapter 2. For the prototype of the PMCEQ (see Appendix 4) a total of 49 items were phrased in the form of statements to which participants could express their level of agreement on a 4-point scale: 1 (*Do not agree*), 2 (*Agree slightly*), 3 (*Agree moderately)*, and 4 (*Agree strongly*). The items were presented after a preamble:

> *This questionnaire is concerned with beliefs people have about their thinking and emotions in difficult situations. Listed below are a number of such beliefs that people have expressed. Please read each item and indicate how much you*

generally agree with it. For each question please circle one response which appears to be the most appropriate one for you.

3.5.3. *Statistical Analysis*

The scores of the PMCEQ items were analysed using principal axis exploratory factor analysis (EFA). Principal axis, rather than principal component analysis, was used because the former results in more cautious estimates for the factor loadings. Since the factors were supposed to be intercorrelated the oblique rotation method Promax was used. The number of factors to be extracted was assessed by the Scree-Plot and Eigenvalue decision rule and, moreover, by parallel analysis using ViSta-PARAN (Young, 2003). The pattern of factor loadings was assessed based on oblique Promax factor rotation (kappa = 4) in the light of expected links between the three factors.

3.6. *Results*

Parallel analysis of the prototype 49 item version of the PMCEQ confirmed the conceptually expected three-factor structure by indicating the presence of three factors. Three factors accounted for 36.35% of the variance. Several items yielded weak primary loadings and/or loaded on more than one factor. These weakly and/or cross-loading factors were subject to successive eliminations as explained below.

The target for item selection was set to be a three-factor model in which each item loads 0.40 or more on a factor and 0.25 or less on the other factors. Items which did not meet both criteria were eliminated one at a time, and the factor model was fitted every time after excluding an item. At every step, the worst fitting item was removed.

The identified model at this stage included 27 items. Three factors accounted for an increased 46.45% of the variance. Table 7 shows the pattern coefficients of the principal axis factor model, for the 27-item version of the PMCEQ (PMCEQ-27, see also Appendix 5) with Promax rotation (adopting Kappa=4).

A further nine items were subsequently eliminated from the PMCEQ-27 (displayed in yellow in Table 7), resulting in the final 18-item version of the PMCEQ. The nine items were eliminated on the basis of two final elimination criteria: (1) statistical redundancy, i.e. low factor loadings or cross-loadings, and (2) lack of clarity in terms of the item wording.

Table 7

Pattern coefficients of the principal axis factor model with Promax rotation for the PMCEQ-27, estimated on a population of 313 participants

	Factor		
	1	2	3
1 In times of "feeling in the dumps" it's hard for me to regulate my low mood.	.785	-.053	.007
4 If things go really badly I tend to 'brood' and dwell on my negative thoughts.	.781	.007	.062
7 When the 'blues' overcomes me I tend to struggle with controlling my low mood.	.762	-.055	-.052
10 I tend to overreact when things are really going wrong.	.717	.065	-.062
13 When confronted with ongoing troublesome circumstances I often start "brooding" and find it difficult to stop.	.643	-.034	.026
16 I tend to think that my worrying thoughts might reflect the reality.	.545	-.037	-.023
19 I easily lose my temper in the heat of the moment.	.482	.103	-.046
22 I find it difficult to purposefully direct my thoughts, to "take charge of my mind" when under pressure.	.461	.076	.039
25 I feel it's difficult to decide between conflicting goals.	.460	-.170	.132
2 In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping".	-.256	.704	-.050
5 I can "step back" and assess whether my worry reflects the reality.	-.018	.698	-.022
8 I feel that negative and anxious thoughts do not depict the reality; I regard them just as "events" which I have to evaluate.	-.043	.648	-.164
11 I can stop my "negative thinking spirals" and focus on what I can do in the situation.	.140	.607	-.014
14 If I encounter or engage in unfamiliar, novel situations or tasks it's important for me to have a flexible and non-evaluative mindset.	-.209	.509	.152
17 I tend to rationally evaluate unpredictable situations rather than getting anxious.	.196	.495	.019
20 When facing difficult or unpredictable situations I am good at suspending my worrying thoughts.	.228	.490	-.082
23 I tend to enter novel situations with an open mind and try to avoid making premature judgments.	.034	.490	.093
26 I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face some troublesome events.	.157	.480	.126
27 When I experience taxing demands I try to act as in the motto "There are no problems, only solutions."	.104	.452	.083
3 I can easily divide important long-term goals into achievable short-term sub-goals.	.016	-.230	.779
6 I can prioritise my needs and formulate a hierarchy of goals.	-.079	.017	.742
9 When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.	-.002	.001	.721
12 When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.	-.043	.222	.628
15 When a problem appears to be insurmountable I know that it is just a matter of breaking it down into smaller problems.	.029	.184	.622
18 I find it hard to break down huge goals into a set of smaller sub-goals - I rather get them out of the way quickly.	.166	-.158	.503
21 If I am overwhelmed with a big task I would stop and take smaller steps.	.023	.098	.494
24 I find it fairly easy to identify important needs and goals for me.	-.019	.091	.408

Items 19, 22 and 25 (Factor 1) were excluded in light of their low loadings, i.e. their (statistical and conceptual) redundancy. In addition item 25 ("I feel it's difficult to decide between conflicting goals") refers conceptually to Factor 3 rather than Factor 1 on which it statistically loaded. Items 5, 14, 18, 20 and 24 were excluded on the grounds of their negative cross-loadings. Item 23 ("I tend to enter novel situations with an open mind and try to avoid premature judgements") was originally included to capture a mindfulness-related dimension; the item was excluded in the light of its complex wording, i.e. its lack of clarity.

After elimination of the redundant or less clearly worded nine items, 18 items (six per factor) were retained in the final version of the questionnaire. Within the conducted EFA for the final (18 item-comprising) version of the PMCEQ Bartlett's Test of Sphericity indicated very good factorability (Approx. Chi Square=2197.91, df=153, $p<.001$) and the Kaiser-Meyer-Olkin measure indicated excellent sampling adequacy (KMO=0.895). The Scree Plot in Figure 2 showed a clear-cut three factor solution; the three factors accounting for an again increased 54.76% of the variance. The estimated correlations (one-tailed Pearson-Product-Moment Correlation coefficients) between factors were: 0.46 for Factor 1 and Factor 2, 0.44 for Factor 1 and Factor 3, and 0.66 for Factor 2 and Factor 3.

Table 8 depicts the final 18-item PMCEQ and Table 9 shows the descriptive statistics and the factor loadings of each item. The range of loadings on the intended factor was 0.51-0.82 for Factor 1, 0.45-0.72 for Factor 2 and 0.57-.78 for Factor 3. The Cronbach's alpha coefficients were 0.85 for Factor 1, 0.76 for Factor 2 and 0.85 for Factor 3. In all, the final 18-item version of the PMCEQ appears to have good construct validity and internal consistency.[19]

[19] Concurrent validity will be tested in Study 3 in the following Chapter 4.

Figure 2

Scree plot of the PMCEQ (final 18-item version)

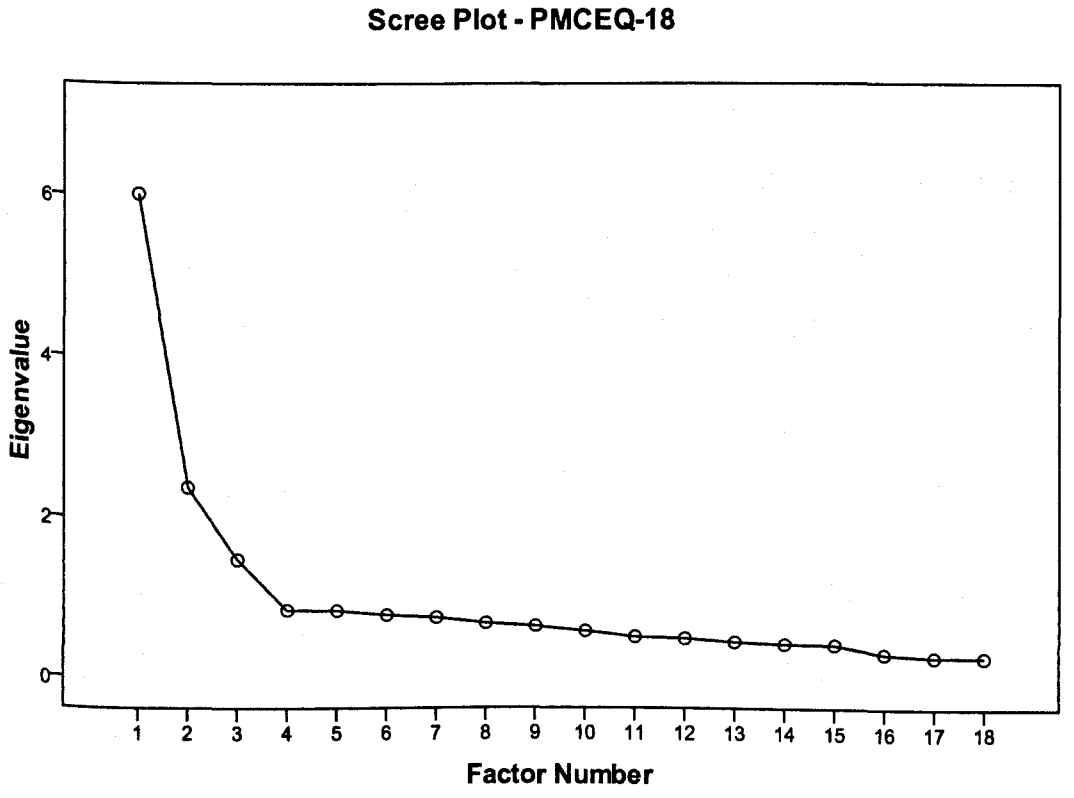


Table 8

The Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ)

This questionnaire is concerned with beliefs people have about their thinking and emotions in difficult situations. Listed below are a number of such beliefs that people have expressed. Please read each item and indicate how much you generally agree with it. ***For each question please tick <u>one</u> response (box) which appears to be the most appropriate one for you:*** ***1 Do not agree*** ***2 Agree Slightly*** ***3 Agree moderately*** ***4 Agree very much***	***1***	***2***	***3***	***4***
1. In times of "feeling in the dumps" it's hard for me to regulate my low mood.				
2. In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping".				
3. I can easily divide important long-term goals into achievable and short-term sub-goals.				
4. If things go really badly I tend to brood and dwell on my negative thoughts.				
5. I feel that negative or anxious thoughts do not depict the reality – I regard them just as "events" which I have to evaluate				
6. I can prioritise my needs and formulate a hierarchy of goals.				
7. When the "blues" overcomes me I tend to struggle with controlling my low mood.				
8. I can stop any "negative thinking spirals" and focus on what I can do in the situation				
9. When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.				
10. I tend to overreact when things are really going wrong.				
11. I tend to rationally evaluate unpredictable situations rather than getting anxious.				
12. When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.				
13. When confronted with ongoing troublesome circumstances I often start "brooding" and find it difficult to stop.				
14. I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face some troublesome events.				
15. When a problem appears to be insurmountable I know that it's just a matter of breaking it down into smaller problems				
16. I tend to think that my worrying thoughts might reflect the reality.				
17. When I experience taxing demands I try to act as in the motto: "There are no problems, only solutions".				
18. If I were overwhelmed by a big task I would stop and take smaller steps.				

Table 9: **Means, standard deviations and factor loadings of the PMCEQ items:**

Item [a]	*X*	*SD*	Factor Loadings [b] PMCEQ-Factor: F1	F2	F3
1(R) In times of "feeling in the dumps" it's hard for me to regulate my low mood.	2.74	1.03	0.80	-.05	-.01
4(R) If things go really badly I tend to brood and dwell on my negative thoughts.	2.85	1.03	0.81	-0.05	0.10
7(R) When the "blues" overcomes me I tend to struggle with controlling my low mood.	2.74	1.03	0.82	-0.04	-0.11
10(R) I tend to overreact when things are really going wrong.	2.90	1.08	0.65	-0.04	-0.11
13(R) When confronted with ongoing trouble-some circumstances I often start "brooding" and find it difficult to stop.	2.81	1.00	0.66	-0.02	0.02
16(R) I tend to think that my worrying thoughts might reflect the reality.	2.62	0.97	0.51	0.00	-0.03
2 In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping".	2.62	0.96	-0.24	0.65	-0.01
5 I feel that negative or anxious thoughts do not depict the reality – I regard them just as events which I have to evaluate.	2.32	0.89	-0.06	0.72	-0.20
8 I can stop any "negative thinking spirals" and focus on what I can do in the situation.	2.62	0.89	-0.06	0.72	-.20
11 I tend to rationally evaluate unpredictable situations rather than getting anxious.	2.60	0.91	0.18	0.47	0.07
14 I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face troublesome events.	2.70	0.90	0.16	0.49	0.12
17 When I experience taxing demands I try to act as in the motto "There are no problems only solutions".	2.39	0.97	0.09	0.45	0.10
3 I can easily divide important long-term goals into achievable and short-term sub-goals.	3.04	0.92	0.02	-0.20	0.72
6 I can prioritise my needs and formulate a hierarchy of goals.	3.05	0.86	-0.05	-0.02	0.71
9 When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.	2.94	0.88	-0.02	-0.07	0.78
12 When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.	2.88	0.91	-0.08	0.11	0.74
15 When a problem appears to be insur-mountable I know that it's just a matter of breaking it down into smaller problems.	2.91	0.94	0.01	0.14	0.70
18 If I were overwhelmed by a big task I would stop and take smaller steps.	3.05	0.89	0.03	0.00	0.57

[a] Item numbers correspond with those of the PMCEQ in Table 6; (R) indicates a reverse scored item.

[b] Estimated using principal axis exploratory factor analysis (EFA).

3.7. *Discussion*

Using an initially wide item pool consisting of 49 statements the first resulting 27-item solution of the PMCEQ was adequate, accounting for 46.45% of the variance. Successive elimination of a further nine redundant or less clearly worded items yielded a clear and balanced three-factor structure (6 items per factor) and good psychometric properties. The intercorrelations between PMCEQ-1 and PMCEQ-2 ($r=0.46$) and between PMCEQ-1 and PMCEQ-3 ($r=0.44$) were acceptable. An intercorrelation between PMCEQ-2 and PMCEQ-3 had also been expected because the dimensions or factors refer to successive stages from perceiving the challenging nature of an endeavour to adequate subsequent goal-setting processes. However with $r=0.66$ the intercorrelation between PMCEQ-2 and PMCEQ-3 necessitates some caution for follow-up studies because of its potentially implied multicollinearity problems which will be explicitly addressed in Study 4, Part A in Chapter 5.

The novelty of the PMCEQ should further emerge in the two following studies by using the PMCEQ measure on different samples in "competition" with constructs hypothesised to be related with metacognitions and meta-emotions of positive nature. Cartwright and Hatton's (2004) MCQ-30 (see Chapter 1.1.4) would be the most closely related instrument assessing metacognitions of the opposite, i.e. maladaptive, type. At this stage it can be inferred by the underpinning item statements that PMCEQ-1 (Confidence in Extinguishing Perseverative Thoughts and Emotions) taps the core, however reversed construct of Wells and Matthews' (1994, 1996) S-REF as confidence in extinguishing worrying thoughts and depressive rumination which in turn prevents the S-REF from becoming hyperactive. With some caution it can be hypothesised here that the PMCEQ-1 factor measures inverse confidence constructs which are already implied in the existing MCQ-30, specifically in reference

to the MCQ-2 subscale (Negative Beliefs about Worry concerning Uncontrollability and Danger). If the PMCEQ-1 measures the capability to quickly prevent the S-REF from becoming hyperactive and perseverative, fairly strong and negative correlations with the MCQ-30 subscales would be expected. Study 3 in the following Chapter 4 will test the implied convergent validity of the PMCEQ against the MCQ-30.[20]

In deviation from PMCEQ-1 – and in inverse extension to the MCQ-30 – the second and third factors of the Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ-2 and PMCEQ-3) appear to measure novel psychological and self-regulatory confidence domains. Whereas MCQ-3 (Low Cognitive Confidence) purely assesses self-beliefs about memory (cognitive confidence), PMCEQ-2 measures self beliefs about emotional regulation with subsequent problem focus. Similarly PMCEQ-3 assesses self-beliefs about goal setting and prioritisation. Therefore beyond the cognitive confidence domain of the MCQ-30; the novel PMCEQ-2 and PMCEQ-3 measure adaptive self-regulatory processes in new areas of cognitive, and in parts also emotional, confidence.

Table 10 lists the item statements assigned to the discussed three dimensions (factors) of the PMCEQ.

[20] MCQ-30 abbreviates Wells and Cartwright-Hatton's (2004) short form of the metacognitions questionnaire; the five subscales of the MCQ-30 are abbreviated as MCQ-1, MCQ-2 through MCQ-5.

Table 10:

PMCEQ items assigned to the three PMCEQ subscales

PMCEQ-1: Confidence in Extinguishing Perseverative Thoughts and Emotions
(1) In times of "feeling in the dumps" it's hard for me to regulate my low mood. (4) If things go really badly I tend to brood and dwell on my negative thoughts. (7) When the "blues" overcomes me I tend to struggle with controlling my low mood. (10) I tend to overreact when things are really going wrong. (13) When confronted with ongoing troublesome circumstances I often start "brooding" and find it difficult to stop. (16) I tend to think that my worrying thoughts might reflect the reality.
PMCEQ-2: Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving
(2) In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping". (5) I feel that negative and anxious thoughts do not depict the reality – I regard them just as "events" which I have to evaluate. (8) I can stop any "negative thinking spirals" and focus on what I can do in the situation. (11) I tend to rationally evaluate unpredictable situations rather than getting anxious. (14) I can make a volitional (free) decision to keep on top of things and remain confident. (17) When I experience taxing demands I try to act as in the motto "There are no problems, only solutions".
PMCEQ-3: Confidence in Setting Flexible and Feasible Hierarchies of Goals
(3) I can easily divide important long-term goals into achievable and short-term sub-goals. (6) I can prioritise my needs and formulate a hierarchy of goals. (9) When I find it difficult to cope with a huge task I tend to tackle it in smaller steps. (12) When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles. (15) When a problem appears to be insurmountable I know that it's just a matter of breaking it down into smaller problems. (18) If I were overwhelmed by a big task I would stop and take smaller steps.

Note: PMCEQ item number in brackets; Factor 1 items reverse scored ones.

One inherent limitation of this Study 2 requires acknowledgement. The PMCEQ instrument developed within this study incorporates one potential flaw in terms of the items measuring the PMCEQ-1 dimension (Confidence in Extinguishing Perseverative Thoughts and Emotions). All items of the PMCEQ-1 factor are negatively worded, whereas the items of the PMCEQ-2 and PMCEQ-3 are all positively worded. On one hand this might have implications for the factor structure of the PMCEQ instrument. On the other hand this can be regarded as a means of controlling for possible social response bias. In order to minimise potential systematic effects resulting from the outlined mixture of positively and negatively worded items, the PMCEQ questionnaire presents the PMCEQ-1 through PMCEQ-3 items in a successively alternating sequence.

3.8. Outlook on Study 3 in Chapter 4

In its entirety, this Study 2 provided first empirical evidence for the validity and internal consistency of the novel PMCEQ measure. The indicated good psychometric properties will be further investigated within the following Study 3. Utilising a new and larger mixed sample consisting of 475 student and worker participants the factor structure of the PMCEQ will be corroborated by assessing its concurrent validity with respect to two conceptually related traits: (a) maladaptive metacognitive traits (measured by the MCQ-30) and (b) intrinsic and extrinsic motivational traits. The core aim is to identify if and which of the PMCEQ subscales show convergent and discriminant validity.

Chapter 4

Study 3

Corroboration of Factor Structure and Assessment of Concurrent Validity of the Positive Metacognitions and Positive Meta-Emotions Questionnaire

4.1. Scope and rationale

Study 2 in the previous Chapter 3 could preliminarily establish good construct validity of the novel PMCEQ instrument by means of EFA. Cronbach's alpha coefficients for all three subscales also reflected good internal consistency. The core aim of Study 3 is to further corroborate the concurrent validity of the novel PMCEQ by means of confirmatory factor analysis (CFA). Will PMCEQ-1, theorised to measure an inverse factor of Wells and Matthews' (1994, 1994) perseverative S-REF construct (specifically of the MCQ-2 subscale "Negative Beliefs about Worry concerning Uncontrollability and Danger"), show the predicted convergent validity with MCQ-30 subscales? In contrast will PMCEQ-2 and PMCEQ-3, theorised to measure metacognitions and meta-emotions in a new area of cognitive (and in parts emotional) confidence, not being accounted for by the MCQ-30 and its factors, show the expected discriminant validity with MCQ-30 subscales?

In addition, and aimed at testing the empirical evidence for the concurrent validity of the PMCEQ, the instrument will be validated against two related constructs: (a) intrinsic motivation with predicted positive correlations with PMCEQ factors, and (b) extrinsic motivation with expected weak negative correlations with the PMCEQ subscales. It can already be predicted here that specifically the subscales

PMCEQ-2 and PMCEQ-3 should be positively correlated with intrinsic motivation. The underlying argument lies in the problem- and goal-related nature of both subscales.

4.2. Executive Summary

A mixed sample of 475 worker and student participants completed the new Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ), Meta-Cognitions Questionnaire 30 (MCQ-30), and the intrinsic and extrinsic motivation-assessing Work Preference Inventory (WPI). Confirmatory factor analysis (CFA) corroborated the structure of the PMCEQ scale. Subscale scores of the PMCEQ had meaningful negative correlations with measures of maladaptive metacognition. The agency and goal-related factors PMCEQ-2 and PMCEQ-3 were positively and moderately strong correlated with intrinsic motivation, whereas the perseveration-decreasing PMCEQ-1 showed merely a weak positive correlation with intrinsic motivation. Only PMCEQ-1 was moderately and negatively correlated with extrinsic motivation; PMCEQ-2 and PMCEQ-3 were not significantly correlated with extrinsic motivation. In all, the findings indicate that the novel PMCEQ instrument produces valid and reliable scores.

Keywords: Challenge, Confidence, Goal Setting, Metacognitive Beliefs, Meta-Emotions, Scale Development, Self-Regulation.

4.3. Introduction and Objectives

The first goal of the present study is to further evaluate the concurrent validity of the PMCEQ, which was developed in Study 2 and assessed in terms of its construct validity, on a new and larger mixed student and worker sample. The second goal is to

evaluate the concurrent validity of the PMCEQ in relation to two sets of conceptually related traits: (a) maladaptive metacognitive traits, and (b) intrinsic and extrinsic motivational traits.

Maladaptive metacognitions have been studied using measures of five interrelated traits (Wells & Cartwright-Hatton, 2004): (1) Positive Beliefs about Worry, i.e. the extent to which a person believes that worrying is useful; (2) Negative Beliefs about Worry concerning Uncontrollability and Danger, i.e. the extent to which a person believes that worrying is uncontrollable and dangerous; (3) Low Cognitive Confidence, i.e. the extent to which a person lacks confidence in his or her attention and memory; (4) Beliefs about the Need to Control Thoughts, i.e. the extent to which a person believes that disturbing thoughts should be suppressed; and (5) Cognitive Self-consciousness, i.e. the extent to which a person focuses attention inwards to monitor own thoughts. Metacognitive (and meta-emotional) factors of opposite nature, i.e. adaptive and positive ones, as identified in Study 2 (Chapter 3) seem to be distinct from those measured by the MCQ-30 (Wells & Cartwright-Hatton, 2004), with the following caveat.

On one hand, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) converges with Positive Beliefs about Worry (MCQ-1), Negative Beliefs about Worry Concerning Uncontrollability and Danger (MCQ-2) and Low Cognitive Confidence (MCQ-3) in tapping Wells and Matthews' (1994, 1996) and Wells' (2000) core conceptualisation of metacognition as a determinant of perseveration.[21] Moreover, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) implies a reduced need for monitoring and controlling external threats and own impulsive thoughts and emotions, and hence converges with Need to

[21] MCQ-1, MCQ-2 through MCQ-5 refer to the subscales/factors of the MCQ-30 (rather than to the subscales of its longer version MCQ).

Control Thoughts (MCQ-4) and Cognitive Self-consciousness (MCQ-5). Therefore, it is hypothesised that the PMCEQ-1 subscale will correlate moderately and negatively with the MCQ-30 subscales.

On the other hand, Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind Setting for Problem Solving (PMCEQ-2) and Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) are not addressed explicitly by Wells and Matthews' (1994) and Wells' (2000) theory. Therefore PMCEQ-2 and PMCEQ-3 assess novel domains of metacognitive and meta-emotional confidence, not accounted for by any of the five MCQ-30 subscales. Moreover, considering the factor labels and item content of the PMCEQ-2 and PMCEQ-3 factors, there is no indication that they conceptually overlap with the MCQ-30 subscales. Therefore, it is expected that these subscales will either not correlate or correlate only weakly and negatively with the MCQ-30 subscales.

Intrinsic motivation is the tendency to engage in tasks because one finds them interesting, challenging, and enjoyable, whereas extrinsic motivation is the tendency to engage in tasks because of task-unrelated factors such as anticipation of reward or punishment (Deci & Ryan, 1985). When operationalised as traits in the domains of work or study intrinsic motivation and extrinsic motivation are independent dispositions to be driven either by the engagement with work or by a means to some end that is external to the work itself (Amabile, Hill, Hennessey, & Tighe, 1994).

Intrinsic motivation implies curiosity and appreciation of complexity as an opportunity to acquire mastery when engaging in demanding activities and a tendency to engage in deep-level cognitive processing. As such, intrinsic motivation in work should foster adaptive metacognition, which in turn should foster intrinsic motivation.

Therefore, it is predicted that the PMCEQ subscales will correlate positively with trait intrinsic motivation in work. Extrinsic motivation energises behaviour by arousing ego-involving anticipations of success or failure, and tends to deplete attention and problem-solving capacity (Deci & Ryan, 1985). As such, extrinsic motivation in work should hinder adaptive metacognition, which in turn should prevent extrinsic motivation. Therefore, it is hypothesised that the PMCEQ subscales will correlate negatively with trait extrinsic motivation in work.

4.4 Method

4.4.1. Participants

A convenience sample of 475 participants was recruited comprising 325 (68.4%) students from various metropolitan universities and 150 (31.6%) professionals from various occupations. The age range was 18 to 66 years ($M = 28.04$, $SD = 8.43$); 179 (37.7%) were males, 289 (60.8%) were females, and 7 (1.5%) individuals did not report their gender. The breakdown of gender by profession was: 121 male students, 202 female students, 58 male workers, and 87 female workers. Participants were approached individually, briefed about the study, and invited to sign an individual consent form; 75% of those approached participated. All participants completed the following scales in an order that was randomised across participants.

4.4.2. Measures

Positive Metacognitions and Meta-Emotions Questionnaire (PMCEQ, Beer & Moneta, 2010*).* This is the crucial questionnaire in and developed for this thesis. Development of the PMCEQ and preliminary assessment of its construct validity has been described in Study 2, Chapter 3.

Meta-Cognitions Questionnaire 30 (MCQ-30; Wells & Cartwright-Hatton, 2004). The MCQ-30 (see Appendix 6) measures individual differences in the five metacognitive traits described in the Introduction, each measured by six items. Items are scored on a 4-point scale ranging from 1 (*Do not agree*) to 4 (*Agree very much*), and scale scores are computed by averaging the scores of their constituent items.

Work Preference Inventory (WPI; Amabile et al., 1994). The WPI (see Appendices 7a and 7b) measures individual differences in intrinsic and extrinsic motivation, each assessed by 15 items. Items are scored on a 4-point scale ranging from 1 (*Never or almost never true for me*) to 4 (*Always or almost always true for me*), and scale scores are computed by averaging the scores of their constituent items.

4.4.3. Statistical Analysis

The construct validity of the PMCEQ was evaluated by confirmatory factor analysis (CFA) using LISREL 8.8 (Jöreskog & Sörbom, 1996). The three metacognitive traits were defined as latent variables (PMCEQ-1, PMCEQ-2 and PMCEQ-3), and the items as congeneric indicators of the latent variables. For each factor, the factor loading of one of its indicators was fixed to 1.0 in order to fix the scale of the factor. In the light of expected overlaps and process interdependencies between the three PMCEQ constructs the factors were let free to be intercorrelated, and the item error terms were not allowed to correlate with one another.

The utilised CFA technique – aiming at testing the probability that the hypothesised factor structure is supported by the data (Cramer, 2003) – used four relevant goodness-of-fit indices reported in the Results and Discussion section: (1) The Chi-Square assesses the overall fit of the model by estimating the discrepancies between the observed covariance matrices and those implied by the model. Adequacy

of a model is indicated by a non-significant Chi-Square, provided there is sufficient statistical power. Frequently, models show significant Chi-Square indices, hence not fitting in a strict sense, but adequate to good fit is still supported by alternative non-Chi-Square-based indices. Furthermore due to its sensitivity to sample size and its tendency to inflate Type-1 error (Bollen, 1989; Cohen, 1988) researchers take alternative goodness-of-fit measures into account to evaluate model fit. (2) The Comparative Fit Index (CFI) measures the model fit compared to a null model. The index ranges from 0 to 1 with values in the interval from .90 to .95 indicating appropriate fit and values above .95 reflecting good fit (Hu & Bentler, 1999). (3) The Root Mean Square Error of Approximation (RMSEA) is a measure of discrepancy between the model and the data, with a value below .05 indicating good fit and values in the range from .05 and .08 indicating adequate fit (Hu & Bentler, 1999). (4) The Standardized Root Mean Square Residual (SRMR) measures discrepancy between the observed and predicted covariance matrices, ranging from 0 to 1 with values < .05 indicating good fit. The SRMR is sensitive to misspecification of the latent model. (Schermelleh-Engel, Moosbrugger & Müller 2003)

4.5 Results and Discussion

The combined "Results and Discussion" format has been chosen here on the grounds that this discussion has to be led by very close reference to the results of the validity tests. The validity analyses are reported and interpreted in two subsections addressing further evaluation of construct validity and the subsequent assessment of concurrent validity of the PMCEQ.

4.5.1. Assessment of construct validity

The Chi-Square test of the confirmatory factor model was significant (Chi-Square=285.55, df=132, $p<0.001$), indicating that the model does not fit strictly. However, all other goodness-of-fit statistics indicated good fit (CFI=0.98; RMSEA=0.05, SRMR=0.045). The model-based estimates of the correlations were 0.40 between Factor 1 and Factor 2, 0.24 between Factor 1 and Factor 3, and 0.81 between Factor 2 and Factor 3. The stronger correlation between Factors 2 and 3 than the one found in Study 2 is probably due to the reduction in the number of items from the original to the final version of the scale, which might have made similarities between items more salient.

In addition the fit of an alternative two-factor model was assessed in which the items of Factor 2 and Factor 3 were defined as indicators of a single factor. The fit of the model was acceptable (CFI=0.96; RMSEA=0.76, SRMR=0.058) but significantly worse than that of the three-factor model (Chi-Square of change=213.88, df=2, $p<0.001$). Therefore, the three-factor model was retained for this study.

Table 11 shows the descriptive statistics of each item and Figure 3 shows their standardised factor loadings and measurement errors. The range intervals of loadings for the three PMCEQ factors were as follows: 0.62-0.80 for PMCEQ-1, 0.51-0.77 for PMCEQ-2 and 0.63-0.76 for PMCEQ-3. In all, the findings corroborate the factor structure of the scale.

Table 11:

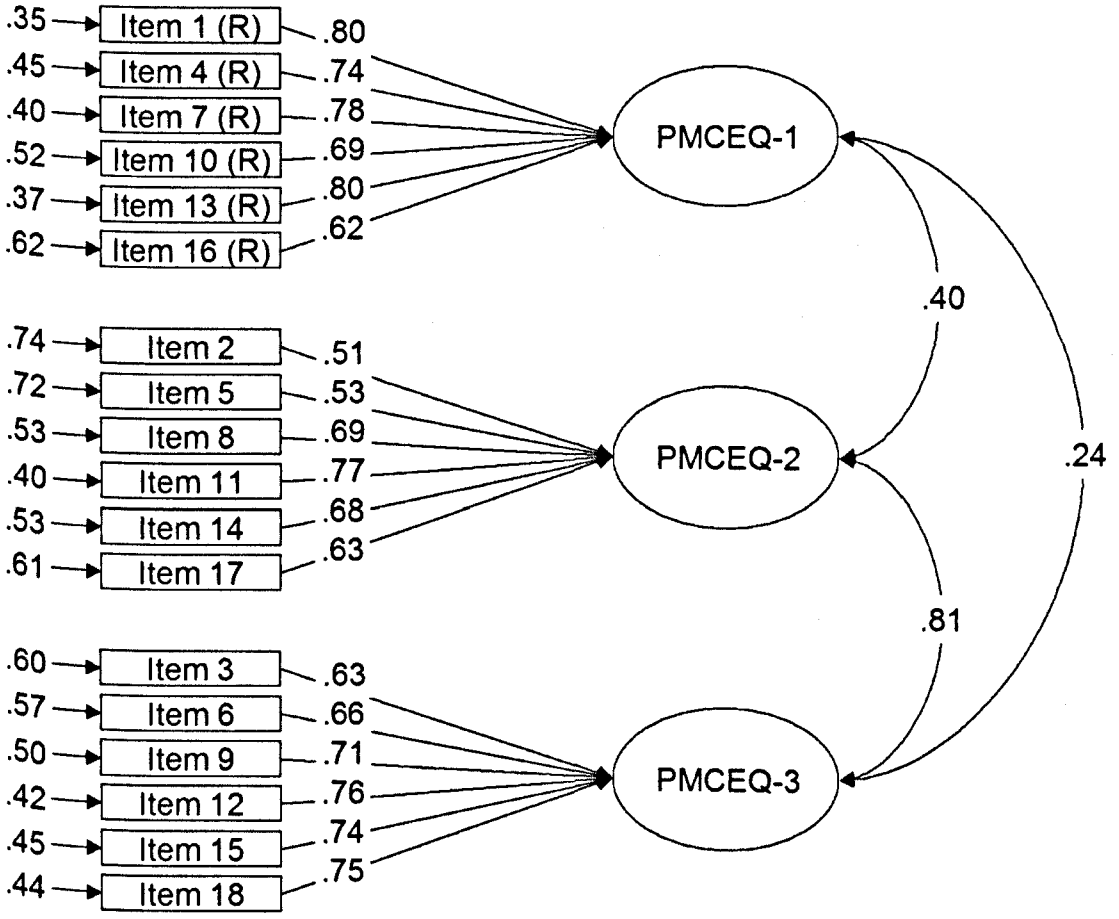
Means, standard deviations, factor loadings and measurement errors of the PMCEQ items

Item [a]	*X*	*SD*	Factor	Factor Loading	Measure-ment Error
1(R) In times of "feeling in the dumps" it's hard for me to regulate my low mood.	2.80	0.99	PMCEQ-1	0.80	0.35
4(R) If things go really badly I tend to brood and dwell on my negative thoughts.	2.82	0.94	PMCEQ-1	0.74	0.45
7(R) When the "blues" overcomes me I tend to struggle with controlling my low mood.	2.83	0.97	PMCEQ-1	0.78	0.40
10(R) I tend to overreact when things are really going wrong.	2.74	1.03	PMCEQ-1	0.69	0.52
13(R) When confronted with ongoing trouble-some circumstances I often start "brooding" and find it difficult to stop.	2.95	0.97	PMCEQ-1	0.80	0.37
16(R) I tend to think that my worrying thoughts might reflect the reality.	2.97	0.95	PMCEQ-1	0.62	0.62
2 In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping".	2.44	0.92	PMCEQ-2	0.51	0.74
5 I feel that negative and anxious thoughts do not depict the reality – I regard them just as events which I have to evaluate.	2.33	0.87	PMCEQ-2	0.53	0.72
8 I can stop any "negative thinking spirals" and focus on what I can do in the situation.	2.46	0.92	PMCEQ-2	0.69	0.53
11 I tend to rationally evaluate unpredictable situations rather than getting anxious.	2.48	0.91	PMCEQ-2	0.77	0.40
14 I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face troublesome events.	2.58	0.81	PMCEQ-2	0.68	0.53
17 When I experience taxing demands I try to act as in the motto "There are no problems only solutions".	2.39	0.88	PMCEQ-2	0.63	0.61
3 I can easily divide important long-term goals into achievable and short-term sub-goals.	2.69	0.91	PMCEQ-3	0.63	0.60
6 I can prioritise my needs and formulate a hierarchy of goals.	2.84	0.85	PMCEQ-3	0.66	0.57
9 When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.	2.85	0.85	PMCEQ-3	0.71	0.50
12 When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.	2.70	0.85	PMCEQ-3	0.76	0.42
15 When a problem appears to be insur-mountable I know that it's just a matter of breaking it down into smaller problems.	2.91	0.86	PMCEQ-3	0.74	0.45
18 If I were overwhelmed by a big task I would stop and take smaller steps.	2.78	0.86	PMCEQ-3	0.75	0.44

(R) indicates reverse items.

Figure 3

Standardised factor loadings and measurement errors of the PMCEQ items



Notes. Labels of factors:

PMCEQ-1 Confidence in Extinguishing Perseverative Thoughts and Emotions;

PMCEQ-2 Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving;

PMCEQ-3 Confidence in Setting Flexible and Feasible Hierarchies of Goals.

(R) indicates a reverse scored item.

4.5.2. Assessment of concurrent validity

Table 12 (p. 152) depicts the descriptive statistics and intercorrelations of the scores of the PMCEQ, MCQ-30, and WPI subscales. The Cronbach's alpha coefficients of the PMCEQ subscales were satisfactory.

Table 12 shows that, as expected, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) had fair and negative correlations with all MCQ-30 subscales; the correlation with Negative Beliefs about Worry Concerning Uncontrollability and Danger (MCQ-2) was strong. Moreover, Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving (PMCEQ-2) had weak and negative correlations with Negative Beliefs about Worry Concerning Uncontrollability and Danger (MCQ-2) and Beliefs about the Need to Control Thoughts (MCQ-4), and a weak and positive correlation with Cognitive Self-Consciousness (MCQ-5). Finally, Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) had weak and negative correlations with Negative Beliefs about Worry Concerning Uncontrollability and Danger (MCQ-2), Low Cognitive Confidence (MCQ-3), and Beliefs about the Need to Control Thoughts (MCQ-4).

In their entirety, the findings support the concurrent validity of the PMCEQ scale in relation to the MCQ-30 subscales, with the caveat that there is substantial overlap between Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) and Negative Beliefs about Worry Concerning Uncontrollability and Danger (MCQ-2). The statistical intercorrelation can conceptually be explained by the fact that item statements of the PMCEQ-1 and the MCQ-2 both refer to prolonged perseverative and cyclical thoughts when facing challenging or worrying situations. However, five of out of the six items forming PMCEQ-1 were derived from the

qualitative analysis within Study 1. Only the (reverse) item "I tend to think that my worrying thoughts might reflect the reality" was derived from the MCQ-30. It is noteworthy that the MCQ-30 items consist exclusively of worry-related statements, whereas PMCEQ-1 includes items tapping depressive rumination, e.g. "If things go really badly I tend to brood and dwell on my negative thoughts".

Table 12 shows that, as expected, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) had a weak and positive correlation with Intrinsic Motivation. Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving (PMCEQ-2) and Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) had fair and positive correlations with Intrinsic Motivation. The stronger positive correlations of PMCEQ-2 and PMCEQ-3 with Intrinsic Motivation can be explained on the grounds that both factors refer to agentic problem and goal focus which can be regarded as manifestations of tackling complex problems driven by intrinsic motivation. Since intrinsic motivation implies appreciation of complexity as an opportunity to acquire mastery the PMCEQ-3 confidence construct of hierarchical and flexible goal-setting should foster complex problem solving.

Moreover, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) and Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind Setting for Problem Solving (PMCEQ-2) had weak and negative correlations with Extrinsic Motivation, whereas, Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) was uncorrelated with Extrinsic Motivation. The latter can be explained in the light that extrinsic motivation does not imply appreciation of complexity and hence necessitates the PMCEQ-3 confidence construct of formulating flexible goal hierarchies to a far lesser extent than

intrinsic motivation. In all, the outlined and interpreted findings support the concurrent validity of the PMCEQ instrument in relation to the WPI subscales of Intrinsic and Extrinsic Motivation.

Finally, Table 12 shows that Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind Setting for Problem Solving (PMCEQ-2) and Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) have slightly different correlations with the other scales. PMCEQ-2 is more predictive of Cognitive Self-Consciousness (MCQ-5), Intrinsic Motivation and Extrinsic Motivation, whereas PMCEQ-3 is more predictive of Cognitive Confidence (MCQ-3) and Beliefs about the Need to Control Thoughts (MCQ-4). The discriminant predictive properties of PMCEQ-2 and PMCEQ-3 suggest that – regardless of their intercorrelations – the two factors are somewhat distinct. In light of the marginally different correlations between PMCEQ-2 and Intrinsic Motivation on one hand and PMCEQ-3 and Intrinsic Motivation on the other, however, more empirical data will be required in future research to investigate the low distinctiveness between PMCEQ-2 and PMCEQ-3.

Table 12:

Means, standard deviations, Cronbach's alpha coefficients (in parentheses) and intercorrelations of Study 3 variables

Variables	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions	2.90	0.68	(0.88)									
2. PMCEQ-2 – Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind Setting for Problem Solving	2.54	0.56	0.23**	(0.80)								
3. PMCEQ-3 – Confidence in Setting Flexible and Feasible Hierarchies of Goals	2.85	0.60	0.27**	0.72**	(0.86)							
4. MCQ-30-1 – Positive Beliefs about Worry	1.76	0.68	-0.46**	-0.05	-0.07	(0.89)						

Variables	*M*	*SD*	*1.*	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*
5. MCQ-30-2 – Negative Beliefs about Worry Concerning Uncontrollability and Danger	1.94	0.84	-0.72**	-0.22**	-0.24**	0.39**	(0.90)					
6. MCQ-30-3 – Cognitive Confidence	1.66	0.65	-0.37**	-0.04	-0.15**	0.25**	0.35**	(0.85)				
7. MCQ-30-4 – Beliefs about the Need to Control Thoughts	1.78	0.63	-0.47**	-0.12*	-0.19**	0.38**	0.55**	0.32**	(0.78)			
8. MCQ-30-5 – Cognitive Self-Consciousness	2.41	0.74	-0.27**	0.15**	0.09	0.26**	0.35**	0.21**	0.41**	(0.86)		
9. WPI – Intrinsic Motivation	2.85	0.42	0.14**	0.43**	0.39**	-0.1*	-0.1*	-0.12**	-0.07	0.24**	(.78)	
10. WPI – Extrinsic Motivation	2.51	0.41	-0.26**	-0.09*	-0.03	0.21**	0.22**	0.05	0.23**	0.04	-0.02	(.72)

Note. $n = 475$.

* $p < .05$ ** $p < .01$

4.6. Conclusions and Outlook on Study 4, Part A in Chapter 5

Studies 2 and 3 have provided first evidence for the good psychometric properties of the PMCEQ. One inherent problem of the PMCEQ-2 and PMCEQ-3 factors could be identified in terms of their fairly high intercorrelation; yet, Study 3 could establish some distinctiveness of the two subscales. The instrument's sound validity and reliability is further supported not only by the fairly large sample sizes, with 313 participants in Study 2 and 475 participants in Study 3, but also by the mixed and fairly representative structure of both samples comprising student and worker participants. Validity and reliability of the novel PMCEQ instrument will have to be further substantiated in future research. However, the preliminary established psychometric stability justifies its utilisation for testing the effects of adaptive metacognitions and cognitive beliefs about emotions on other psychological variables.

Wells and Matthews (1994, 1996) and Wells (2000, 2009) propose a core link between metacognition and coping, stating that coping is metacognitive in nature. Research evidence has also shown that dysfunctional metacognitions are positively correlated with perceived stress. The subsequent Study 4, Part A will test the relationships between both MCQ-30 and PMCEQ as independent variables and the three outcome variables of adaptive coping strategies, maladaptive coping strategies and perceived stress. In a three-step approach three different linear models will be tested by means of SEM techniques. The three SEM models comprise the same measurement model but three different structural models will successively be developed. The core aim is to examine the differential effects of dysfunctional metacognitions (measured by the MCQ-30) and positive metacognitions and meta-emotions (measured by the PMCEQ) on the three dependent variables under investigation.

Chapter 5

Study 4, Part A

Coping and Perceived Stress as a Function of Positive Metacognitions and Meta-Emotions

5.1. Scope and rationale

Wells and Matthews (1994, 1996) and Wells (2000, 2009) posit that coping strategies are metacognitive in nature. There is empirical evidence that metacognitions of the dysfunctional and maladaptive type (as measured by the MCQ-30) are associated with increased stress perception and sustained levels of stress (perception) have in turn been found to contribute to a range of psychological disorders. Prolonged and increased stress has shown to trigger onset and maintenance of psychopathological disorders in individuals with genetic dispositions or vulnerability factors – known as the diathesis-stress model (e.g. Zubin & Spring, 1977). Whereas maladaptive metacognitions (as measured by the MCQ-30) are linked to maladaptive coping dispositions and increased stress perception, it would be predicted that metacognitions and meta-emotions of the adaptive type (as measured by the PMCEQ) are in contrast positively associated with adaptive coping strategies and negatively associated with both maladaptive coping strategies and perceived stress.

Testing the effects of the PMCEQ factors on adaptive coping strategies, maladaptive coping strategies and perceived stress utilising SEM techniques – while simultaneously controlling for effects of the MCQ-30 factors – allows for quantifying potential effects of the PMCEQ factors above and beyond those of the MCQ-30 constructs.

5.2. *Executive Summary*

The present study explores the linear relationships between maladaptive metacognitions and adaptive metacognitions as independent variables and coping strategies and perceived stress as dependent variables or outcome measures. A mixed sample of 212 worker and student participants completed the following battery of questionnaires: Meta-Cognitions Questionnaire 30 (MCQ-30), Positive Metacognitions Questionnaire (PMCEQ), Brief Coping Questionnaire (COPE), and Perceived Stress Scale (PSS). Based on the three-factor model of adaptive metacognitive traits and classical theories of appraisal and coping, it was hypothesised that (a) Confidence in Extinguishing Perseverative Thoughts and Emotions (trait 1 [PMCEQ-1]) would correlate negatively with maladaptive coping, (b) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction, and Mind-Setting for Problem-Solving (trait 2 [PMCEQ-2]) and Confidence in Setting Flexible and Feasible Hierarchies of Goals (trait 3 [PMCEQ-3]) would correlate positively with adaptive coping and (c) all three metacognitive traits would correlate negatively with perceived stress.

A cross-sectional design was utilised and a mixed sample of 212 workers and students completed the questionnaire battery comprising MCQ-30, PMCEQ, COPE and PSS. Data analyses consisted of correlation analysis and subsequent structural equation modeling (SEM) analyses and supported the hypotheses controlling for maladaptive metacognitions. PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions (trait 1) – was negatively predictive of maladaptive coping strategies and of perceived stress. Due to high intercorrelation the two subscales PMCEQ-2 and PMCEQ-3 were combined, forming the integrated PMCEQ-2* construct. PMCEQ-2* – Confidence in Interpreting Own Emotions as Cues,

Restraining from Immediate Reaction, Mind-Setting for Problem-Solving and Confidence in Setting Flexible and Feasible Hierarchies of Goals (traits 2 and 3) – was positively predictive of adaptive coping strategies and negatively predictive of perceived stress. There were no significant effects of the entire MCQ-30 on any of the three outcome variables of adaptive coping, maladaptive coping or stress

The study provides evidence that functional metacognitive and meta-emotional dimensions of the PMCEQ are implicated in advantageous coping strategies and decreased stress perception above and beyond corresponding contributions of the MCQ-30. This fourth study also shows that adaptive coping strategies and low stress vulnerability not only require the absence of maladaptive metacognitive traits but also the presence of adaptive metacognitive and meta-emotional traits. The findings suggest that positive metacognitions foster adaptive coping and prevent both maladaptive coping and perceived stress above and beyond the (inverse) contributions of maladaptive metacognitions. Resulting directions for future research are discussed.

Keywords: Adaptive Coping; Appraisal: Adaptive Metacognitions; Adaptive Meta-Emotions; Perceived Stress; Metacognition-Coping-Link.

5.3. *Introduction and Objectives*

Metacognition refers to the knowledge and beliefs about one's own cognitive regulation and the capability to deconstruct and understand them through reflection and problem solving (Flavell, 1979). The study of metacognitions was pioneered in the field of developmental and educational psychology (Flavell, 1979; Nelson & Narens, 1990), and has been more recently applied in the domains of clinical psychology and psychopathology (Wells & Matthews, 1994, 1996; Wells, 2000,

2009) and in the field of positive psychology within this PhD research. Whereas clinical psychologists and psychiatrists examine negative effects of dysfunctional metacognitions on coping, stress perception, performance indicators, well-being and other quality of life measures (e.g. life satisfaction), this study investigates potentially enhancing effects of positive and functional metacognitions (and meta-emotions) on (adaptive) coping behaviour and (reduced) stress perception. The final Study 4, Part B (Chapter 6) will extend this view beyond perceived stress by explicitly investigating the effects of adaptive (positive) metacognitions and meta-emotions on anxiety and depression (negative emotions).

The effects of adaptive metacognitions are hypothesised to be inverse to those of maladaptive metacognitions. This Study 4, Part A examines the impacts of both maladaptive and adaptive metacognitions. The investigation not only emphasises adaptive as opposed to maladaptive metacognitions but extends the focus by also taking adaptive meta-emotions into account. As outlined in previous chapters the MCQ-30 does not comprise meta-emotional items, whereas some PMCEQ-items explicitly assess (positive) meta-emotions, e.g. the two (reverse) items "When the 'blues' overcomes me I tend to struggle with my low mood" and "I tend to overreact when things are really going wrong".

Wells and Matthews' (1994, 1996) and Wells' (2000, 2009) theory of psychological and emotional dysfunction posit that metacognitions determine coping strategies since metacognitive beliefs comprise beliefs not only about individuals' cognitions and internal states but also about coping strategies which in turn can influence both. However, hardly any empirical studies have investigated the relationship between metacognitions and coping styles or strategies. Moreover, to the knowledge of the author no study has yet researched potential links between

metacognitions (and meta-emotions) of adaptive nature and coping behaviour. One of the few studies addressing the (maladaptive) metacognition-coping relationship is Sica, Steketee, Ghisi, Chiri, L. & Franceschini's (2007) study examining the effects of (maladaptive) metacognitive beliefs on worry, obsessive-compulsive symptoms and coping styles in a non-clinical sample. Their main finding was that Positive Beliefs about Worry (MCQ-1) predicted maladaptive coping strategies. The present Study 4, Part A expands the focus of Sica et al.'s (2007) research approach by investigating the effects of adaptive or functional metacognitive and meta-emotional traits on stress perception and, moreover, by simultaneously controlling for potentially confounding effects of dysfunctional metacognitive traits. The underlying kernel theory under investigation in the present study focuses on adaptive metacognitions and meta-emotions, maintains that these are not just reversed maladaptive metacognitions and posits that they prevent maladaptive coping and foster adaptive coping.

Perceived stress occurs when the individual perceives or anticipates a discrepancy between a situation or an event and his or her coping resources. Whereas dysfunctional metacognitions represent a vulnerability factor in terms of sensitised and increased stress perception, it is predicted that positive metacognitions and meta-emotions will be negatively correlated with perceived stress.

To date, the metacognition-coping link (with the exception of Sica et al.'s (2007) abovementioned study) has not been conceptualised and tested with reference to classical theories of appraisal and coping (e.g. Lazarus and Folkman's, 1984). The present study investigates the relationships between adaptive metacognitions and meta-emotions as independent variables and maladaptive coping strategies, adaptive coping strategies and perceived stress as outcome variables, using maladaptive

metacognitions as a control variable, in a mixed community sample of workers and students.

5.3.1. Conceptualisation and measurement of metacognitive traits

Empirical evidence for the effects of metacognitions on psychological well-being has until now been provided only for metacognitions of maladaptive and dysfunctional nature. Wells and Matthews' (1994, 1996) Self-Regulatory Executive Function (S-REF) model and Wells' (2000, 2009) theory of emotional disorders states that psychological dysfunction is maintained by maladaptive metacognitions that result in and foster perseverative and ruminative thinking, maladaptive use of attention and adoption of dysfunctional coping strategies, which conjointly constitute a cognitive-attentional syndrome (*CAS*; Wells, 2000, 2009). Maladaptive metacognitions which are activated by the encounter of a stressful event or problematic situation are theorised to result in prolonged maladaptive S-REF activity, thus maintaining the CAS. Wells and Matthews' (1994, 1996) and Wells' (2000, 2009) tenet is a core distinction between two different modes individuals can operate when encountering a problematic situation. The object mode refers to interpreting thoughts as facts and is, with the exception of genuinely threatening situations, dysfunctional because it fosters perseveration and maladaptive coping. In contrast the metacognitive mode, in which individuals treat thoughts merely as cues or "events" which require subsequent evaluation, is theorised to be functional across the board because it enhances evidence-based belief elaboration and subsequent adaptive and problem-focussed coping.

Maladaptive metacognition has been studied using the Meta-Cognitions-Questionnaire (*MCQ*; Cartwright-Hatton & Wells, 1997) or its, shorter form (*MCQ-*

30; Wells and Cartwright-Hatton, 2004). The MCQ-30 measures individual differences in five interrelated traits: (1) Positive Beliefs about Worry, i.e. the extent to which a person believes that worrying is useful; (2) Negative Beliefs about Worry concerning Uncontrollability and Danger, i.e. the extent to which a person believes that worrying is uncontrollable and dangerous; (3) Low Cognitive Confidence, i.e. the extent to which a person lacks confidence in his or her attention and memory; (4) Beliefs about the Need to Control Thoughts, i.e. the extent to which a person believes that disturbing thoughts should be suppressed; and (5) Cognitive Self-Consciousness, i.e. the extent to which a person focuses attention inwards to monitor thoughts.

The kernel theory of adaptive metacognition and meta-emotion developed and tested within this PhD research proposes that absence of maladaptive metacognition is not sufficient for an individual to succeed when tackling problematic situations or challenging encounters. Hence, the study draws on the commonly utilised positive psychology paradigm that psychological adaptation is not merely attributable to the absence or low prevalence of maladaptive dispositions, but also requires being fostered by adaptive dispositions (e.g. Wright & Lopez, 2002). In particular, successful resolution of challenging and difficult situations requires (a) metacognitive beliefs that facilitate to switch S-REF activity on and off based on the strategic demands of the situation, (b) meta-emotions of interest and curiosity (Mitmansgruber et al., 2009) in one's own primary responses to challenges and (c) metacognitive beliefs of an agentic type that support identification of alternative pathways and flexible goal restructuring.

The PMCEQ measures adaptive metacognitive beliefs people hold about their own cognitive and emotional processes when facing challenging situations or

encounters in the form of traits: (1) Confidence in Extinguishing Perseverative Thoughts and Emotions, (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving and (3) Confidence in Setting Flexible and Attainable Hierarchies of Goals. All three factors (traits) are hypothesized to foster what Hudlicka (2005) describes as a "feeling of confidence" (p. 57).

The present study utilises the PMCEQ subscales, assessing the adaptive metacognitive and meta-emotional dispositions, to investigate their effects on adaptive coping strategies, maladaptive coping strategies and perceived stress levels. Moreover, the study simultaneously controls for corresponding effects of maladaptive metacognitive traits, assessed by the MCQ-30, on the three outcome variables under investigation. If the data provided evidence for coping-enhancing and stress-reducing effects of functional metacognitions and functional meta-emotions, the present Study 4, Part A could potentially inform coaching and even clinical interventions which appear to be valuable in the light of the burden those severe and prolonged levels of (perceived) stress incorporate for performance and well-being.

5.3.2. *Appraisal processes and coping strategies*

Lazarus and Folkman's (1984) transactional (process) model of stress postulates dynamic interrelations between potential stressors and psychological stress responses. The person-environment interaction is emphasised by defining stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 10).

An individual's response to a stressor is theorised to depend on primary and secondary appraisal processes. Within the primary appraisal process a situation or event (stressor) is assessed as having stressful, irrelevant, or benign-positive effects. The implications of stressful appraisal are that a situation/event is perceived as harmful (psychological and/or physiological damage has already occurred), threatening (anticipation of harm) or challenging (reflecting the person's confidence in overcoming obstacles). Lazarus (1991) hypothesised that threat appraisals relate to different negative emotional responses. Empirical evidence supports this view, with stress having been: (1) observed to evoke negative emotional responses (e.g. Kamarck, Peterman & Raynor, 1998) and (2) found to correlate with both anxiety and depressive symptoms (e.g. Chang, 1998; Bergdahl & Bergdahl, 2002). In extreme cases the onset of severe mental disorders can be triggered by excessive and prolonged levels of (perceived) stress (diathesis-stress model, e.g. Zubin & Spring, 1977).

The secondary appraisal process incorporates the assessment of available external coping resources and the person's internal coping abilities. Coping is defined as "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). Coping comprises cognitive, emotional, and behavioural strategies the individual employs to manage a problematic person-environment relationship (Folkman & Lazarus, 1985). Hence, coping can be characterised as a situation-specific and dynamic response to a stressor which is informed and motivated by appraisal processes.

Two main classes of coping strategies have been identified – problem-focussed and emotion-focussed. Problem-focussed coping aims at taking direct action

for problem solving or seeking relevant information on the problem at hand, whereas emotion-focussed coping aims at reducing the emotional impact of a problem (Lazarus & Folkman, 1984). Cognitive appraisal and implementation of the corresponding adequate coping strategy depend on three factors: the typology of the stressful situation, the environment, and interpersonal factors (Kaplan, 1996). As a consequence of these multifactorial determinants, attempts and conventions to distinguish between adaptive and maladaptive coping are not clear-cut. However, in the long-term perspective problem-focussed or approach coping strategies imply better outcome effects than emotion-focussed or avoidance coping strategies. Problem-focussed coping is aimed at expansions of internal and external coping resources by taking direct action for problem solving or seeking relevant information for the situation; emotion-focussed coping seeks to merely control and reduce the negative emotional impacts of stressful situations (Lazarus & Folkman, 1984). Some researchers have equated emotion-focussed coping with "defence mechanisms" (e.g. Savickas, 1995) being desirable merely in the short term and representing unhealthy responses in the long term (Gross, 2009).

In conclusion there is empirical evidence that problem-focussed or approach coping is superior to emotion-focussed or avoidance coping as a general coping strategy. As Zuckerman & Gagne (2003) point out, although emotion-focussed coping can provide temporary relief from negative emotions, there is consensus that in the long run problem-focussed coping is adaptive whereas emotion-focussed coping is maladaptive. In this study coping was measured by Carver's (1997) Brief COPE questionnaire and its subscales were used to conceptualise the two latent variables (constructs) Adaptive Coping and Maladaptive Coping on the basis of the aforementioned distinction. The two distinct constructs had been previously validated

by Factor Analysis which revealed that four subscales of the Brief COPE loaded on the latent variable Adaptive Coping and four other subscales on the construct of Maladaptive Coping.

5.3.3. *Adaptive metacognition as predictor of coping strategies and perceived stress*

The present study draws on Lazarus' (1999) postulation that increased confidence to overcome obstacles and duress is linked to challenge appraisal as opposed to detrimental threat perception. Extending this argument it is proposed that, when confronted with difficult situations or events, individuals scoring high on the three PMCEQ confidence factors would display favourable primary and secondary appraisal processes which in turn should foster more adaptive and less maladaptive coping mechanisms. Yet, the three adaptive traits underlying the PMCEQ instrument are likely to act at different appraisal levels, and therefore to have distinct effects on coping mechanisms.

On one hand, Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) captures the ability to quickly refrain from rumination and worry when confronted with stressors in the form of challenging situations and events. Individuals who score low on this trait believe that they lack the ability to regain equilibrium after experiencing even minor disturbing thoughts or emotions. As such, they are likely to have an increased need for micro-monitoring of their internal states and external events. This increases the likelihood that a stressor, even one of low intensity, is primarily appraised as a threat. In turn, the primary threat appraisal should foster maladaptive coping. Therefore the following hypothesis is posited:

(H1) Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) will correlate negatively with maladaptive coping.

On the other hand Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and subsequent Mind-Setting for Problem-Solving (PMCEQ-2) and Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) tap the ability to correctly interpret complex stressors and tackle them by using agency, flexibility and strategy. People who score low on these traits believe they lack the ability to (flexibly and strategically) act upon a stressor. As such they are likely to experience increased dissonance between the perceived demands of a difficult or challenging situation and their own coping ability. The perception of low coping ability increases the likelihood that a stressor is secondarily appraised as a threat. The following resulting hypothesis is posited:

(H2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving (PMCEQ-2), and Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) will correlate positively with adaptive coping.

Finally, perceived stress is the extent to which a stressor is appraised as being stressful and is postulated to be an outcome of both primary and secondary appraisal processes (Lazarus, 1999). The PMCEQ traits, although theorised to act at differential levels of the appraisal processes, should all foster a positive challenge perception of stressors and hence prevent (excessive) stress perception. Therefore the following hypothesis is posited:

(H3) All three metacognitive and meta-emotional traits (PMCEQ-1, PMCEQ-2, and PMCEQ-3) will correlate negatively with perceived stress.

Study 3 (Chapter 4) provided evidence that maladaptive metacognitive traits as measured by the MCQ-30 (Wells and Cartwright-Hatton, 2004) have weak to strong negative correlations with adaptive metacognitive traits as measured by the

PMCEQ and hence are potential confounders of the hypothesised relationship. Therefore the predominant aim of the present study is to test the three derived research hypotheses while controlling for maladaptive metacognition.

5.3.4. Aims and Approach

Maladaptive metacognitive traits, conceptualised within Wells and Matthews' (1994, 1996) S-REF model and measured by means of the five factors of the MCQ-30, are potential confounders of the predicted relationships stated in the three hypotheses under investigation. The core aim of this study is to test the research hypotheses regarding the three positive metacognitive and meta-emotional traits as measured by PMCEQ-1, PMCEQ-2 and PMCEQ-3 while simultaneously controlling for the five maladaptive metacognitive traits assessed by the MCQ-30. Therefore the study aims to examine the potential contributions of the PMCEQ factors over and beyond possible effects of the MCQ-30 in terms of the three outcome variables maladaptive coping, adaptive coping, and perceived stress. The linear model to be tested comprises the three hypotheses outlined in the previous section. The investigation is based upon a three-step modeling approach described below in the Statistical Analysis section.

Correlation analysis revealed a high intercorrelation between PMCEQ-2 and PMCEQ-3 ($r = .687$, $p < .001$). In the light of inherent multicollineratity problems for SEM techniques and by virtue of the fact that both PMCEQ factors have the same hypothesised effects (hypotheses 2 and 3) they will be investigated as a single compound construct – henceforth referred to as PMCEQ-2* in this study Moreover, SEM revealed that utilising the two-factor PMCEQ construct (PMCEQ-1 and PMCEQ-2*) provided a slightly better fit than the original three-factor PMCEQ

construct (PMCEQ-1, PMCEQ-2 and PMCEQ-3). Overall fit-indices for both models are reported on page 179.

5.4. Method

5.4.1. Participants

A convenience sample of 212 worker and student participants was recruited comprising 108 (50.9%) students from various metropolitan universities, and 104 (49.1%) workers from various occupations. The age range was 18 to 70 years (M = 30.2, SD = 11.27); 61 (28.8%) were males, 151 (71.2%) were females. The ethnic background of the sample comprised 120 (56.6%) White, 36 (17.0%) Asian, and 28 (13.2%) Black participants; 28 (13.2%) were of other ethnicity.

5.4.2. Materials

Meta-Cognitions Questionnaire 30 (MCQ-30, Wells & Cartwright-Hatton, 2004). The MCQ-30 consists of the five following replicable factors: (1) Positive Beliefs about Worry, (2) Negative Beliefs about Worry concerning Uncontrollability and Danger, (3) Low Cognitive Confidence, (4) Beliefs about the Need to Control Thoughts, and (5) Cognitive Self-Consciousness. The MCQ-30 possesses good internal consistency and adequate to good construct and convergent validity (Wells & Cartwright-Hatton, 2004).

Positive Metacognitions and Meta-Emotions Questionnaire (PMCEQ; Beer & Moneta, 2010). This measure assesses individual differences in adaptive metacognitive and meta-emotional beliefs when facing challenging or unpredictable situations; development and validation of the PMCEQ has been described in Studies 2

and 3 within Chapters 3 and 4, respectively. The instrument consists of three replicable factors assessed by 18 items in total (with six items for each factor). The three factors measure the following three dimensions of positive metacognitions and positive meta-emotions: (1) Confidence in Extinguishing Perseverative Thoughts and Emotions (e.g. "If things go really badly I tend to brood and dwell on my negative thoughts"), (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction, and Mind-Setting for Problem-Solving (e.g. "I tend to rationally evaluate unpredictable situations rather than getting anxious"), and (3) Confidence in Setting Flexible and Feasible Hierarchies of Goals (e.g. "I find it fairly easy to identify important needs and goals for me"). Using a four-point scale respondents are asked to what extent they "generally agree" with the statements presented. The PMCEQ possesses good internal consistency with Cronbach's alpha coefficients of 0.85 for PMCEQ-1, 0.76 for PMCEQ-2, and 0.85 for PMCEQ-3; in addition the PMCEQ shows good construct and concurrent validity (Beer & Moneta, 2010).

Brief Coping Questionnaire (Brief COPE, Carver, 1997). The Brief COPE measures 14 different coping strategies with each strategy comprising two items and every item measured on a 4-point scale ranging from 1 (*I have not been doing this at all*) to 4 (*I have been doing this a lot*). The filler factor "humour" was not administered in this study resulting in a 26 items and 13 dimensions comprising modified version of the Brief COPE. Eight dimensions were of particular interest in this study (1) active coping, (2) planning and strategy use, (3) using functional support, (4) positive reframing, (5) denial, (6) substance use, (7) behavioural disengagement, and (8) self distraction. Coping strategies (1) to (4) represent adaptive or approach coping, whereas dimension (5) to (8) represent maladaptive or avoidance coping.

Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983). The 14 items comprising scale taps the degree to which respondents find their lives unpredictable, uncontrollable, and overloading. Respondents are asked to rate their perceived stress state over the course of the previous month; items are scored on a 5-point scale with higher scores representing higher levels of perceived stress. Examples of items include: "In the last month how often have you felt that you could not cope with all the things you had to do?" and "In the last month, how often have you been angered because of things that happened that were outside of your control?". Application of the PSS to a wide scope of settings has provided evidence for its relatedness to psychological distress responses, specifically symptoms of anxiety and depressive disorders (Chang, 1998). There is a vast amount of literature reporting good psychometric properties of the PSS (e.g. Mimura & Griffiths, 2004).

5.4.3. Statistical Analysis

Prior to describing the specific Structural Equation (SEM) modeling approach in this Study 4, Part A, three main arguments for using SEM rather than the second best alternative of Path Analysis (PA) will be concisely outlined. These arguments also hold for the final Study 4, Part B (Chapter 6).

5.4.3.1. Arguments for conducting SEM

Compared to PA the chosen SEM approach, also utilised in the final Study 4, Part B, rests on more realistic assumptions. Following Pedhazur (1997) it can be summarised that:

1. PA relies on the restrictive assumption that variables are measured without error; this assumption is hardly ever met in applied settings, specifically in

non-experimental research. Therefore and in the light of the questionnaire-based survey research in this thesis SEM – explicitly taking measurement error into account – is superior to PA;

2. SEM conceptualises unobserved or latent variables by means of multiple indicators (whereas PA uses single indicators = variables). It is more realistic to assume that complex psychological constructs comprise multiple indicators, i.e. that "multiple indicators are necessary to capture the essence of such variables" (Pedhazur, 1997, p. 841). With regard to this thesis the aforementioned argument counts specifically for the constructs PMCEQ-2 and PMCEQ-3 – the factor names already imply and reveal their complex nature;
3. The formulation of recursive models (models with unidirectional causation) is unrealistic in many research areas. Moreover, interest in reciprocal causation may be the focus of research. Bi-directionality appears to be more realistic and of higher ecological validity in many applied settings, again specifically in non-experimental research.

5.4.3.2. *The specified three-step SEM approach*

The hypothesised relationships were tested using structural equation modeling (SEM) techniques (e.g. Kline, 1998) as implemented in LISREL 8.8 (Jöreskog & Sörbom, 1996). Within a three-step modeling approach Models 1 to 3 incorporated the same measurement model but distinct structural models. The three-step SEM approach allowed for investigating differential and "competing" effects of adaptive metacognitive and meta-emotional traits (assessed by PMCEQ-1 and PMCEQ-2*) and maladaptive metacognitive traits (assessed by the MCQ-30) on adaptive coping, maladaptive coping and stress perception.

The (identical) measurement model can be described as follows: The study constructs (dysfunctional metacognitions, positive metacognitions and positive meta-emotions, maladaptive coping, adaptive coping, and perceived stress) were defined as latent variables. The five dysfunctional metacognitive traits, measured by the five MCQ-30 subscales, were defined as indicators of the latent variable dysfunctional metacognitions. In terms of the PMCEQ a two-factor construct was used here on the grounds of the high intercorrelation between the two subscales PMCEQ-2 and PMCEQ-3 ($r = .687$, $p < .001$). As a resulting means to prevent potential multicollinearatity problems for the SEM approach, the two factors, PMCEQ-2 and PMCEQ-3, were merged into the new PMCEQ-2* for this study. This pragmatically driven approach can also be justified on theoretical and conceptual grounds: Both the original PMCEQ-2 and PMCEQ-3 (forming the single PMCEQ-2*) are hypothesised to promote adaptive coping. Most importantly, SEM analysis showed that utilising the aggregated PMCEQ-2* factor provided a better model fit in this Study than using the original PMCEQ-2 and PMCEQ-3 factors (see p. 179).

Item scores of the two resulting PMCEQ subscales (with PMCEQ-1 consisting of six items and PMCEQ-2* comprising 12 items) were defined as indicators of the two corresponding latent variables conceptualising Positive Metacognitions and Positive Meta-Emotions. The four functional subscales of the Brief COPE were defined as indicators of the latent variable Adaptive Coping (ADCOPE); the four dysfunctional subscales of the Brief COPE were defined as indicators of the latent variable Maladaptive Coping (MACOPE).

Indicators of the latent variable Perceived Stress (PSTRESS) were created using parceling as follows. First, a single-factor principal components' model was fitted to the items of the PSS. The scree-plot, indicating sufficiency of a single factor

solution, confirmed that the scale was unidimensional. Using the item factor pattern coefficients as a guide and following the "item-to-construct balance" method (e.g., Little, Cunningham, Shahar & Widaman, 2002) three parcels of the items measuring the latent variable perceived stress were then created.

In order to control for confounding effects of the MCQ-30 a three step modeling approach was utilised with the following structural models:

In Model 1 the following paths were specified: (a) paths from PMCEQ-1 to Maladaptive Coping (MACOPE) and to Perceived Stress (PSTRESS); (b) paths from PMCEQ-2* to Adaptive Coping (ADCOPE) and to Perceived Stress (PSTRESS). In order to control for potentially confounding effects of maladaptive metacognition the MCQ-30, defined by its five subscales as indicators, was just kept in the model with no paths specified towards any of the three outcome variables.

In Model 2 three paths from the MCQ-30 construct to the three outcome variables Adaptive Coping (ADCOPE), Maladaptive Coping (MACOPE), and Perceived Stress (PSTRESS) were specified. Here, controlling for adaptive metacognition and meta-emotion, PMCEQ-1 and PMCEQ-2* were merely kept in the model with no paths specified towards the outcome variables.

In the final Model 3 all paths of Model 1 and 2 were specified as described above with the exception of the path between MCQ-30 and ADCOPE which was non-significant in Model 2; i.e. Model 3 specified all the paths of Model 1 and all the paths of Model 2 that had turned out to be significant. Hence, the most relevant final Model 3 encompassed the following paths: (a) paths from PMCEQ-1 to Maladaptive Coping (MACOPE) and to Perceived Stress (PSTRESS); (2) paths from PMCEQ-2* to Adaptive Coping (ADCOPE) and to Perceived Stress (PSRESS); and (c) paths from the MCQ-30 to Maladaptive Coping (MACOPE) and to Perceived Stress (PSTRESS).

5.5. Results

5.5.1. Data Description

Descriptive statistics and Pearson product-moment correlation coefficients for all questionnaire variables are presented in Table 13. Reliability analyses of the utilised questionnaires show Cronbach's alpha coefficients being in line with previous studies.[22] PMCEQ-1 and PMCEQ-2* are highly reliable with Cronbach's alpha coefficients of .835 and .881, respectively. In accordance with the predictions PMCEQ-1 was negatively correlated with both Maladaptive Coping and Perceived Stress. Also in line with the predictions PMCEQ-2* was positively correlated with adaptive coping and showed the expected negative correlation with maladaptive coping and perceived stress.

Above and beyond bivariate correlation analysis the hypothesised relationships between the study variables were tested simultaneously using SEM techniques. Results reflecting the underlying processes are subsequently outlined.

[22] The only exception was the constructed maladaptive coping subscale with low Cronbach's alpha.

Table 13: *Means, standard deviations, Cronbach's alpha coefficients and intercorrelations of Study 4, Part A variables.*

Note: n=212*$p<0.05$; **$p<0.01$	***M***	***SD***	**Scale**	**Scores**	**Alpha**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**	**12.**
1. PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions	16.8	4.3	6-24	6-24	.84	.43**	.42**	.47**	-.52**	-52**	-.36**	-.39**	-.45**	.09	-.39**	-.60**
2.PMCEQ-2 – Confidence in Interpreting Own Emotions, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving	14.9	3.8	6-24	6-24	.76	-	.69**	.91**	-.12*	-.23**	.01	-.01	-.21**	.30**	-.20**	-.47**
3. PMCEQ-3 – Confidence in Setting Flexible and Feasible Hierarchies of Goals	16.9	4.0	6-24	7-24	.86	-	-	.92**	-.18**	-.26**	01	-.07	-.23**	.31**	-.24**	-.48**
4. PMCEQ-2* - Combined PMCEQ-2 and PMCEQ-3	31.7	7.1	12-48	15-48	.88	-	-	-	-.17**	-.27**	.01	-.05	-.24**	.33**	-24**	-.52**
5. MCQ-1 – Positive Beliefs about Worry	10.9	4.3	6-24	6-23	.69	-	-	-	-	.76**	.71**	.75**	.71**	.03	.28**	.44**
6. MCQ-2 – Negative Beliefs about Worry concerning Uncontrollability and Danger	12.1	4.9	6-24	6-24	.67	-	-	-	-	-	.69**	.72**	.79**	-.01	.29**	.43**
7. MCQ-3 – Low Cognitive Self Confidence	10.1	3.9	6-24	6-24	.57	-	-	-	-	-	-	.73**	.65**	.16**	.23**	.31**
8. MCQ-4 – Beliefs about the Need to Control Thoughts	11.6	4.4	6-24	6-24	.62	-	-	-	-	-	-	-	.71**	.15*	.17**	.35**
9. MCQ-5 – Cognitive Self-Consciousness	15.5	4.4	6-24	6-24	.68	-	-	-	-	-	-	-	-	.03	.20**	.39**
10. ADCOPE – Adaptive Coping	22.0	5.1	8-32	8-32	.75	-	-	-	-	-	-	-	-	-	-.03	-.13*

	M	*SD*	Scale	Scores	Alpha	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
11. MACOPE – Maladaptive Coping	12.7	3.6	8-32	8-25	.65	-	-	-	-	-	-	-	-	-	-	.43**
12. PSS – Perceived Stress	25.1	7.8	0-56	8-51	.82	-	-	-	-	-	-	-	-	-	-	-

5.5.2. Structural Equation Models

The relative contributions of the dysfunctional metacognition construct (MCQ-30), and the two positive metacognitions and positive meta-emotions dimensions (PMCEQ-1 and PMCEQ-2*) on Adaptive Coping (approach coping) and on Maladaptive Coping (avoidance coping) as well as on Perceived Stress were simultaneously examined using structural equation modeling [SEM] (e.g. Kline, 1998). Models 1 and 2 and the final Model 3 with its standardised path coefficients are depicted in Figure 4 (1), (2) and (3).

The overall fit of all three SEM models was assessed by the four commonly used goodness-of-fit indices Chi-Square, Goodness of Fit Index (GFI) Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) using the software LISREL 8.80 (Jöreskog & Sörbom, 1996).

The Chi-Square assesses the overall fit of the model by estimating the discrepancies between the observed covariance matrices and those implied by the model. Adequacy of a model is indicated by a non-significant Chi-Square, provided there is sufficient statistical power. Frequently, models show significant Chi-Square indices, hence they do not fit in a strict sense, but adequate to good fit is still supported by alternative non-Chi-Square-based indices. Furthermore due to its sensitivity to sample size and its tendency to inflate Type-1 error (Bollen, 1989; Cohen, 1988) researchers take alternative goodness-of-fit measures into account to evaluate model fit. The GFI is an absolute fit index, ranging from 0 to 1, with values close to 1 being indicative of good fit (Hu & Bentler, 1999). The CFI measures the model fit compared to a null model. The index ranges from 0 to 1 with values in the interval from .90 to .95 indicating appropriate fit and values above .95 reflecting good fit (Hu & Bentler, 1999). The RMSEA is a measure of discrepancy between the model

and the data, with a value below .05 indicating good fit and values in the range from .05 and .08 indicating adequate fit (Hu & Bentler, 1999).

All three models did not fit in a strict statistical sense based merely upon the Chi-Square; however, the three non-Chi-Square-based statistics indicated adequate to good fit of the models.

Model 1 did not fit in a strict statistical sense (Chi-Square = 884.75, $df = 520$, $p < .001$), but the other goodness of fit indices revealed that the fit of the model was close (CFI = .96; RMSEA = .058; p of test of close fit < .059) (see the above mentioned standards of evaluation by Hu and Bentler, 1999). Figure 4 (1) shows the path diagram with estimated standardised path coefficients. PMCEQ-1 predicted, with negative and strong coefficients, maladaptive coping and perceived stress, supporting hypothesis 1 and hypothesis 3. PMCEQ-2* predicted, with positive and moderate coefficient, adaptive coping, supporting hypothesis 2, and, with negative and weak coefficient, perceived stress, supporting hypothesis 3. All hypothesised paths were significant at the $p < .001$ level. In all, the findings support hypotheses 1-3 without controlling for maladaptive metacognition.

Model 2 had satisfactory but not close fit (Chi-Square = 1059.46, $df = 521$, $p < .001$; CFI = .95; RMSEA = .070; p of test of close fit < .010). Figure 4 (2) shows the path diagram with estimated standardised path coefficients. MCQ-30 predicted, with positive and fair coefficients that were significant at the $p < .001$ level, maladaptive coping and perceived stress, but did not predict adaptive coping. In all, the findings indicate that maladaptive metacognition is an explanatory factor in competition with adaptive metacognition for hypotheses 1 and 3, but it is not a competitor for hypothesis 2.

Model 3 had satisfactory but not close fit (Chi-Square = 880.22, $df = 518$, $p < .001$; CFI = .96; RMSEA = .058; p of test of close fit < .031). Model 3 fitted better than Model 2 (Chi Square Change = 179.24, $df = 3$, $p < .001$) indicating that adaptive metacognition explains variance in the outcome variables above and beyond the variance accounted for by maladaptive metacognition. Model 3 did not fit better than Model 1 (Chi Square Change = 4.53, $df = 2$, $p < .104$) indicating that maladaptive metacognition does not explain variance in the outcome variables above and beyond the variance accounted for by adaptive metacognition. Figure 4 (3) shows the path diagram with estimated standardised path coefficients. All the hypothesised paths from PMCEQ-1 and PMCEQ-2* to coping and perceived stress were significant at the $p < .001$ level in the hypothesised direction. Both paths from MCQ-30 to maladaptive coping and perceived stress, which were significant in Model 2, were not significant in the best fitting Model 3. In all, the findings support hypotheses 1-3 controlling for maladaptive metacognition.

Compared to the aforementioned and optimal Model 3 the *alternatively tested Model 3* with the original three-factor PMCEQ construct (PMCEQ-1, PMCEQ-2 and PMCEQ-3) fitted slightly worse (Chi-Square Change = -44.96, df = -5).

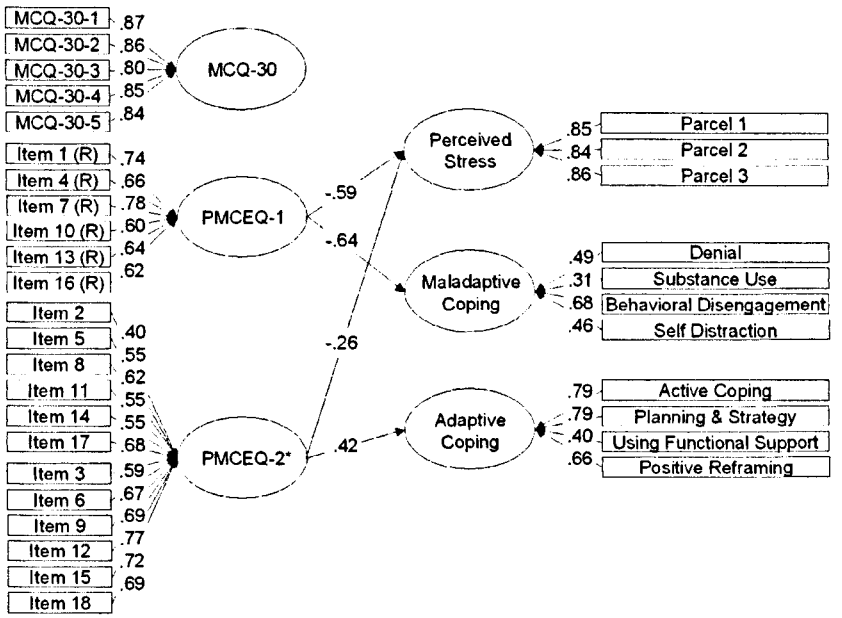
The conceptually most relevant and statistically best fitting Model 3 produced in LISREL is depicted in Figure 4 (3). The hypothesised relationships among the constructs (latent variables) are shown in the structural part of the model. The standardised path coefficients supported all three hypotheses in terms of the PMCEQ: (1) PMCEQ-1 was negatively predictive of Maladaptive Coping (β = -.571); (2) PMCEQ-2* (the combined PMCEQ-2/PMCEQ-3) was positively predictive of Adaptive Coping (β = .419) and (3) PMCEQ-1 and PMCEQ-2* were both negatively predictive of Perceived Stress (β = -.497 and β = -.290, respectively).

Interestingly, within the final and optimal Model 3, the MCQ-30 construct was not significantly predictive of any of the three outcome measures.

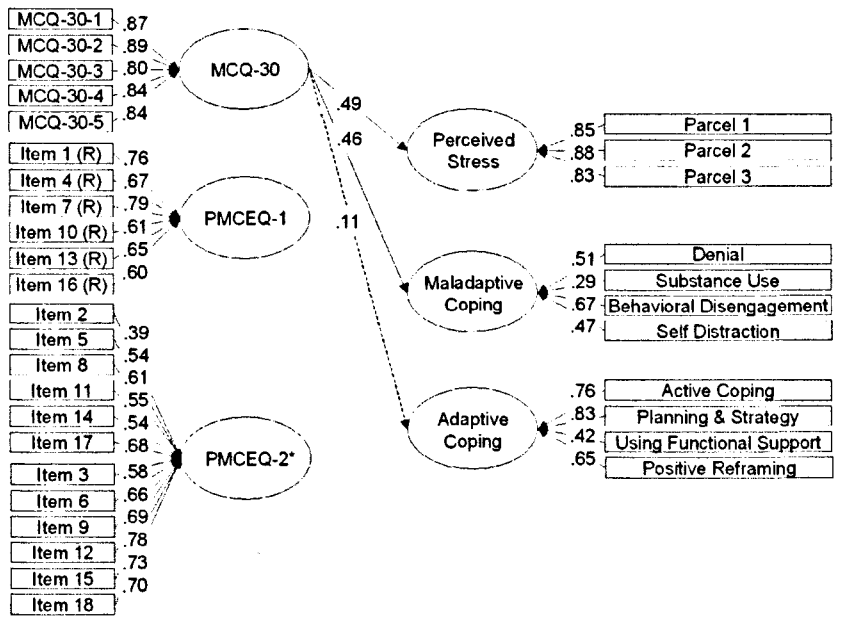
Figure 4

Path diagram, with standardised path coefficients, of the estimated SEM models of coping strategies and perceived stress as a function of (1) adaptive metacognitions (and meta-emotions) as measured by the PMCEQ, (2) maladaptive metacognitions as measured by the MCQ-30, and (3) adaptive and maladaptive metacognitions

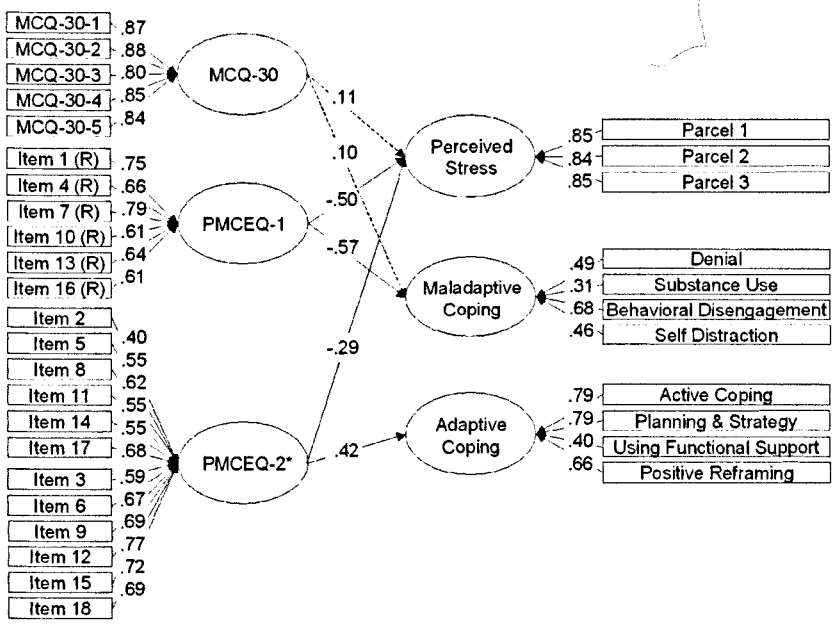
(1)



(2)



(3)


MCQ-30-1
MCQ-30-2
MCQ-30-3
MCQ-30-4
MCQ-30-5
.87
.88
.80
.85
.84
MCQ-30
Item 1 (R)
Item 4 (R)
Item 7 (R)
Item 10 (R)
Item 13 (R)
Item 16 (R)
.75
.66
.79
.61
.64
.61
PMCEQ-1
Item 2
Item 5
Item 8
Item 11
Item 14
Item 17
Item 3
Item 6
Item 9
Item 12
Item 15
Item 18
.40
.55
.62
.55
.55
.68
.59
.67
.69
.77
.72
.69
PMCEQ-2*
.11
.10
-.50
-.57
-.29
.42
Perceived Stress
Maladaptive Coping
Adaptive Coping
.85
.84
.85
Parcel 1
Parcel 2
Parcel 3
.49
.31
.68
.46
Denial
Substance Use
Behavioral Disengagement
Self Distraction
.79
.79
.40
.66
Active Coping
Planning & Strategy
Using Functional Support
Positive Reframing

5.6. *Discussion*

Until now no research has been conducted to investigate the effects of positive metacognitions and positive meta-emotions on adaptive (approach) coping, maladaptive (avoidance) coping, and perceived stress.

In this study a linear model was tested which hypothesised that the novel construct of positive metacognitions and meta-emotions (PMCEQ) would be positively correlated with Adaptive Coping dispositions and negatively correlated with Maladaptive Coping strategies. It was also hypothesised that both – PMCEQ-1 and PMCEQ-2* – subscales would lessen stress perception.

The findings from SEM supported all three hypotheses and the model as a whole. In particular, the perseveration and worry extinguishing PMCEQ-1 was negatively predictive of Maladaptive Coping strategies (H1), whereas the problem-focussed and agentic PMCEQ-2* was positively predictive of Adaptive Coping strategies (H2); both PMCEQ-1 and PMCEQ-2* negatively predicted Perceived Stress (H3). All three hypotheses were supported controlling for maladaptive metacognition measured as a single trait using the MCQ-30.

5.6.1 *Discriminant effects of adaptive metacognitive and meta-emotional traits*

The discriminant effects – with PMCEQ-1 preventing avoidance coping, and PMCEQ-2* fostering approach coping – are in line with expectations in light of what these novel psychological constructs measure. PMCEQ-1 taps the core, however inverse, construct of Wells and Matthews' (1994, 1996) S-REF as confidence in extinguishing ruminative and perseverative thoughts and emotions which prevents the S-REF from becoming hyperactive and perseverative. The ability to prevent perseveration and rumination cycles appears to protect against engaging in

maladaptive avoidance coping strategies. PMCEQ-2* refers to the confidence of correctly interpreting one's own emotions, followed by mind-setting for problem-solving and also comprises subsequent confidence in setting flexible and attainable hierarchies of goals. The items capturing these confidence domains reflect agentic problem solving and focussed goal setting which corresponds with active and strategic approach coping strategies. In all, results in conjunction with the item content of the PMCEQ subscales suggest that the three subscales assess a process from quickly shifting from perseveration and worry (making emotion-focussed coping less likely) to agentic problem focus and goal setting. This transition or shift from the dysfunctional object mode to the functional metacognitive mode appears to decrease the likelihood of avoidance coping and increase the likelihood of overall superior approach coping.

The study provides evidence that the positive metacognitive and positive meta-emotional dimensions of the PMCEQ contribute to functional coping strategies and decreased levels of perceived stress. In line with Wells' (2009) assertion that many coping behaviours are metacognitive in nature the study shows that this tenet can also be applied to adaptive metacognitions and adaptive meta-emotions.

Interestingly, the linear model revealed no significant path coefficients between the MCQ-30 constructs and any of the three outcome variable. The lack of significant MCQ-30 effects in the light of significant PMCEQ effects supports the assumption that the absence of maladaptive metacognitions is necessary but not sufficient for functionally dealing with challenging and/or unpredictable situations. Adaptive and functional coping responses as well as decreased stress responses to such challenge or unpredictability require explicitly the presence of positive

metacognitive and meta-emotional traits as measured by the PMCEQ and subsequent activation of problem and goal focussed behaviour.

5.6.2. Specific study limitations and directions for future research

The finding that maladaptive metacognition as measured by the MCQ-30 was no longer a significant predictor of maladaptive coping and perceived stress when entered as a predictor together with the adaptive metacognitive traits should be interpreted cautiously for two reasons. First, the internal consistency of the MCQ-30 subscales in this study was low, and hence may have caused attenuation of the path coefficients of the latent variable of maladaptive metacognition. Second, due to the relatively small sample size, maladaptive metacognition was modelled as a single construct. However, it is likely that specific MCQ-30 subscales have effects that can complement those of the PMCEQ subscales. Therefore, future research should investigate the effects of distinct maladaptive metacognitive traits as represented by the five MCQ-30 subscales. Therefore, future research should identify additional explanatory factors for adaptive coping as follows.

Provided future data sets would show intercorrelation patterns between the PMCEQ and MCQ subscales similar to those in this study (see Table 12) effects of the following specific MCQ subscales are of interest: MCQ-1 (Positive Beliefs about Worry), MCQ-2 (Negative Beliefs about Worry concerning Uncontrollability and Danger) and MCQ-5 (Cognitive Self-Consciousness). These three MCQ factors were most highly correlated with the three PMCEQ factors and therefore their distinct potential effects on coping strategies and stress perception would shed more light on further discriminant effects of adaptive versus maladaptive metacognitions

The model explained more variance in maladaptive coping than in adaptive coping. This finding is open to two complementary interpretations. First, it is possible that the recently developed PMCEQ is incomplete in that it does not measure additional adaptive metacognitive traits that foster adaptive coping. Second, it is likely that adaptive coping strategies have a more complex, multifactorial aetiology than maladaptive coping strategies.

Cognitive appraisal and implementation of a coping strategy depend on three factors: the typology of the stressful situation, the environment, and inter-personal factors (Kaplan, 1996). This study ignored the typology of everyday life stress experienced by the study participants, and hence the model of this study is generic. It is likely that adaptive and maladaptive metacognitive traits exert different effects across social contexts, such as achievement and interpersonal relations. Therefore, future research should replicate and extend the model of this study on specific types of stressors.

Despite its limitations, this preliminary study establishes links between the key personality traits of adaptive and maladaptive metacognition, the strategies people use to cope with everyday life stress, and their level of perceived stress. The findings support Wells and Matthews' (1994, 1996) theoretical claim that maladaptive metacognition drives coping, extend it to adaptive metacognition, and provide suggestions on how to further investigate the metacognition-coping link.

5.6.3. *Directions for potential applications*

The study can inform applications in terms of potential interventions. In (inverse) analogy to metacognitive therapy for psychological disorders (MCT, Wells, 2009) the PMCEQ confidence factors might be amenable to some cultivation via

therapeutic or coaching interventions. Such interventions would foster beneficial approach coping strategies (PMCEQ-2*) and reduce the engagement in dysfunctional avoidance strategies (PMCEQ-1). In addition to their advantageous impacts on coping strategies both PMCEQ constructs exert health-protective effects by decreasing the levels of stress perception. Future research should expand the rational by investigating the effects of positive metacognitions and meta-emotions on measures of psychological well-being and, in the long term, on life satisfaction measures. Potential positive metacognitive interventions would ideally be assessed by utilising randomised controlled trials (RCT) and longitudinal study designs.

5.7. *Outlook on the final Study 4, Part B in Chapter 6*

Study 4, Part A has provided evidence that both PMCEQ-1 and PMCEQ-2* contribute to statistically significant reductions in perceived stress levels. In contrast the relationship between MCQ-30 and perceived stress was, albeit positive as expected, non-significant. Using the same sample as in Study 4, Part A the final Study 4, Part B will extend the focus by explicitly investigating the effects of both MCQ-30 and PMCEQ on anxiety and depression as measures of negative emotions or negative affective states. It is hypothesised that PMCEQ factors will be negatively correlated with the negative emotions of anxiety and depression, whereas the MCQ-30 construct will be negatively correlated with anxiety and depression.

Chapter 6

Study 4, Part B

Effects of Positive Metacognitions and Positive Meta-Emotions on Negative Emotions

6.1. Scope and rationale

Study 4, Part A provided evidence that both factors PMCEQ-1 and PMCEQ-2* (the combined PMCEQ-2 and PMCEQ-3) were negatively predictive of perceived stress. Perceived stress can be regarded as a proxy and short-term measure of psychological distress, potentially leading to state negative emotions of anxiety and depression. On these grounds, Study 4, Part B extends the investigation by using state negative emotions of anxiety and depression as outcome measures.

Extending the view beyond the scope of the previous Study 4 Part A by investigating the effects of metacognitions and meta-emotions on anxiety and depression is furthermore justified in light of convincing empirical evidence that prolonged and sensitised stress perception often triggers the onset of anxiety disorders and/or depressive episodes. The rationale for investigating both anxiety and depression is grounded in their high co-occurrence, i.e. in the comorbidity between anxiety and depression. The main objective here is to examine if and which of the PMCEQ factors will predict low scores of anxiety and depression and compare and contrast the PMCEQ effects with the inverse effects of the MCQ construct.

6.2. *Executive Summary*

The present study explores the linear relationships between maladaptive metacognitions, adaptive metacognitions and meta-emotions as independent variables and anxiety and depression as outcome measures. The same mixed sample of 212 worker and student participants utilised in Study 4, Part A completed the following battery of questionnaires: Meta-Cognitions Questionnaire 30 (MCQ-30), Positive Metacognitions and Positive Meta-Emotions Questionnaire (PMCEQ) and Hospital Anxiety and Depression Scale (HADS). Again a cross-sectional design was employed and data analysis comprised correlation analysis and subsequent structural equation modeling (SEM) analyses. PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions – was negatively predictive of anxiety and depression. PMCEQ-2 – Confidence in Interpreting Own Emotions, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving – also negatively predicted anxiety and depression but to a far lesser extent than PMCEQ-1. This can be explained in the light of what these factors measure: PMCEQ-1 reflects an inverse construct of S-REF perseveration and rumination as assessed by the MCQ-30, specifically by the MCQ-2 subscale Negative Beliefs about Worry concerning Uncontrollability and Danger. Above and beyond the perseveration inhibiting PMCEQ-1, the PMCEQ-2 factor also incorporates problem-focussed or agentic properties. The ability to quickly terminate worry and rumination cycles as assessed by the PMCEQ-1 items has by nature more pronounced decreasing effects on anxiety and depression than the agency-related constructs as measured by some of the PMCEQ-2 items. This argument was further supported by the finding that the even more agency-related PMCEQ-3 factor – Confidence in Setting Flexible and Feasible Hierarchies of Goals – was a non-significant predictor of both anxiety and depression in the SEM model. As expected

and in line with a plethora of previous studies the MCQ-30 construct, comprising the five MCQ-30 subscales utilised as indicators in this study, was strongly and negatively predictive of both anxiety and depression. Comparing the relative contribution of PMCEQ-1 and MCQ-30 to anxiety and depression in absolute terms the predictive power of the MCQ was slightly higher than that of the PMCEQ-1 subscale.

The study findings suggest that absence of psychological distress, here assessed by anxiety and depression, not only requires the absence of maladaptive metacognitive traits as assessed by the MCQ-30 but also the presence of functional metacognitions and adaptive meta-emotions as measured by the PMCEQ. Compared to the MCQ-30 the PMCEQ instrument covers a more encompassing range of psychological dimensions by assessing problem-focus and goal-setting as positive traits beyond the worry- and rumination-related maladaptive traits measured by the MCQ-30. It is therefore concluded that potential self-empowering coaching applications of the PMCEQ should be wider than the corresponding, however inverse and clinica, ones of the MCQ-30. This has already been reflected in the previous Study 4, Part A with PMCEQ factors having significant negative effects on maladaptive coping and perceived stress and significant positive effects on adaptive coping.

In terms of interventions it is argued that potential clinical and coaching interventions aimed at development and cultivation of PMCEQ-1 "skills" would reduce anxiety and depression. Cultivation of the agentic psychological constructs assessed by PMCEQ-2 and PMCEQ-3 is hypothesised to increase problem-solving, self-determination and goal-setting. This in turn should have enhancing impacts on academic and professional performance measures. It is also suggested that PMCEQ-1

better informs clinical, i.e. psychotherapeutical, interventions whereas PMCEQ-2 and PMCEQ-3 could be at the focus of self-empowering coaching practices.

Keywords: Perceived Stress; Anxiety Disorders; Depressive Disorders; Negative Emotions; Positive Metacognition; Positive Meta-Emotion.

6.3. Introduction

Wells and Matthews' (1994, 1996) S-REF model – described in detail in Chapter 1.2 – has stimulated clinical and experimental research on different dimensions of metacognitions in generalised anxiety disorder (GAD), major depressive disorder (MDD) and other psychological or mental disorders, e.g. obsessive-compulsive disorder (OCD) and substance-related disorders. GAD and MDD have high life time prevalence rates. In terms of MDD the (2000) prognosis of the American Psychiatric Society estimates that 5 to 12 per cent of males and 10 to 25 per cent of females develop at least one major depressive episode at some point in their lives. In addition the comorbidity rate between GAD and MDD is high: Watson, Weber, Assenheimer & Clark (2005) report correlation coefficients between anxiety disorders and depressive disorders in the range of 0.45 to 0.75. Both disorders have debilitating effects on quality of life and also imply high costs for mental health settings and in terms of decreased work productivity and absenteeism. In addition prevalence rates for both GAD and MDD have steadily been increasing and according to WHO's (1996) prediction Major Depressive Disorder (MDD) will represent the most prevalent disease cluster by 2020. In the light of the current economic crisis which implies high job insecurity with potentially stress-increasing effects it can be hypothesised that individuals will become more vulnerable to anxiety-related disorders, specifically GAD and comorbid depressive disorders, specifically MDD.

From a cognitive perspective metacognitive beliefs have been found to be a crucial aetiological agent of both anxiety and depression. Wells' (2000) conceptualises metacognitive beliefs as being "concerned with the interpretation of one's own cognition" (p. 34). It will be shown that two types of dysfunctional metacognitive beliefs – positive and negative ones – play a fundamental role in the onset and maintenance of anxiety disorders and depressive disorders.

This section will first outline metacognitive models and corresponding research evidence specifically with regard to anxiety disorders and depressive disorders and then infer the resulting framework for the contribution of the opposite type of metacognitions and meta-emotions, i.e. adaptive ones as measured by the PMCEQ, as potential protectors against stat negative emotions. The core aim is to investigate the differential effects of MCQ factors and PMCEQ factors on the same outcome measures (anxiety and depression).

6.3.1. Characterisation, metacognitive theory and research of anxiety disorders

There is a plethora of disorders grouped under the umbrella term anxiety disorders, e.g. generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), post-traumatic stress disorder (PTSD) and phobias. Since research evidence suggests that phobias are predominantly learned by means of classical or operant conditioning and as PTSD is the result of severe and highly traumatic events, the focus here will be on GAD which also has the highest prevalence rate. The predominant characteristic of GAD, the most frequently diagnosed anxiety disorder, is unspecified or free-floating anxiety with persistent levels of anxiety or worry in many life domains and over many life circumstances. The chronic disorder implies severe social and functional impairments with pronounced risks of deteriorations in social

and occupational respects. Due to its unspecified nature sufferers from GAD are unable to identify the genuine source of their fear, resulting in maintenance of high anxiety levels and, frequently, in the experiencing even more acute anxious episodes. It is estimated that there is comorbidity with MDD in over two-thirds of GAD (Sue, Sue & Sue, 2006).[23]

From an encompassing and holistic biopsychosocial perspective the aetiology of generalised anxiety disorder (GAD) is threefold and comprises biological vulnerability (diathesis), psychological factors and social factors. Psychological factors can be further broken down, e.g. into cognitive, behavioural and even psychodynamic ones. The focus within this thesis lies in the cognitive domain; the specific mechanisms within the S-REF model can be summarised as follows. Both positive and negative beliefs about worry, as measured by corresponding MCQ-1 and MCQ-2 subscale items, contribute to excessive and perseverative S-REF activity which then predominantly operates in the disadvantageous object mode characterised by dysfunctional and negatively biased attention, threat monitoring and maladaptive and inflexible coping. Cartwright-Hatton and Wells (1997) and Wells and Carter (2001) provided empirical evidence that GAD-diagnosed patients hold significantly stronger negative beliefs about worry (measured by MCQ-2) than non-patient controls. MCQ-30 items for such negative metacognitive beliefs about worry concerning uncontrollability and danger, measured by the MCQ-2 subscale, are "When I start worrying, I cannot stop" and "My worrying could make me go mad". More recent clinical evidence has been provided by Sica, Steketee, Ghisi, Chiri and Franceschini's (2007) study which found that such negative metacognitive beliefs about worry strongly predict GAD and OCD.

[23] DSM-IV criteria for GAD are: Excessive anxiety and apprehensions over a number of life circumstances for a period of at least six months, difficulty in controlling the worry, and general anxiety symptoms, e.g. restlessness, vigilance and difficulty concentrating.

In addition empirical evidence has shown that positive beliefs about worry (measured by MCQ-1), i.e. beliefs that involve positive thoughts and attributions of worry, contribute to the onset and maintenance of GAD and other anxiety-related disorders. MCQ-1 example items that tap such positive metacognitive beliefs are "Worrying helps me to avoid problems in the future" and Worrying helps me to cope" and are measured by the MCQ-1 subscale.

In his (1995) metacognitive theory Wells proposed that positive metacognitive beliefs about worry (MCQ-1) and negative beliefs about worry (MCQ-2) significantly contribute to the maintenance of intermittent episodes of worry cycles which are the pronounced manifestations of GAD.

Within Study 4, Part A (Chapter 5) Wells' (2009) assertion that coping behaviours are metacognitive in nature was highlighted and study results supported the hypothesis that metacognitions impact on both adaptive and maladaptive coping strategies. With regards to GAD and also MDD Wells' (2000, 2009) metacognitive theory of emotional disorders conceptualises maladaptive metacognitive beliefs as antecedent factors in the initiation of maladaptive coping and as being central to maladaptive coping strategy selection (see also Fermie, Spada, Nikcevic, Georgiou & Moneta, 2009).

6.3.2. Characterisation, metacognitive theory and research of depressive disorders

Depressive disorders are the predominant mental disorders affecting an estimated 340 million people worldwide with increasing tendency (Lyddy, 2000). In Britain, in 1998, approximately nine million people sought help from their GPs for depression-related complaints (British Psychological Society, 2000). In addition to the high prevalence rates of depressive disorders two recent developments within Western

societies are of particular concern. There is not only a trend of decreasing age of onset (Hammen, 1997) but depressive disorders also incorporate high risks of recurrence. Severely depressed individuals suffer from an average of four depressive episodes, each lasting typically for three to five months (Judd, 1997). While the debilitating effects of MDD are readily apparent[24], several studies have provided evidence that even relatively mild forms of depression (e.g. dysthymic disorders) often induce impairing consequences in terms of professional performance, economic status and quality of interpersonal relationships. Hence, even mildly, not clinically, depressed individuals may display impaired functioning (Hammen, 1997). An estimated 12 per cent of these milder types of depression display chronic patterns with a duration of more than two years (Davison, Neale and Kring, 2003).

Depressive disorders are subsumed under mood or affective disorders. With regard to unipolar depression there is a distinction between major depressive disorders (MDD) and dysthymic disorders. The formal DSM-IV diagnosis of MDD requires either depressed mood or significant loss of interest and pleasure for a period of at least two weeks and four additional symptoms such as sleep and appetite disturbances, loss of energy, feeling of worthlessness, difficulty in concentrating and even suicidal thoughts (American Psychiatric Association, 2000). Dysthymic disorder encompasses chronically depressed mood lasting most of the time for at least two years (Gotlib and Hammen, 1992) requiring only three of the mentioned symptoms but excluding suicidality (Davison et al., 2003).

The diagnostic criteria imply a distinction between vegetative (somatic) and mood symptoms of depression. Whereas vegetative symptoms of depression (e.g. weakness, fatigue and gastrointestinal problems) are predominant in non-Western

[24] The most severe effect of MDD and other mood disorders is suicide; Culbertson (1997) estimates that about 10% of those suffering from affective disorder commit suicide.

cultures, mood symptoms (e.g. feelings of extreme sadness and worthlessness with the common consequence of withdrawal) seem to be predominant in Western cultures (Gleitman, Fridlund and Reisberg, 2004).

In the light of a holistic biopsychosocial approach the aetiology of major depressive disorder (MDD) is threefold and comprises biological vulnerability (diathesis) and psychological and social factors. The focus within this thesis lies in the cognitive domain; the specific mechanisms within the S-REF model can be summarised as follows. Whereas positive and negative beliefs about worry play a crucial role in GAD, positive beliefs about rumination have been found to be positively associated with MDD. In reference to Just and Alloy (1997) Sue, Sue and Sue (2006) put it: "In particular, ruminative responses – in which one dwells on how bad one feels, considers the possible consequences of one's symptoms, and expresses to others how bad one feels – are believed to prolong and intensify depressive moods and possibly bring about the onset of depressive episodes" (p. 370). In Wells and Matthews' terminology rumination is the explicit manifestation of prolonged, excessive and perseverative S-REF activity with its previously outlined dysfunctional impacts not only on mood but also on attention, coping and even the formulation of inappropriate goals.

Positive metacognitive beliefs about rumination are depicted in Papageorgiou and Wells' (2001) Positive Beliefs about Rumination Scale (PBRS), e.g. "I ruminate to try to find an answer to my problems" or "I need to ruminate about this problem to prevent future mistakes". In their subsequent (2001) study Papageorgiou and Wells administered the PBRS and found a significant positive correlation between rumination and MDD. Using a much larger sample size Watkins and Moulds (2005)

replicated and extended Papageorgiou and Wells' (2001) study approach and also found that rumination results in significantly elevated symptoms of MDD.

In their (2008) review article *Metacognition in Depressive and Anxiety Disorders: Current Directions* Corcoran and Segal emphasise the recent interest in investigating whether the process of relating thoughts or metacognitive awareness is linked to or even predictive of depressive disorders. They conceptualise metacognitive awareness (psychological acceptance or mindfulness) as the "degree to which individuals adopt a 'decentred set' with respect to their thoughts and feelings" (p. 37). It is argued here that this conceptualisation reflects, in Wells and Matthew's (1996, 1994) taxonomy, the functional and adaptive metacognitive mode. As opposed to the object mode, only being adaptive in genuinely threatening situations, the metacognitive mode captures the interpretation of thoughts not as facts but as mental "events" or cues necessitating subsequent evaluations. Interestingly and in contrast to depressive disorders, metacognitive awareness appears to play a less pronounced role in anxiety disorders.

Somewhat surprisingly, both depression and anxiety (subsequently referred to as negative emotions) have been explained predominantly by MCQ-30 factors, i.e. without taking depressive rumination and metacognitive awareness into account in terms of depression. A (2007) study by Spada, Nikčević, Moneta and Wells showed that positive and negative metacognitive beliefs about worry (MCQ-1 and MCQ-2), low cognitive confidence in memory (MCQ-3) and the need to control thoughts (MCQ-4) significantly contributed to the relationship between perceived stress and negative emotions.[25] The potential mechanisms underlying the findings were explained by inferring that negative beliefs about worry (MCQ-2) and beliefs about

[25] In addition to the direct effects they found that the MCQ-30 factors partially mediated the relationship between perceived stress and negative emotion; furthermore the maladaptive MCQ-30 factors moderated the relationship between perceived stress and negative emotions.

the need to control thoughts (MCQ-4) are likely to foster persistent and negative interpretations of experience such that perceived stress results in more pronounced negative emotional outcomes. Similarly, low cognitive confidence (MCQ-3) is also likely to contribute to an increased transmission of perceived stress by potentially reducing the awareness and choice of effective coping strategies.

Concluding sections 6.3.1 and 6.3.2, in recent years there has been increasing empirical evidence for the detrimental effects of positive and negative metacognitive beliefs significantly contributing to the onset and maintenance of anxiety and depressive disorders. In terms of anxiety disorders worry represents the most relevant dysfunctional coping strategy resulting in perseverative object mode S-REF activity. With regards to depressive disorders depressive rumination and lack of metacognitive awareness or mindfulness exerts analogous prolonged S-REF hyperactivity. However, some studies have provided evidence that depression can be accounted for purely by the dysfunctional MCQ-30 constructs. The latter can be explained by means of the comorbidity between depression and anxiety. It appears, however, that holistic (meta)cognitive models of unipolar depression (MDD) would take worry-related MCQ-30 factors, depressive rumination and lack of or low levels of metacognitive awareness (mindfulness) into account. Most likely this view also holds for less severe but more chronic dysthymic disorders.

The next section will employ the inverse perspective by deriving hypothesised relationships and mechanisms between metacognitions and meta-emotions of a functional and adaptive nature (assessed by the PMCEQ) on mental well-being. In order to compare and contrast the contributions of dysfunctional and functional metacognitions within the following analysis the same outcome measures will be

utilised. This means that psychological well-being will be conceptualised as absence or extremely low levels of the negative emotions of anxiety and depression.

6.3.3 *Hypothesised effects of positive metacognitions and positive meta-emotions on state negative emotions*

Positive metacognitions, i.e. those of an adaptive and self-empowering nature, are at the heart of this thesis. Since their effects on adaptive self-regulation and negative emotions have not been investigated before, potential effects of these positive constructs can only be (inversely) inferred from the outlined existing theory and research of dysfunctional metacognitions. The three confidence constructs assessed by the PMCEQ are hypothesised to be negatively correlated with both Anxiety and Depression. In Study 4, Part A it was argued that specifically PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions – taps the reverse (or at least a capability to quickly terminate processes) of perseverative worry and rumination in the sense of Wells and Matthews' (1994, 1996) S-REF model. It is predicted that individuals with stable and positive metacognitive and meta-emotional traits would score low on the (negatively worded) PMCEQ-1 items, e.g. "If things go really badly I tend to brood and dwell on my negative thoughts" which explicitly addresses depressive rumination and "I tend to think that worrying thoughts might reflect the reality" which depicts the disadvantageous object mode. Based on these arguments it is hypothesised that:

(H1) Confidence in Extinguishing Perseverative Thoughts and Emotions (PMCEQ-1) will be negatively correlated with both Anxiety and Depression.

PMCEQ-2 – Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving – taps the core

ability to make sense of one's own emotions in a non-judgmental way and thus captures a mindfulness-related capability. PMCEQ-2 also depicts confidence in not getting into perseverative rumination cycles as reflected by the item "I can stop any 'negative thinking cycles' and focus on what I can do in the situation". In so far PMCEQ-2 depicts confidence constructs which resemble those assessed by the PMCEQ-1 factor. Above and beyond this domain PMCEQ-2 measures more agentic and problem-focussed confidence domains as assessed by the item "When I experience taxing demands I try to act as in the motto: There are no problems, only solutions". In analogy to hypothesis 1 is it predicted: that:

(H2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving (PMCEQ-2) will be negatively correlated with both Anxiety and Depression.

The third positive metacognitive and meta-emotional factor PMCEQ-3 – Confidence in Setting Flexible and Feasible Hierarchies of Goals – differs from PMCEQ-1 and PMCEQ-2 by virtue of the fact that it captures economic and flexible goal setting. Therefore, PMCEQ-3 is even more problem-focussed and agentic than PMCEQ-2. Attainable or economic goal setting is assessed by items such as "When I were overwhelmed by a big task I would stop and take smaller steps"; flexible goal setting is measured by items such as "I can prioritise my needs and formulate a hierarchy of goals". The resulting prediction is:

(H3) Confidence in Setting Flexible and Feasible Hierarchies of Goals (PMCEQ-3) will be negative correlated with both Anxiety and Depression.

6.3.4. Hypothesised effects of dysfunctional metacognitions on state negative emotions

In analogy to Study 4, Part A the aim is to take Wells and Matthews' (1994, 1996) dysfunctional metacognitions, measured by the MCQ-30, simultaneously into account. The rationale is based on the underpinning aim to differentially assess effects of both maladaptive metacognitions (measured by the MCQ-30) and adaptive metacognitions and meta-emotions (measured by the PMCEQ) on Negative Emotions conceptualised by Anxiety and Depression. In line with Study 4, Part A and in order to assure comparability between Studies 4 and 5 the five subscales of the MCQ-30, i.e. MCQ-1 to MCQ-5, were defined as latent variables of the overall construct MCQ-30 assessing the total construct of dysfunctional or maladaptive metacognitive traits. The resulting research hypothesis, which has been supported by a plethora of aforementioned empirical studies, is:

> *(H4) The MCQ-30 construct, consisting of the five maladaptive metacognitive factors as indicators, will be positively correlated with both Anxiety and Depression.*

6.4. Method

6.4.1. Participants

The same convenience sample of 212 worker and student participants as in Study 4, Part A (Chapter 5) was utilised comprising 108 (50.9%) students from various metropolitan universities, and 104 (49.1%) workers from various occupations. The age range was 18 to 70 years (M = 30.2, SD = 11.27); 61 (28.8%) were males, 151 (71.2%) were females. The ethnic background of the sample comprised 120 (56.6%) White, 36 (17.0%) Asian, and 28 (13.2%) Black participants; 28 (13.2%) were of other ethnicity.

6.4.2. Materials

Meta-Cognitions Questionnaire 30 (MCQ-30, Wells & Cartwright-Hatton, 2004). The MCQ-30, also utilised in Studies 3 and 4 Part A (Chapters 4 and 5), was used. The MCQ-30 consists of the five following replicable factors: (1) Positive Beliefs about Worry, (2) Negative Beliefs about Worry concerning Uncontrollability and Danger, (3) Lack of Cognitive Confidence, (4) Beliefs about the Need to Control Thoughts, and (5) Cognitive Self-Consciousness. The MCQ-30 possesses good psychometric properties of internal consistency and both construct and convergent validity (Wells & Cartwright-Hatton, 2004).

Positive Metacognitions and Meta-Emotions Questionnaire (PMCEQ; Beer & Moneta, 2010). The questionnaire instrument developed within this thesis and already utilised in Studies 3 and 4 Part A (Chapters 4 and 5) was administered. The three factors measure the following dimensions of functional metacognitions and meta-emotions: (1) Confidence in Extinguishing Perseverative Thoughts and Emotions, (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving, (3) Confidence in Setting Feasible and Flexible Hierarchies of Goals.

Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983) [Appendix 10]. Both subscales consist of seven items measuring anxiety and depression, respectively. The 7 items comprising the anxiety subscale include items such as "I get a sort of frightened feeling as if something awful is about to happen" and "I get sudden feelings of panic". The 7 items comprising the depression subscale contain items such as "I still enjoy the things I used to enjoy" and "I have lost interest in my appearance". Respondents are asked to measure their emotional state over the course of the previous week with each item being measured on a 4-point scale (0 to

3); thus the range for both subscales is 0-21 with higher scores indicating the potential presence of emotional problems. Various cut-offs have been applied by different researchers – Bowling (2005) suggests the following interpretation of subscale scores: < 7: non-cases; sores in the range from 8-10: doubtful cases and scores > 11: likely cases. For this study the timeframe was increased, asking participants to rate their emotional state over the course of the last month (rather than the last week).

The HASD scale has been applied to a variety of both clinical and non-clinical samples. The majority of validation studies confirmed the two-factor structure with expected loadings of the anxiety and the depression items on the constructs anxiety and depressive symptoms respectively; this held again for both clinical and non-clinical samples (Mykletun, Stordal & Dahl, 2001). Even in non-clinical samples there appears to be comorbidity between anxiety and depression as reflected by reported intercorrelations between the subscales in the range from 0.49 to 0.63 (Mykletun, Stordal & Dahl, 2001). Overall the HADS has sound psychometric properties reflected by good reliability and validity (Zigmond & Snaith, 1983; Mykletun, Stordal & Dahl, 2001).

It should be emphasised that in spite of its possibly misleading name the HADS is suitable for administration to non-clinical samples. Moreover, compared to other alternative instruments, e.g. Beck Depression Inventory (BDI), the HADS items are "not intimidating". The absence of potentially distressing statements as used in the BDI, e.g. "I feel that the future is hopeless and that things cannot improve" or even items to assess suicidal thinking was the main (ethical) selection criterion for the HADS rather than the BDI within this research.

6.4.3. Statistical Analysis

The hypothesised relationships were tested using structural equation modeling (SEM) techniques (e.g., Kline, 1998) as implemented in LISREL 8.8 (Jöreskog & Sörbom, 1996).

Two models were tested which both comprised the following identical measurement model: the study constructs (PMCEQ-1, PMCEQ-2, PMCEQ-3, MCQ-30, Anxiety and Depression) were defined as latent variables. The five maladaptive metacognitive traits, measured by the MCQ-30, were defined as indicators of the aggregated dysfunctional metacognition construct (MCQ-30). The six subscale items of each of the three PMCEQ factors were defined as indicators of the three constructs PMCEQ-1, PMCEQ-2 and PMCEQ-3. In analogy to Study 4, Part A an alternative model was tested which combined the PMCEQ-2 and PMCEQ-3 factors into the aggregated PMCEQ-2* (comprising 12 indicator items). The seven anxiety measuring items of the HADS were defined as latent variable of the outcome variable Anxiety and the seven depression-related HADS items as indicators of the second outcome variable Depression.

The two tested SEM models are described as follows. In Model 1 the following paths were specified: (a) paths from PMCEQ-1 to Anxiety and Depression, (b) paths from the aggregated PMCEQ-2* to Anxiety and Depression and (c) paths from MCQ-30 to Anxiety and Depression.

Model 2 equated Model 1 but used the original (non-aggregated) PMCEQ subscales, hence utilising the following specified paths: (a) paths from PMCEQ-1 to Anxiety and Depression, (b) paths from PMCEQ-2 to Anxiety and Depression, (c) paths from PMCEQ-3 to Anxiety and Depression, and (d) paths from MCQ-30 to Anxiety and Depression.

6.5. Results

6.5.1. Data Description

Descriptive statistics and Pearson product-moment correlation coefficients for all questionnaire variables are presented in Table 14. Whereas the sample scored extremely low on HADS Depression ($M = 4.2$), the average HADS Anxiety score was high ($M = 8.5$) indicating potentially doubtful cases with reference to Bowling's (2005) suggested cut-off classification. In line with expectations all five MCQ-30 factors were positively correlated with both Anxiety and Depression; the Pearson bivariate correlation coefficients were moderate to strong, ranging from 0.35 to 0.60 (all of them significant at the .001 level). Also in line with expectations all three PMCEQ factors were negatively correlated with both Anxiety and Depression; the Pearson bivariate correlation coefficients were also moderate to strong, ranging from 0.28 to 0.60 (all of them significant at the .001 level). Anxiety and Depression was strongly intercorrelated ($r = .64$, $p < .001$) indicating high comorbidity.

Above and beyond bivariate correlations the hypothesised relationships between the study variables were tested simultaneously using SEM. Results reflecting the underlying processes are subsequently outlined.

Table 14: *Means, standard deviations, Cronbach's alpha coefficients and intercorrelations of Study 4, Part B variables*

[N=212; *p<0.05 **p<0.01.]	*M*	*SD*	Scale Range	Range Scores	Alpha	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions	16.8	4.3	6-24	6-24	.84	.43**	..42**	.47**	-.52**	-.52**	-.36**	-.39**	-.45**	-.60**	-.48**
2.PMCEQ-2 – Confidence in Interpreting Own Emotions, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving	14.9	3.8	6-24	6-24	.76	-	.69**	.91**	-.12*	-.23**	.01	-.01	-.21**	-.37**	-.29**
3. PMCEQ-3 – Confidence in Setting Flexible and Feasible Hierarchies of Goals	16.9	4.0	6-24	7-24	.86	-	-	.92**	-.18**	-.26**	.01	-.07	-.23**	-.35**	-.28**
4. PMCEQ-2* - Combined PMCEQ-2 and PMCEQ-3	31.7	7.1	12-48	15-48	.88	-	-	-	-.17**	-.27**	.01	-.05	-.24**	-.39**	-.31**
5. MCQ-1 – Positive Beliefs about Worry	10.9	4.3	6-24	6-23	.69	-	-	-	-	.76**	.71**	.75**	.71**	.56**	46**
6. MCQ-2 – Negative Beliefs about Worry concerning Uncontrollability and Danger	12.1	4.9	6-24	6-24	.67	-	-	-	-	-	.69**	.72**	.79**	.60**	.49**
7. MCQ-3 – Low Cognitive Self Confidence	10.1	3.9	6-24	6-24	.57	-	-	-	-	-	-	.73**	.65**	.43**	.36**
8. MCQ-4 – Beliefs about the Need to Control Thoughts	11.6	4.4	6-24	6-24	.62	-	-	-	-	-	-	-	.71**	.47**	.35**
9. MCQ-5 – Cognitive Self-Consciousness	15.5	4.4	6-24	6-24	.68	-	-	-	-	-	-	-	-	.56**	.49**
10. ANXIET – HADS Anxiety	8.49	4.6	0-21	0-21	.86	-	-	-	-	-	-	-	-	-	.64**
11. DEPRESS – HADS Depression	4.23	8.4	0-21	0-15	.76	-	-	-	-	-	-	-	-	-	-

6.5.2. Test of the fitted Structural Equation Models

The relative effects of the PMCEQ factors and the MCQ-30 construct on both outcome measures Anxiety and Depression were simultaneously examined using SEM (e.g. Kline, 1998). Two SEM models were tested. Contrary to results of Study 4, Part A, Model 2, utilising the three PMCEQ factors rather than the aggregated PMCEQ-2*, provided a better fit than the alternative Model 1. Two further modifications optimised Model 2: (1) adding covariance between Anxiety and Depression (on the grounds of the high intercorrelation, reflecting comorbidity) and (2) keeping PMCEQ-3 just in the model with no paths specified to Anxiety and Depression.

The overall fit of both models was assessed on the basis of the same four goodness-of-fit indices used in Study 4, Part A: (1) Chi-Square assessing the overall fit of the model by estimating the discrepancies between the observed covariance matrices and those implied by the model, (2) Goodness of Fit Index (GFI) as an overall fit index ranging from 0 to 1 and indicating good fit by values close to 1, (3) Comparative Fit Index (CFI) as an absolute fit index with values close to 1 indicating good fit and (4) Root Mean Square Error of Approximation (RMSEA) with values below .05 indicating good fit and values in the range of 0.05 to 0.08 representing acceptable fit (Hu & Bentler, 1999).

Model 1 (utilising PMCEQ-1 and PMCEQ-2*) did not fit in a strict statistical sense based merely upon the Chi-Square fit index (Chi-Square = 755.39, df = 424, $p < .0001$) but the three non-Chi-Square-based statistics indicated adequate fit with GFI = .81, CFI = .97 and RMSEA = .061.

The optimal Model 2 (utilising PMCEQ-1, PMCEQ-2 and PMCEQ-3) did not fit in a strict statistical sense based merely upon the Chi-Square fit index (Chi-Square

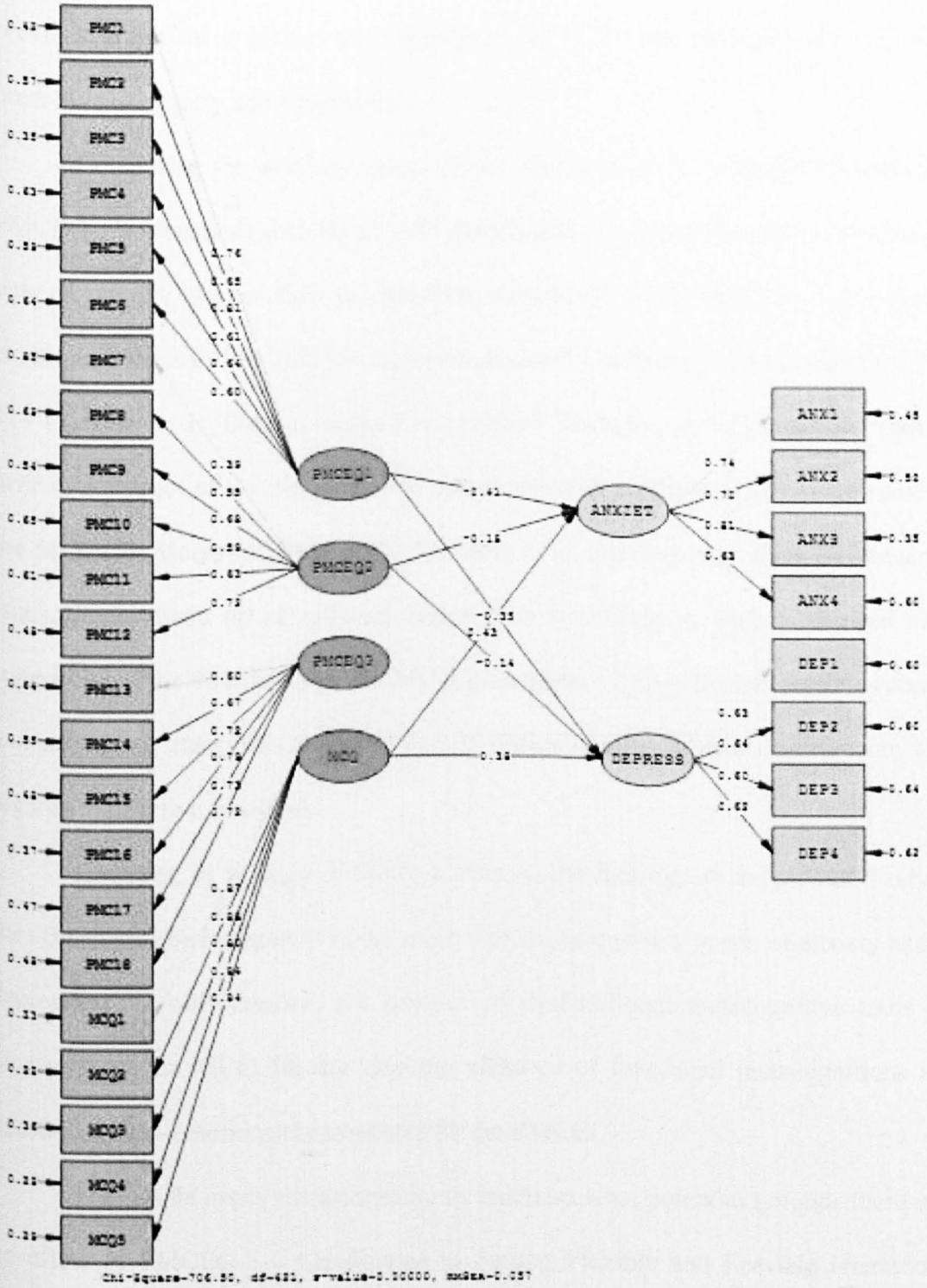
= 706.50, df = 421, $p < .0001$) but provided a better fit than Model 1 (Chi-Square Change = 48.89, df = 3). The three non-Chi-Square-based statistics indicated adequate to good fit with GFI = .82, CFI = .97 and RMSEA = .057.

The final model is depicted in Figure 5. The hypothesised relationships among the latent variables are shown in the structural part of the model; the standardised path coefficients supported three out of the four hypotheses: (1) PMCEQ-1 negatively and strongly predicted Anxiety (β = -.406) and Depression (β = -.348), (2) PMCEQ-2 negatively, yet weakly, predicted Anxiety (β = -.177) and Depression (β = -.145) and (3) MCQ-30 positively and strongly predicted Anxiety (β = .429) and Depression (β =.383).

Only hypothesis 3, stating that PMCEQ-3 should be predictive of Anxiety and Depression, was not supported, either in terms of Anxiety or in terms of Depression.

Figure 5

SEM of the relationships between maladaptive metacognitions and adaptive metacognitions as independent variables and anxiety and depression as outcome variables (standardised coefficients)



6.6. Discussion

Data supported the first two hypotheses with PMCEQ-1 strongly predicting decreased Anxiety and Depression and PMCEQ-2 also negatively predicting Anxiety and Depression but to a lesser extent. The hypothesised anxiety and depression reducing effects of the more agentic PMCEQ-3 were not supported. In line with previous empirical evidence the aggregated MCQ-30 was strongly and positively predictive of anxiety and depression.

Comparing the absolute values of the standardised β-coefficients reveals that PMCEQ-1's (negative) correlation with anxiety and depression (negative emotions) is only marginally weaker than the (positive) correlation of the MCQ-30 with negative emotions. This is in line with the argument discussed in Study 4, Part A that PMCEQ-1 – Confidence in Extinguishing Perseverative Thoughts and Emotions – taps an inverse construct of the perseverative and ruminative S-REF activity as assessed by the MCQ-30. Moreover, PMCEQ-1 does this in an efficient way since the construct (subscale) is made up of only six items. Whereas Study 4, Part A showed clear superiority of the PMCEQ over the MCQ-30 in terms of the outcome variables coping and perceived stress, this Study 4, Part B shows equality of both instruments with regards to negative emotions.

However, in analogy to Study 4, Part A, the findings of the present Study 4, Part B can also be interpreted in the sense that absence or low levels of anxiety and/or depression not only requires the absence of dysfunctional metacognitive traits (as measured by the MCQ-30) but also the presence of functional metacognitions and functional meta-emotions (as measured by the PMCEQ).

The results imply the interesting question on what potential grounds there was no effect of PMCEQ-3 – Confidence in Setting Flexible and Feasible Hierarchies

Goals – on Anxiety and Depression. The discriminant effects on state negative emotions of PMCEQ-1 and to a lesser extent of PMCEQ-2 on one hand and the goal stetting related effects of PMCEQ-3 on the other hand are potentially linked to distinct psychological well-being concepts.[26] PMCEQ-1 and PMCEQ-2 appear to measure feeling good states in the sense of hedonic well-being, i.e. absence of emotional distress (anxiety and depression). PMCEQ-3, tapping flexible and attainable goal-setting and self-determination, refers to flourishing and self-actualisation. Flourishing and self-actualisation are expressions of eudaimonic well-being which is less focussed on pleasure or the absence of distress but more concerned with curiosity and engagement. Empirical evidence for these arguments was provided within this PhD research by the strong positive correlation between PMCEQ-3 and Intrinsic Motivation as opposed to a merely weak positive correlation between PMCEQ-1 and Intrinsic Motivation (see Study 3 in Chapter 4).

PMCEQ-2 is of somewhat hybrid nature assessing mindfulness-related confidence factors (Confidence in Interpreting Own Emotions as Cues and Restraining from Immediate Reaction) as well as problem-focussed and agentic properties (Mind-Setting for Problem-Solving). Results underpin this two-fold nature: PMCEQ-2 is a negative but only weak predictor of anxiety and depression but also a positive and strong predictor of Intrinsic Motivation (see Study 3 in Chapter 4).

The inherent general limitations of this final Study 4, Part B are identical to those in the previous Study 4, Part B and will be addressed in the General Discussion in the subsequent final Chapter 7.

The study can inform applications in terms of potential interventions. In (inverse) analogy to metacognitive therapy for psychological disorders (Wells, 2009)

[26] Although absence/low levels of anxiety and/or depression do not necessarily equate with "psychological well-being" the approximation appears legitimate for the following discussion.

the PMCEQ confidence factors might be amenable to some cultivation via therapeutic or coaching interventions. Such interventions should specifically be tailored to build individuals' confidence in quickly extinguishing perseveration and depressive rumination. In conjunction with Study 4, Part A multiple synergy effects would be expected since PMCEQ-1 not only reduces stress perception, anxiety and depression but has also been shown to protect against maladaptive coping strategies. Interventions tailored to PMCEQ-2 and PMCEQ-3 constructs should have the beneficial effects of desensitising stress perception and, moreover, fostering adaptive coping strategies and also intrinsic motivation. The hypothesised effects should be of special interest with regard to efficiency-increasing coaching in academic and professional settings.

Chapter 7

General Discussion and Conclusions

7.1. Summary of main findings and novelty of the research

From the theoretical and evidence-based research framework developed in the Introduction the following six relevant aspects or "cornerstones" emerged:

1. Developmental and educational psychologist research the enhancing effects of adaptive metacognitions on learning and academic performance;
2. Clinical psychologist examine by nature metacognitions of the maladaptive type which in turn affect psychological well-being in a detrimental fashion, frequently resulting in severe psychological disorders;
3. Both educational and clinical psychologists differentiate between metacognitive knowledge and metacognitive regulation;
4. Metacognitions appear to be transferable not only from certain tasks to tasks of different nature but potentially from certain life domains into different ones;
5. The social environment, interactions with other people, can potentially facilitate the acquisition and refinement of metacognitions and meta-emotions;
6. Somewhat surprisingly hardly any research can be identified until now which investigates the effects of adaptive metacognitions (and meta-emotions) in terms of adaptive psychological self-regulation, potentially contributing to psychological equilibrium.

Incorporation of metacognitions in the field of clinical psychology is of fairly recent origin – only within the last 15 years have maladaptive metacognitions

attracted the attention of mental health practitioners and researchers. Corresponding research has shed light on the detrimental effects which such dysfunctional metacognitions potentially exert on coping strategies, self-regulatory processes and psychological well-being. Substantial empirical evidence has supported the claim that maladaptive metacognitive traits contribute to a plethora of psychological and psychopathological disorders. The first and still most prominent metacognitive theory of psychological dysfunction, as an attempt to explain underlying maladaptive metacognitive processes, has been provided by Wells and Matthews' (1994, 1996) influential S-REF model and Wells' related (2000, 2009) metacognitive model of emotional disorders. As a common denominator these models ascribe onset and maintenance of psychological disorders to the Cognitive Attentional Syndrome (*CAS*, Wells and Matthews, 1994, 1996; Wells, 2000). Wells and Matthews' (1994) tenet is that for vulnerable individuals the CAS is triggered by problematic situations. Core manifestations of the CAS are perseverative and ruminative thinking styles, dysfunctional attentional routines and maladaptive coping strategies which result in correspondingly maladaptive behavioural patterns. In S-REF terminology the CAS reflects the maladaptive object mode and excessive or perseverative S-REF activity, characterised by close and dysfunctional thought monitoring, attempts to suppress worrying thoughts, which often exert rebound effects, and/or threat focus.

The outlined metacognitive models of psychological disorders provided the stimulus for this PhD research to derive a novel instrument which would assess *adaptive* metacognitions and meta-emotions and to subsequently investigate the effects of such positive psychological constructs on coping strategies, stress perception and emotions. In the light of increasing research evidence for the crucial role which maladaptive metacognitions play in psychopathological disorders, the

intriguing question within this PhD research was whether protective effects of adaptive metacognitions and their underlying processes could be identified. Beyond Wells and Matthews' focus on (maladaptive) metacognitions it seemed necessary to take also (adaptive) meta-emotions into account within this thesis. Conducting this novel research appeared to be specifically worthwhile since there is an increasing trend of psychological disorders in Western societies, in line with WHO's (1996) prediction that the incidence prevalence rates of the debilitating MDD are expected to steadily rise. It can furthermore be hypothesised that the current economic crisis with implied increasing job insecurity could potentially result in a similar increase of anxiety-related disorders.

The rationale for this research was that, providing a reliable and valid measurement instrument of positive metacognitions and meta-emotions (the PMCEQ) could be developed, this measure could be used to test the hypothesised stabilising effects of such positive traits with regards to coping, perceived stress and state negative emotions (anxiety and depression). If findings supported the hypothesised functional effects of positive metacognitions on self-regulation and psychological stability the novel PMCEQ could potentially inform not only augmentations of clinical interventions but also guide the development of coaching interventions in different life domains, e.g. in terms of psychological well-being or academic and professional performance.

In all, metacognitions of adaptive nature and their effects on coping, stress resilience and state emotions were at the heart of this thesis. Extending the merely metacognitive focus, the emotion-based counterpart, meta-emotion, was also investigated. The five studies comprising research started with the development of the Positive Metacognitions Questionnaire and Positive Meta-Emotions Questionnaire

(PMCEQ) derived from a qualitative approach based upon semi-structured interviews. The PMCEQ scale was then rigorously validated in terms of its construct and concurrent validity by means of EFA and CFA, respectively. The fairly large validation samples of 313 and 475 participants, respectively, provided evidence for the sound reliability and validity of the new measure. In subsequent cross-sectional survey studies the PMCEQ, alongside a battery of additional questionnaires, was administered in order to investigate its effects on the relevant psychological constructs of coping strategy selection, stress perception and state negative emotions assessed by anxiety and depression. The studies supported the vast majority of hypotheses predicting stress, anxiety and depression reducing effects of positive metacognitions and meta-emotions measured by the PMCEQ. In addition it was found that the assessed positive metacognitive and meta-emotional traits were positively correlated with trait intrinsic motivation and negatively correlated with trait extrinsic motivation within the aforementioned validation studies.

Prior to discussing the core findings, their implications and potential applications in detail, the five studies shall be concisely summarised and broadly discussed in terms of their main results. A more detailed discussion of selected and outstanding aspects will be presented in the subsequent Overall Discussion (7.2.).

The qualitative Study 1 was designed to identify commonly occurring thought processes, emotions and subsequent behavioural response patterns during encounters with profoundly challenging situations. The administered semi-structured interview schedule utilised metacognitive priming techniques, tailored to investigate positive metacognitions and possibly positive meta-emotions. The developed metacognitive priming template could be successfully applied to elicit interviewees' recall of their

adaptive metacognitive and meta-emotional beliefs and processes they employed when confronted with challenging tasks or projects.

The qualitative analysis also supported the tenet that challenge perception is essentially required for activating adaptive metacognitive and meta-emotional responses and for the functional and agentic shift from object to the superior metacognitive mode of cognitive processing. Three (out of a total of 13) interviewees referred to tasks which merely incorporated low levels of challenge, ambiguity or unpredictability and could subsequently not account for the activation of positive metacognitive and/or meta-emotional beliefs and processes. On these grounds the three interviewees were excluded from the analysis.

Theory-led Thematic Analysis and Grounded Theory could identify three common super-ordinate themes, i.e. an integrative framework, for item wording of the PMCEQ. The three identified constructs (traits) comprised: (1) Confidence in Extinguishing Perseverative Thoughts and Emotions, (2) Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving and (3) Confidence in Setting Flexible and Feasible Hierarchies of Goals. It appeared that the three interlinked themes or psychological dimensions represented a crucial successive sequence of cognitive, emotional and behavioural processes.

Study 2 was aimed at the development and derivation of the PMCEQ instrument in the light of the findings of the qualitative precursor Study 1. Items for the PMCEQ were worded around the three-dimensional integrative framework. Using a first validation sample encompassing 313 participants successive Exploratory Factory Analyses (EFAs) were conducted. The EFAs supported the expected three-factor structure and resulted in an 18-item version of the PMCEQ. Each of the three

factors comprised six items and item content was in line with the factor wording proposed in the qualitative Study 1 with the resulting subscales PMCEQ-1 (Confidence in Extinguishing Perseverative Thoughts and Emotions), PMCEQ-2 (Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving) and PMCEQ-3 (Confidence in Setting Flexible and Feasible Hierarchies of Goals). The PMCEQ showed good construct validity and internal consistency.

Study 3 was aimed at establishing concurrent validity of the PMCEQ by means of Confirmatory Factor Analysis (CFA); a new, mixed student and worker, validation sample comprising 475 participants was utilised. Using the dysfunctional metacognition measuring MCQ-30 in order to assess concurrent validity of the PMCEQ revealed the novelty of the PMCEQ in the sense that it also measures (inverse) constructs above and beyond the MCQ-30: PMCEQ-1 can be interpreted as an inverse measure of the MCQ-30 instrument and showed good convergent validity with the MCQ-30 subscales, whereas PMCEQ-2 and PMCEQ-3 showed discriminant validity with MCQ-30 subscales. In conclusion the agency-related PMCEQ-2 and PMCEQ-3 scales appear to measure additional psychological constructs not being accounted for by the MCQ-30, i.e. by Wells and Matthews' (1994, 1996) and Wells' (2000) (maladaptive) metacognitive models. Convergent validity of both PMCEQ-2 and PMCEQ-3 with trait intrinsic motivation further supported the fair psychometric properties of the PMCEQ instrument.

Study 4, Part A tested the effects of maladaptive metacognitions (assessed by the MCQ-30) and adaptive metacognitions (assessed by the PMCEQ) as independent variables on the three outcome measures of maladaptive coping strategies, adaptive coping strategies and perceived stress. In comparison to Studies 2 and 3 (with 313 and

475 participants, respectively) Study 4, Part A utilised a smaller, yet well balanced, mixed student and worker sample of 212 participants. Several SEM approaches revealed that the best fitting model implied combining the two factors PMCEQ-2 and PMCEQ-3 to the integrated factor PMCEQ-2*. This was statistically motivated in the light of the high intercorrelation between PMCEQ-2 and PMCEQ-3 with inherent multicollinearity problems for SEM techniques. Moreover, the SEM model using the aggregated PMCEQ-2* provided slightly better fit indices than the alternatively tested SEM model using the three original PMCEQ factors. On conceptual grounds merging PMCEQ-2 and PMCEQ-3 into PMCEQ-2* could be justified since both factors measure comparable confidence domains – both PMCEQ-2 and PMCEQ-3 overlap in terms of their problem-focus component which discriminates both factors from the rumination-extinguishing PMCEQ-1.

SEM analyses found that the PMCEQ predicted the outcome measures in line with hypotheses: preventing maladaptive coping (PMCEQ-1), fostering adaptive coping (PMCEQ-2*) and reducing perceived stress (PMCEQ-1 and PMCEQ-2*). The expected and supported differential effects of PMCEQ-1 and PMCEQ-2* were conceptually in line with the content of both items: the rumination and perseveration extinguishing PMCEQ-1 factor prevented maladaptive or avoidance coping, whereas the problem- and goal-focussed PMCEQ-2* fostered adaptive or approach coping. Interestingly, maladaptive metacognition, measured by the MCQ-30 as a single composite construct, had no significant effect on any of the three outcome measures.

In analogy to Study 4, Part A the final Study 4, Part B tested the MCQ-30 and the developed PMCEQ "in competition", this time in reference to the outcome measures of state negative emotions which comprised (HADS) Anxiety and (HADS) Depression. Albeit Study Part 4 B used the same participants as Study 4, Part A, the

best-fitting model here implied using the original three-factor structure of the PMCEQ – rather than combining PMCE-2 and PMCEQ-3 into the aggregated PMCEQ-2* factor as in the previous Study 4, Part A. PMCEQ-1 had pronounced negative effects on anxiety and depression; the corresponding effects of the PMCEQ-2 were weaker. The stronger predictive effects of PMCEQ-1 on both anxiety and depression again reflected that the PMCEQ-1 assesses a core confidence construct to extinguish perseverative worry and depressive rumination. PMCEQ-2 still implies two meta-emotional components – understanding one's own emotions as vital cues and restraining oneself from immediate overreaction – but also incorporates agentic and problem-focussed items which assess mind-setting for problem-solving. As hypothesised the MCQ-30 construct predicted positively and strongly anxiety and depression.

7.2. Overall discussion

Within Study 1 the application metacognitive priming template, developed and tailored to elicit interviewees' recall of adaptive metacognitions, identified the three factor framework for the novel PMCEQ. Interviewees were able to recall their salient thoughts, emotions, strategies and actions when they were confronted with their challenging tasks and projects. In its entirety, the qualitative analysis reflected interviewees' high awareness of their cognitive, emotional and behavioural strategies employed during challenging encounters. The high degree of overlapping commonalities in the analysed metacognitive and meta-emotional patterns appears to reflect the accuracy of participants' accounts. Accuracy of their reports and the salient nature of interviewees' challenge scenarios were in line with Nisbett and Wilson's (1977) finding that "accurate reports will occur when influential stimuli are salient

and are plausible causes of the responses they provide, and will not occur when stimuli are not salient and are not plausible causes" (p. 231). Applied to this research the priming questions within the semi-structured interviews represented the stimuli for interviewees' recall and salience was implied in the self-selected challenge scenarios the interviewees chose. The high degree of awareness in terms of their cognitive and emotional self-regulation, which interviewees appeared to have when coping with their challenging tasks or projects, was the reason for labelling the three metacognitive and meta-emotional factors "confidence" factors.

EFA, conducted in Study 2, extracted three factors that corresponded with the themes that had been identified in the qualitative Study 1. Hence, EFA supported the three constructs comprising the metacognitive and meta-emotional framework identified in the qualitative analysis. Validation of the final 18-item version of the PMCEQ showed good internal consistency and high construct validity of the instrument. Within Study 3 good convergent validity of the PMCEQ could be established by using trait intrinsic motivation as a hypothesised related measure of positive self-regulation and self-determination. Fair discriminant validity could be established by using the measure of trait extrinsic motivation.

The developed and psychometrically stable PMCEQ can conceptually, yet only partially, be regarded as an inverse counterpart of the maladaptive metacognitions assessing MCQ-30. In all, whereas the S-REF theory, utilising the MCQ-30 or MCQ, measures dysfunctional strategies of cognitive self-regulation and coping, the PMCEQ appears to be a reliable and valid instrument to assess functional metacognitive and meta-emotional self-regulation and associated self-empowering

and flexible coping strategies.[27] The latter assertion was supported by Study 4, Part A which showed that PMCEQ-factors positively predict adaptive coping, and negatively predict maladaptive coping and perceived stress. Further support was provided by Study 4, Part B which showed that PMCEQ factors negatively predict anxiety and depression (state negative emotions).

7.3. Novel metacognitive and meta-emotional confidence domains tapped by the PMCEQ

In this section the novel metacognitive and meta-emotional confidence areas tapped by the PMCEQ subscales – above and beyond the MCQ-30 – will be discussed.

7.3.1. Challenge context and perception

Correlation analyses of all data sets within this thesis showed that PMCEQ-1 (Confidence in Extinguishing Perseverative Thoughts and Emotions) represents the PMCEQ factor which is most strongly and negatively related with the MCQ-30 – more specifically with the MCQ-2 subscale (Negative Beliefs about Worry concerning Uncontrollability and Danger). However, even the most highly (and negatively) correlated two factors PMCEQ-1 and MCQ-2 should not just be regarded as opposite ends of two poles. Comparing the item contents of the MCQ-2 and PMCEQ-1 shows in addition to "inverse commonalities" in terms of perseveration some distinctiveness: whereas MCQ-2 only refers to perceived uncontrollability and perceived danger of worry and worrying thoughts, PMCEQ-1 items depict more generally negative perseverative and also depressive ruminative thinking. Moreover,

[27] Arguments referring to the MCQ-30 can be similarly applied to its original and longer version, i.e to Cartwright-Hatton and Wells' (1997) Meta-Cognitions Questionnaire (MCQ).

the PMCEQ-1 (and similarly the PMCEQ-2 and PMCEQ-3) items ask participants explicitly about their thoughts and emotions when confronted with challenging or difficult situations. This is emphasised by the PMCEQ preamble "This questionnaire is concerned with beliefs people hold about their thinking and emotions in difficult situations..." and also explicitly reiterated in some single items, e.g. "When confronted with ongoing troublesome circumstances I often start brooding and find it difficult to stop".

The underlying rationale for asking participants to reflect upon difficult situations was grounded in growing research evidence that metacognitions (and most likely also meta-emotions) are activated by challenge and in situations where routines usually do not work (Wilson, 2001). The psychometric stability of the PMCEQ within three different and fairly large samples in this research (comprising 313, 475 and 212 participants) can cautiously be interpreted as support for the metacognition-challenge link. Moreover, support for the hypothesis that positive metacognitions are elicited by challenge had already been provided by the qualitative study: the three interviewees who did not report a fair degree of perceived difficulty, challenge or unpredictability could subsequently not substantially account for elicited functional metacognitive or meta-emotional processes.

7.3.2. Inclusion of meta-emotional processes

Inclusion of rumination-related items in the PMCEQ-1 subscale (e.g. the quoted item in the previous paragraph "When confronted with ongoing troublesome circumstances I often start brooding and find it difficult to stop" or "If things go really badly I tend to tend to 'brood' and dwell on my negative thoughts") was based upon two grounds: (1) the general necessity of investigating meta-emotions in addition to

metacognitions and (2) research evidence that beliefs about rumination play a core role in MDD as opposed to the predominant relevance of beliefs about worry in GAD.

In conclusion it can be argued that PMCEQ-1 taps (inverse) metacognitive and, beyond MCQ-30 factors, also meta-emotional confidence domains which partially (inversely) overlap with those assessed by the MCQ-30, specifically the MCQ-2 subscale. In their entirety, the three MCQ-30 subscales would suggest conceptual (inverse) overlap with the PMCEQ-1 factor which data supported by the high negative intercorrelations between PMCEQ-1 (Confidence in Extinguishing Perseverative Thoughts and Emotions) and: (1) MCQ-2 (Negative Beliefs about Worry concerning Uncontrollability and Danger) with strong negative intercorrelation, (2) MCQ-1 (Positive Beliefs about Worry) with moderate negative intercorrelation and (3) MCQ-4 (Need to Control Thoughts) with moderate negative intercorrelation. PMCEQ-1 does, however, only weakly overlap with MCQ-3 (Low Cognitive Confidence) and is even less strongly negatively correlated with MCQ-5 (Cognitive Self-Consciousness).

7.3.3. Transition from extinguishing perseveration to agentic problem and goal focus

The PMCEQ-2 factor (Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving) can potentially explain the transitional process from the initially essential cessation of rumination (PMCEQ-1) to preventing potentially inappropriate overreactions and to the subsequent core shift in terms of agentic problem and goal focus and eventually to active coping behaviour (PMCEQ-2 and PMCEQ-3). In S-REF terminology, transition from PMCEQ-1 to PMCEQ-2 would account for the crucial shift from the static and dysfunctional object mode to the flexible and functional metacognitive

mode. Moreover, as discussed in previous sections short bouts of worry and rumination in some cases contributed to a clarification of possible self-determined actions or even broadened identified options. Within the qualitative Study 1 it emerged that for Interviewee 7, who had to negotiate a reduction of her working hours in order to pursue her MSc course, anger was the catalyst for confronting her employer to negotiate what the employer previously had rejected. Notably, she could interpret her own emotion of anger as a vital cue for action but without overreacting, i.e. by restraining herself from immediate inappropriate reaction. Subsequently she solved the problem by successfully achieving the envisaged work reduction agreement with her employer. Most notably, within this process, she could also clearly prioritise her goals, reflecting her transition from PMCEQ-2 to PMCEQ-3 properties: If her employer had not agreed to her requested work time reduction she would have decided in favour of pursuing her MSc course even at the expense of losing her job.

A similar sequence – in line with the sub-components of PMCEQ-2 – was accounted for by Interviewee 8 when applying for the university recognition of a 'Research Centre' and facing severe initial objections within this lengthy process in which he reminded himself *"Don't overreact to the system, feel your way through, explore the possibility and work towards the solution"*. The quotation reflects the sequential process from mindful restraint from overreaction to the subsequent focus on problem solution. It can be concluded that PMCEQ-2 not only explains the transition from object to metacognitive mode, which is not substantially accounted for and explained in Wells and Matthews' (1994, 1996) S-REF model, but also suggests a new dimension of metacognitive and here clearly also meta-emotional confidence not being assessed by any of the MCQ-30 factors (subscales).

The factor PMCEQ-3 (Confidence in Setting Flexible and Feasible Hierarchies of Goals) taps yet another confidence domain not captured by the MCQ-30. PMCEQ-3 can be regarded as the most agentic and approach-focussed factor among the three PMCEQ constructs and is specifically required when individuals face complex challenges and/or unanticipated developments which necessitate flexible readjustments of strategic sub-goals.

Overall, in conceptual and item content respects, PMCEQ-1 represents the PMCEQ subscale which is most closely, yet inversely, related to MCQ-30 subscales. Correlation analyses of different data sets supported the hypothesised negative relationships. PMCEQ-2 and PMCEQ-3 measure cognitive and emotional confidence domains above and beyond the MCQ-30. Moreover, in contrast to the PMCEQ, all MCQ-30 (and MCQ) subscales refer to "worry" in their item statements. It might be concluded that the MCQ-30 widely measures, or is at least confounded by, trait anxiety – this explains the attempts in several studies which employ the MCQ-30 to control for potentially confounding effects of trait anxiety. While this assertion has to be formulated with caution the main results of Study 4, Parts A and B appear to provide some support: The MCQ-30 construct, as opposed to PMCEQ-subscales, did not predict coping or perceived stress (Study 4 Part A) but in line with expectations the MCQ-30 construct positively predicted anxiety and depression and the PMCEQ factors negatively predicted the negative emotion outcomes (Study 4, Part B). From the results that the MCQ-30 construct failed in predicting non-worry-related outcomes as opposed to predicting anxiety, it could be inferred that the MCQ-30 assesses trait anxiety. However, such inference is subject to two caveats: (1) the sample size in Studies 4 and 5 was relatively small (N=212) and (2) MCQ-30 predictions were tested by using the overall MCQ-30 as one latent variable rather than its five subscales or

factors as individual latent variables. The reason for the latter was the sample size restriction. Future research should investigate and compare the effects of all subscales (factors) of both measures, i.e. PMCEQ and MCQ-30, on outcome constructs under investigation.

7.4. Strengths and limitations

Prior to addressing some inherent limitations of this research, its core strengths will be concisely summarised. The outline of the novel and original elements of this PhD research in Section 7.1 already discussed core inherent strengths.

7.4.1. Core Strengths

Overall, core strengths of this PhD research and potentially novel contributions to theory, research and practice can be summarised as follows.

The research, comprising five studies, was the first attempt to identify and subsequently apply positive metacognitions and in parts also positive meta-emotions, derived from psychopathological models, to adaptive and functional psychological constructs. The research resulted in successful identification of novel metacognitive and meta-emotional confidence constructs with strong indications that these adaptive confidence factors exert significant and positive effects on functional self-regulation in the midst of challenge, unpredictability and ambiguity. The research could provide first empirical evidence that the positive metacognitive and meta-emotional constructs (traits) assessed by the novel PMCEQ prevent maladaptive coping strategies and significantly reduce levels of perceived stress; moreover, they foster adaptive and functional coping strategies in the sense of agentic problem and goal-focussed approach coping. Administration of the developed and validated PMCEQ instrument

also supported the hypothesised positive effects on, and the positive link to, trait intrinsic motivation. Since the protective and preventative effects of the three positive mental traits appear to be exerted by challenge perceptions their effects are specifically beneficial in times of pronounced change with implied unpredictability. In the light of recently increased volatility in Western societies, e.g. in terms of economic and social structures, the research might provide a stimulus to intensify and refine subsequent research and deduct evidence-based theory of the effects of positive metacognitions and positive meta-emotions on relevant psychological outcome measures.

In their entirety, the quantitative studies within this PhD research could establish first empirical evidence that the three positive mental traits assessed by the PMCEQ are of a psychologically protective nature in terms of psychological indicators: the traits not only reduce perceived stress and foster adaptive coping but also prevent, or reduce susceptibility to, anxiety and depression. The research also provided first tentative explanations of the cognitive and emotional beliefs and in parts also mechanisms underlying these preventative effects, which appears to be valuable in the light of increasing incidence and prevalence rates of MDD and related disorders.

Interestingly, findings indicate that successful coping with severe challenge not only requires the absence of dysfunctional traits but necessitates the presence of functional traits. This argument can be derived from the key finding that maladaptive metacognitions do not explain the absence or low levels of adaptive coping, whereas positive metacognitions do explain high levels of adaptive approach coping. This core finding supports the fundamental assumptions of positive psychology "that positive experiences and traits are not necessarily slave processes to some negative state or

trait" (Lee, Steen & Seligman, 2005, p. 634). Furthermore the finding could potentially inform current CBT and Metacognitive Therapy (MCT) approaches not only to address treatment of misguided metacognitions but also to encourage patients to foster positive metacognitive – and positive meta-emotional – self-regulation.

With regards to non-clinical settings first results indicate that the PMCEQ represents a potential instrument to inform coaching interventions in several life domains. The three PMCEQ components conjointly seem to capture a metacognitive and meta-emotional style that supports flexible and resilient behaviour which in turn fosters autonomy orientation and self-determination. On these grounds the PMCEQ instrument could inform coaching interventions tackling Johnston's (2005) emphasised aim of coaching psychologists to facilitate their clients' self-determination and subsequent goal achievement. Potential implications of the PMCEQ for both clinical and non-clinical (coaching) practice will be discussed in Section 7.5.3.

An interesting overall finding which emerged during this research is that the developed PMCEQ measures eudaimonic well-being to a higher extent than hedonic well-being. The latter – referring to "feeling good states", here in the sense of minimising psychologically unpleasant states of anxiety, depression and/or high stress perception – is reflected by PMCEQ-1 items and their underlying processes. Eudaimonic well-being – flourishing and finding meaning in academic, social and even interpersonal domains – is attributable to PMCEQ-2 and PMCEQ-3 (or the combined PMCEQ-2*) items and their underpinning processes.

7.4.2. Inherent limitations and reflexivity

Inherent possible limitations of this PhD research have been addressed throughout the thesis and shall be concisely summarised in the order of the study sequence. Attempts to remedy or minimise some of the limitations in future research will be outlined.

The qualitative *Study 1* was subject to limitations discussed on pages 112-113. Most notably the sample demographic of "academic professionals" might have limited the possibility of finding a wider spectrum of adaptive metacognitive and meta-emotional beliefs and self-regulatory processes. However, the good reliability and fair validity of the subsequently developed PMCEQ, when tested on different validation samples, appears to justify the pragmatically driven purposive sampling employed in Study 1. Conducting the semi-structured interviews for the PMCEQ development implied in addition the inherent bias of researcher expectations when analysing the interview transcripts. However, the attempt to identify two broad constructs of adaptive self-regulation – functional metacognitions and meta-emotions on one hand and resilience-related adaptive personality assets on the other hand – was a triangulation means to control for and minimise researcher bias.

The developed PMCEQ within *Study 2* incorporated one potential flaw in terms of the items measuring the PMCEQ-1 dimension (Confidence in Extinguishing Perseverative Thoughts and Emotions). All items of the PMCEQ-1 factor are negatively worded, whereas the items of the PMCEQ-2 and PMCEQ-3 are all positively worded. Potential systematic effects on the structure of the PMCEQ instrument have been outlined on page 138.

Corroboration of the factor structure and assessment of concurrent validity of the PMCEQ in *Study 3* revealed high intercorrelation between the agency-related

factors PMCEQ-2 and PMCEQ-3. Utilising the MCQ-3, MCQ-4 and MCQ-5 factors alongside Intrinsic and Extrinsic Motivation to assess discriminant validity only provided weak evidence that the two factors, PMCEQ-2 and PMCEQ-3, are somewhat distinct. Future research with larger validation is required the further investigate discriminant validity.

Results of both *Studies 4, Part A and Part B* should be considered in the light of three inherent limitations. Firstly, due to the questionnaire-based survey design, potential self-report bias and social desirability bias might have occurred. Secondly, the cross-sectional design, which was employed due to the time and resource constraints of this PhD research, imposes limitations for inferring cause-and-effect relationships. Hence, future research could be improved by utilising a longitudinal design which will allow a rigorous test of stability over time and inference of cause-and-effect relationships. Thirdly, whereas sample sizes for Studies 2 and 3 were sufficiently large with 313 and 475 participants, respectively, Studies 4 Part A and Part B used the same sample of merely 212 participants.

The somewhat small sample size of 212 participants required certain compromises for the SEM techniques utilised in Study 4, Parts A and B. All three subscales of the PMCEQ were conceptualised as single latent variables, whereas this was no longer possible for the five MCQ-30 subscales in light of the sample size restriction. Hence, the whole MCQ-30 scale was defined as compound latent variable using its five factors or subscales as indicators. Future research should address this limitation by using larger samples and defining all MCQ-30 subscales – equivalent to the PMCEQ subscales – as single latent exogenous variables. Utilisation of all five MCQ-30 factors as single latent variables would increase objectivity when comparing

differential effects between MCQ-30 and PMCEQ factors as exogenous variables on latent endogenous variables (outcome measures) under investigation.

The inherent limitation that the novel PMCEQ only partially captures meta-emotions as emotions individuals have about their own emotions will be discussed within the recommendation for theory development on pages 233 and 234.

Finally it could be argued that – regardless of the high amounts of variance in outcome measures explained by metacognitive and meta-emotional beliefs and processes – the approach has been slightly reductionist. Utilising a more holistic biopsychosocial model (Engel, 1977) would have required also taking biological and social factors into account too. Investigation of underlying biological predispositions of (adaptive and maladaptive) metacognitive traits was clearly beyond the scope of this thesis. Underlying social determinants were indirectly accounted for by investigating the effects of meta-emotions in addition to metacognitions. It has been shown that adaptive meta-emotions not only facilitate understanding of one's own but also of others' emotions. This in turn can be hypothesised to be linked to communion-related assets (as partially shown in Study 1) which then should facilitate creation and maintenance of valuable social support structures.

7.5. Implications and future applications

Core implications of this PhD research for both theory and future research will be discussed. Relevant recommendations for improved future research, resulting from overcoming the inherent limitations within this research, have been outlined throughout this thesis, specifically in the previous Section 7.4.2. The chapter ends with a discussion of practice implications by suggesting potential interventions which could be derived from the crucial findings of this PhD research.

7.5.1. Theory

Wells and Matthews' (1994, 1996) process-orientated S-REF model and Wells' (2000, 2009) corresponding metacognitive theory and therapy concepts of psychological and specifically emotional disorders provided the stimuli for this research. Investigation of inverse, i.e. positive, metacognitive and meta-emotional constructs and their effects on functional self-regulation, specifically on adaptive coping and on the decrease of stress perception and of state negative emotions, was based upon both authors' invaluable contributions.

As a synergy effect of this PhD research, however, the following recommendations for further development of Wells and Matthews' theory of dysfunctional metacognitive processes can be identified.

The exclusive focus on metacognitive constructs should be reconsidered. In view of the current research Wells and Matthews' tenet that emotions and meta-emotions are purely reflecting evaluative cognitive and metacognitive processes is debatable. Arguments for the relevance of meta-emotions as psychological constructs being somewhat distinct from metacognitions, and resulting suggestions for taking metacognitions and meta-emotions simultaneously into account have been made in Chapter 1.5. Findings in this PhD research provided the first tentative evidence for the adaptive role of positive meta-emotions: several interviewees in the qualitative Study 1 displayed detached mindfulness and frustration tolerance which are meta-emotional in nature and Sugiura (2003) emphasises the core role of detached mindfulness in the amelioration of clinical anxiety and depression. Although MCT recommends training patients in detached mindfulness (Wells, 2000) this meta-emotional construct has not been incorporated into underpinning theories of emotional disorder.

One additional argument for the relevance of emotions and meta-emotions within psychopathology is that individuals with an emotional disorder frequently experience mood-congruent biases that in turn exert dysfunctional effects on their thinking, reasoning and decision-making. (Corcoran & Segal, 2008).

However, it should be emphasised that theory (and research) of the construct of meta-emotion is of very recent origin and needs future substantiation. In this context it is debatable to what extent the PMCEQ captures meta-emotions as emotions individuals have about their own emotions (Jäger and Bartsch 2006) or, similarly, as emotional reactions about their own emotions (Mitmansgruber et al., 2009). On one hand some items of the PMCEQ-1 and the PMCEQ-2 factor suggest that they tap predominantly cognitive beliefs about emotions, which does not refer to genuine meta-emotions in the aforementioned sense. On the other hand some items that capture Confidence in Restraining from Immediate Reaction and Interpreting Own Emotions as Cues incorporate elements of meta-emotions as conceptualised by Jäger and Bartsch (2006) and Mitmansgruber et al. (2009). Support was provided by the qualitative Study 1 in which interviewees gave accounts (not only for their aforementioned detached mindfulness but also) for their compassion, interest and curiosity which appeared to foster their acceptance of their own emotions in the sense of Neff (2003) and which can be interpreted as positive meta-emotions as characterised in Section 1.5. Empirical support for this conclusion was provided by the high positive correlation of both PMCEQ-2 and PMCEQ-3 with Intrinsic Motivation. In conclusion it can be argued here that more rigorous research is needed to develop a theory of the impacts of adaptive meta-emotions on positive psychological constructs – as attempted in this thesis – and the impacts of maladaptive

meta-emotions on psychopathological constructs for the suggested augmentation of Wells and Matthews' purely metacognitive approach.

Furthermore the generally negative effects ascribed to episodes of worry and rumination in Wells and Matthews' model(s) do not account for the potentially self-empowering effects of brief episodes of worry and rumination, i.e. relatively short bouts of S-REF perseveration. Three interviewees in this research provided explicit accounts for the adaptive catalyst effects of brief bouts of worry, anger and depressive rumination which then resulted in increased self-determination, adaptive coping strategies and subsequent agentic problem solving. Moreover, the majority of interviewees in Study 1 reported short ruminative episodes at the beginning of their challenge encounters (PMCEQ-1) but could then convey these negative stimuli into agentic problem-focussed coping and goal setting (PMCEQ-2 and PMCEQ-3). These functional processes, however, required that the interviewees could consciously refrain from overreactions by being mindful (as expressed specifically by PMCEQ-2). Although Wells (2000) addresses the adaptive effects of (detached) mindfulness, the S-REF model could be augmented by explicitly incorporating such mindfulness-controlled brief worry and rumination cycles, i.e. their underlying cognitive and emotional processes. The aforementioned process might shed light on how individuals successfully shift from object to metacognitive mode. It would better explain the successful cessation of active worry and rumination cycles, which in Wells' (2000) diagram of the S-REF model is simply depicted by the uncommented "Finish" arrow (see Figure 1 in Chapter 1, p. 32).

The section ends by briefly discussing possible theory implications which result in two suggestions for potential amendments of the research instruments MCQ-30 and MCQ. These two most prevalent measurement instruments of dysfunctional

metacognitions – Wells and Cartwright Hatton's (2004) MCQ-30 and Cartwright-Hatton and Wells' (1994) original MCQ – might be broadened in scope in two respects: (1) the exclusive focus on worry-related items potentially incorporates confounding effects of trait anxiety and, hence, it would be recommended to include non-worry-related items, as included in PMCEQ-1, that captured dysfunctional perseveration, and (2) inclusion of items assessing potentially inhibiting cognitive processes for problem solving and goal focus could be suggested. The latter arguments refer to factors PMCEQ-2 and PMCEQ-3 and it can be hypothesised that, inversely, psychologically instable individuals not only have a tendency towards perseveration and rumination but lack the subsequent problem and goal orientation.

7.5.2. Research

The empirical research within this PhD – using three different and fairly large samples of 313, 475 and 212 participants – provided evidence for the good reliability and solid construct and concurrent validity of the PMCEQ. Future empirical research will hopefully further support the instrument's good psychometric properties. However, this PhD research did cast some doubts on the distinctiveness and discriminant validity of the PMCEQ-2 and PMCEQ-3 subscales (as discussed on p. 151). Therefore larger validation samples will be needed to provide rigorous empirical evidence for or against the distinctiveness of the two scales. It was possible that both subscales measure in fact a conglomerate dimension and that some items of the aggregated PMCEQ-2* (the combined PMCEQ-2 and PMCEQ-3) construct turned out to be redundant. However, Study 4, Part B (Chapter 6) could provide evidence for discriminant predictive validity of the PMCEQ-2 and PMCEQ-3 factors in terms of anxiety and depression. Analogous support comes also from the subsequently

summarised psychology project study into the effects of the PMCEQ factor on life satisfaction.

Findings within this research supported the hypothesis that the PMCEQ is associated with core psychological constructs of a positive nature, specifically with adaptive coping dispositions, low stress sensitivity and pronounced trait intrinsic motivation. Future research should be conducted to investigate further potentially functional effects of the PMCEQ factors on other psychological constructs with positive connotations and impacts, e.g. creativity and flow. Flow, a state of being task absorbed and focussed, plays a fundamental role in the enjoyment of leisure and occupational activities. As outlined in the Introduction (Chapter 1.6.), flow states share with adaptive metacognitions that the activation of both requires a degree of challenge perception.

Furthermore it is suggested to take quality of life and psychological well-being as specific outcome measures into account. In terms of the latter promising findings emerged already from data of an empirical undergraduate psychology project (dissertation) which used the PMCEQ. The core aim was to investigate to what extent the PMCEQ factors, alongside personality traits and dispositional optimism/pessimism, predict life satisfaction.[28] A mixed sample of 131 worker and student participants completed the Satisfaction with Life Scale (LS), the PMCEQ, the optimism- and pessimism-assessing Life Orientation Test (LOT) and the six-factor HEXACO-PI-R personality inventory. A significant multiple linear regression model emerged which accounted for 28% in the variance of life satisfaction. The linear regression analysis identified three significant predictors of life satisfaction: (a) extraversion, (b) PMCEQ-3 and (c) dispositional pessimism. Hence, interestingly,

[28] The author of this PhD thesis supervised this student's undergraduate project.

only one of the six personality traits, extraversion, and only one of the three metacognitive confidence constructs, PMCEQ-3 (Confidence in Setting Feasible and Flexible Hierarchies of Goals) positively predicted life satisfaction. Optimism did not contribute to life satisfaction, whereas pessimism negatively predicted life satisfaction. The finding that, in terms of the PMCEQ instrument, only PMCEQ-3 was a significant predictor of life satisfaction is in line with this PhD's research findings: it was expected that life satisfaction, as an overall eudaimonic evaluation of one's life and its meaningfulness, would be positively predicted by the agency-related and goal-focussed PMCEQ-3 subscale. As aforementioned this study furthermore supports the hypothesis that PMCEQ-2 and PMCEQ-3 have discriminant predictive validity since PMCEQ-3, but not PMCEQ-2, predicted the life satisfaction.

In line with predictions, findings of this PhD research supported the hypothesis that the PMCEQ is negatively correlated with dysfunctional psychological constructs, specifically maladaptive coping strategies, anxiety and depression. Future research should be conducted to investigate potentially protective effects of the PMCEQ on other psychological constructs with negative connotations and impacts, e.g. obsessive-compulsive symptoms or proneness to addictive behaviours.

Future empirical research should also attempt to further investigate an interesting overall finding which emerged from this PhD research: it appears that psychological equilibrium and well-being not only require the absence of maladaptive metacognitive (and meta-emotional) traits, as measured by the MCQ-30 and MCQ, but also the presence of explicitly adaptive metacognitive and meta-emotional traits, as measured by the PMCEQ.

This PhD research excluded any investigation of underlying biological and physiological "aetiology" of metacognitions and meta-emotions. There are, however,

recent attempts to investigate the biological basis of cognitive processes and related neurophysiological mechanisms. In terms of positive metacognitions two recommendations for future research could be put forward. Experimental investigations of cognitive processes, which individuals display when their positive metacognitive and meta-emotional activities are required within challenge scenarios, would contribute significantly to a better understanding of the hypothesised cognitive mechanisms. Such cognitive processes are nowadays amenable to experimental research in the light of recent and sophisticated computer programmes. An extremely well-validated tool for such research would be the Cambridge Neuropsychological Automated Battery (CANTAB). Prior screening of participants by means of the PMCEQ would allow identification of participants being high and those being low in positive metacognitions. The resulting grouping could in addition be cross-validated using the MCQ-30. Appropriate CANTAB tests could be used to provide evidence for prevalence versus absence of the CAS (specifically with regard to threat monitoring). Absence or low levels of CAS are to be expected in the group displaying high degrees of adaptive metacognitions (and meta-emotions). Such cognitive experimental research would also function as a means of triangulation by backing up the existing questionnaire-based techniques. Hence, it is hypothesised that cognitive experimental research findings would support Wells and Matthew's theory of maladaptive metacognitions and the theory of their adaptive counterparts developed within this PhD research.

In addition neuroimaging techniques have attracted recent attention for uncovering cognitive and neurophysiological processes. By means of functional magnetic resonance imaging (fMRI) Begley (2007) provided evidence that adaptation to novel situations and related self-regulation actions are associated with increased

frontal lobe activity; moreover, he provided the first evidence that the adult brain has the ability for neuroplasticity in response to new experience. The intriguing question here would be if metacognitions and meta-emotions of functional nature resulted in beneficial structural and functional changes of the brain, i.e. neuroplasticity.

The main scope for future research, however, would be to investigate to what extent the main findings and implications of this PhD research and the components of the developed PMCEQ could be applied to therapeutic and coaching interventions aimed at increasing adaptive self-regulation, psychological well-being and performance in different life domains as discussed in the subsequent section.

7.5.3. Practice

The overall findings of this PhD research suggest that the three PMCEQ confidence constructs and their underlying metacognitive and (in parts) meta-emotional processes represent core functional adjustment mechanisms to challenge and/or unpredictability. The processes are functional in the sense that PMCEQ-related adaptive adjustments imply agentic problem-focus and goal-setting flexibility, with the latter being paramount for adjustments to unpredictable problem developments. Data from different samples provided the first empirical evidence that the PMCEQ constructs exert stabilising effects by reducing maladaptive coping strategies, perceived stress and measures of negative emotions (anxiety and depression). PMCEQ factors and their underlying metacognitive and (in parts) meta-emotional dimensions furthermore appear to be positively predictive of functional psychological constructs; the PMCEQ components were shown to foster adaptive approach coping and intrinsic motivation.

In the light of the summarised effects of the PMCEQ factors on core psychological constructs, the PMCEQ components could inform therapeutic interventions within clinical psychology. For less severe psychological problems, those of transient nature and/or not meeting diagnostic criteria of psychopathological disorders, the PMCEQ dimensions could inform novel practice recommendations within the field of counselling psychology. Finally, since the PMCEQ constructs not only prevent maladjustments but, moreover, foster self-determination and adaptive approach coping, they could inform coaching practice in a variety of life domains. Potential practice implications within the domains of clinical and counselling psychology on one hand and within the growing field of coaching psychology on the other hand, will be discussed in the following two sections.

7.5.3.1. Clinical and Counselling Interventions

Due to their reducing effects on perceived stress, anxiety and depression clinical and counselling interventions, attempting to target and foster PMCEQ dimensions, could be an alternative to, or augmentation of, present CBT-based and, moreover, MCT-based treatment approaches to psychological disorders.

MCT treatments predominantly address maladaptive metacognitions and resulting dysfunctional coping strategies and behaviours related to the MCQ and MCQ-30 dimensions. MCT attempts to facilitate patients' maladaptive metacognitive beliefs and, moreover maladaptive metacognitive processing based on the underlying architecture and mechanisms of the S-REF model which were addressed throughout this thesis. Since the CAS is hypothesised to underlie psychological disorders, MCT facilitates patients' attempts to reduce self-focussed attention, threat monitoring, active worry and rumination. MCT-based therapy attempts to block such

dysfunctional metacognitive processing routines at an early stage "in order to increase subjective control over processing and to facilitate efficient disconfirmatory processing" (Wells, 2000, p. 102).

The adaptive counterpart to the aforementioned maladaptive metacognitive beliefs and processing routines could be identified as the PMCEQ-1 construct (Confidence in Extinguishing Perseverative Thoughts and Emotions) within this research. Oversimplified it can be argued that the PMCEQ-1 construct represents an inverse, albeit more basic, facet of the MCQ/MCQ-30 dimensions. Therefore, the PMCEQ-1 cannot contribute to inferring augmentations of MCT approaches.

Potential augmentations of MCT approaches can, however, be derived from the agency and goal-directed confidence dimensions of the PMCEQ-2 (Confidence in Interpreting Own Emotions as Cues, Restraining from Immediate Reaction and Mind-Setting for Problem-Solving) and PMCEQ-3 (Confidence in Setting Flexible and Feasible Hierarchies of Goals). Problem focus and goal-setting – as tapped by PMCEQ-2 and PMCEQ-3 in reference to psychologically stable individuals – could also be amenable to interventions in mental health settings on the subsequently outlined grounds.

Successful treatment of any mental disorder incorporates the inherent risk of relapse after remission. It is suggested here that extending the focus beyond disrupting and replacing maladaptive S-REF routines within MCT, helping patients to actively engage in subsequent problem solving and goal setting could serve as additional means within MCT approaches to prevent potential relapse. Provided a patient has overcome a debilitating disorder, such extended interventions to efficiently solve future problems and being able to formulate and eventually attain self-set goals could

exert mood-enhancing and stabilising effects that would protect against potential relapse.

Such attempts of treatment can be hypothesised to exert sustained and stabilising effects since it has been shown in Study 4, Part A that, whereas PMCEQ-1 merely prevents maladaptive coping, the aggregated PMCEQ-2* (compound PMCEQ-2 and PMCEQ-3) fosters adaptive coping strategies. Adaptive or approach coping in turn increases the likelihood of successful problem solution. Moreover, the tentative evidence that PMCEQ-2 and PMCEQ-3 decrease stress perception should have stabilising effects on patients, specifically since pronounced levels of perceived stress trigger onset or relapse of psychological disorder; corresponding empirical evidence has been provided by the diathesis stress model.

The positive paradigm underlying the abovementioned recommendations follows Cloninger's (2006) school of thought to emphasise adaptive resources and mechanisms. Cloninger recommends that psychopathology and psychiatry should also support patients in developing efficient strategies to focus on adaptive and self-empowering thoughts, emotions and subsequent behaviours in order to counterbalance the predominant and exclusive disorder-focussed view in psychopathology and psychiatry.

In this context it should be reiterated that the majority of interviewees in the qualitative Study 1 gave convincing accounts for their successful transition from (PMCEQ-1 and MCQ-2 related) worry and rumination to extinction of these negative bouts and subsequent agentic and flexible problem and goal focus. Somewhat speculatively and necessitating future randomised controlled trial (RCT) research, it could be inferred that extinguishing active worry and depressive rumination is not

sufficient to prevent future rebound effects but furthermore requires problem solving and goal attainment strategies.

However, with regards to possible clinical applications some caution should be applied since this research was exclusively based upon non-clinical samples. Therefore, the briefly outlined inferences for clinical samples might be limited and it can be assumed that this counts particularly for severe cases of psychopathology. Only rigorous future RCT research could provide empirical evidence whether or not the augmentation of maladjustment-focussed interventions by additional adjustment-focussed ones would be applicable and efficient overall in clinical settings.

In counselling practice settings, which deal with less severe 'cases', it can be hypothesised that the discussed intervention extensions should have measurable well-being enhancing effects. The chances of such positive effects on psychological well-being and quality of life are even higher in the domains of coaching interventions which will be subsequently discussed.

7.5.3.2. Coaching Interventions

Applications of the PMCEQ and the identified framework of positive metacognitive and meta-emotional self-regulation appear to be promising in the field of coaching psychology with the potential to inform efficient coaching interventions. Grant (2006) defines coaching psychology as the "systematic application of behavioural science to the enhancement of life experience, work performance and well-being for individuals, groups and organisations who do not have clinically significant health issues or abnormal levels of distress" (p. 12). On a broad level Johnston (2005) stresses the core aim of coaching psychologists which is to aid clients to maintain their determination and which in turn is crucial for subsequent goal

achievement. In reference to Johnston (2005) the PMCEQ-3 factor (Confidence in Setting Flexible and Feasible Hierarchies of Goals) should provide valuable contributions.

Derived from the narrative accounts of the interviewees in Study 1 it was argued in different parts of the thesis that successful adaptation to challenge comprises a sequence of functional cognitive, emotional and behavioural self-regulation. Extinguishing perseveration, subsequent problem tackling and goal focus represent the cornerstones of such adaptive self-regulation. The corresponding PMCEQ constructs display similarities with Grant's (2003) conceptualisation and emphasis of insight for effective coaching interventions and his postulation that "it can be predicted that individuals' levels of insight should increase as they move through the self-regulatory cycle towards attaining goals" (p. 256). Grant emphasises that such insight, which resembles the confidence constructs in this thesis, is superior to self-reflection processes since individuals are often stuck in the latter. Corresponding evidence came from this PhD research in light of the positive effects the agentic PMCEQ-2 and PMCEQ-3 factors exerted on adaptive (approach) coping and this highlights the relevance of encouraging clients in coaching settings to quickly terminate potential perseveration and subsequently focus on problem tackling and goal attainment.

There is empirical evidence that intrinsic motivation and flow are positively correlated with productivity and performance indicators. The strong link between positive metacognitions and intrinsic motivation indicates that the PMCEQ could be utilised as a means to enhance performance in occupational settings and domains. It can be hypothesised that positive metacognitive and meta-emotional traits are not only positively correlated with trait intrinsic motivations (as shown in Study 3 within this

research) but that both traits could also be positively related with flow measures and measures of creativity. Should future research establish these hypothesised links possible applications of PMCEQ-derived coaching interventions aimed at occupational excellence are self-evident. With regard to physical performance it can be proposed that the PMCEQ-derived coaching interventions would foster peak performance within athletes.

In conclusion, it is beyond the scope of this PhD research to derive concrete practice interventions for clinical, counselling and coaching settings, but the tentative empirical evidence suggests that the PMCEQ items have the potential to constructively inform the development of such intervention programmes.

7.6. Overall Conclusions

In its entirety, consolidating core findings over all five studies, this research's novel contributions lie in four relevant aspects with regards to general applications: (1) first empirical evidence indicates that the PMCEQ is a reliable and valid measure of adaptive cognitive and emotional self-regulation in challenging and/or unpredictable encounters or situations, (2) the PMCEQ represents an instrument which potentially informs therapeutic and coaching interventions in different (clinical and non-clinical) domains, (3) the tentatively uncovered mechanisms underlying the interplay between the three PMCEQ dimensions appear to foster adaptive adjustments to challenge, unpredictability and change which should be particularly valuable in the light of the current economic instability and (4) overall findings suggest that MCT should not only draw on attempts to impact upon and "correct" misguided metacognitions (and meta-emotions) but more explicitly help patients to develop and cultivate positive metacognitive and meta-emotional self-regulation. The latter

suggestion draws on the optimistic view that even trait-related psychological constructs are amenable to some change. If psychologists and psychiatrists can successfully reduce dysfunctional thoughts, emotions and behaviours of their patients, they could simultaneously encourage their patients to train and cultivate functional thoughts, feelings and subsequent actions.

Beyond psychological and clinical treatment implications a plethora of potential applications of the novel PMCEQ measure by means of coaching interventions could be identified. The positive relationships between PMCEQ subscales and "eudaimonic" constructs, e.g. goal-setting, self-determination and intrinsic motivation suggest that the measure could be used to tailor interventions aimed at promoting peak performance, e.g. for gifted students, executive professionals and athletes.

Other future research in non-clinical and non-coaching contexts could be derived from the relationship between positive metacognitions on one hand and other functional and adaptive psychological constructs on the other. This research provided evidence that positive metacognitions are positively correlated with adaptive constructs such as approach coping, curiosity and intrinsic motivation. It should be worthwhile to take other adaptive psychological constructs into account. Flow can be identified as such a core construct which in turn could inform coaching interventions in occupational settings. The flow state plays a fundamental role in the enjoyment of occupational and leisure activities and has been conceptualised as "the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (Csikszentmihalyi, 2002, p. 4). The hypothesised link between metacognition and flow can be based upon the operationalisation of flow as a function

of the perceived challenges of a situation; hence, flow and positive metacognition appear to be both activated by challenge perception.

Future research could empirically test the prediction that the three PMCEQ factors are amenable to some cultivation which in turn should exert enhancing effects on performance indicators in educational and work settings. The identified metacognitive factors are, like dysfunctional metacognitive factors, traits but they are more changeable than other personality traits, such as introversion, neuroticism and psychoticism, that appear to be remarkably stable and enduring personality aspects and, hence, hardly amenable to interventions. Moreover, future research could provide evidence for the positive effects of PMCEQ constructs above and beyond the evidence which has already emerged from this PhD research. Outcome measure of psychological well-being, specifically quality of life and life satisfaction, were of interest within a positive psychology approach. First empirical evidence from the small-scale study described on page 237 provides tentative evidence that PMCEQ-3 positively predicts life satisfaction.

Investigations of the underlying neurophysiological basis of metacognitions were beyond the scope of this PhD research but can be recommended for future research. Experimental investigations of cognitive and associated neurophysiological processes, which individuals display when their positive metacognitive and meta-emotional activities are required within challenge scenarios, would contribute significantly to a better understanding of the hypothesised cognitive mechanisms. Such cognitive processes are nowadays amenable to experimental research due to recent and sophisticated computer programmes, specifically the Cambridge Neuropsychological Automated Battery (CANTAB). In addition, by means of functional magnetic resonance imaging (fMRI) it could be investigated if adaptation

to novel situations and related self-regulation actions were in fact associated with increased frontal lobe activity and neuroplasticity in response to new experience (Begley, 2007). Future research could contribute to establishing core links between the psychological constructs of positive metacognitions, which were at the heart of this PhD research, and underlying neuroanatomical structures and neurophysiological processes.

Overall it is hoped that this research will contribute to increased awareness of the potential impacts of adaptive constructs and will provide some stimuli for further investigating beneficial psychological effects of positive traits by means of rigorous empirical research.

Appendix 1 – Consent Form for Study 1

'CONSENT FORM'

Title of study:	**Impacts of adaptive metacognitions and meta-emotions on (occupational) challenges**
Name of Investigators:	Nils Beer & Dr Giovanni Moneta Department of Psychology, London Metropolitan University

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PARTICIPANT'S CONSENT

- I have been informed of and understand the purpose of this study and its procedures and wish to participate.
- I also understand that in the debriefing session at the end of my participation I will have a further opportunity to ask any questions about this study.
- I understand that the data collected for this study is strictly confidential and I will not be identifiable in any report of this study.
- I further understand that I may withdraw from the study at any time without prejudice to me.

Print name	**Signature**	**Date**
_____	_____	_____

For office use only

INVESTIGATOR'S STATEMENT

I have informed the above named participant of the nature and purpose of this study and have sought to answer their questions to the best of my ability. I have read, understood and agree to abide by the Ethical Principles for Conducting Research with Human Participants set out by the British Psychological Society in carrying out this study.

Signed: Date:

Appendix 2- Briefing Sheet for Study 1

Invitation for your Research Participation & Briefing

Investigation of potential impacts of adaptive metacognitions and meta-emotions on challenging (occupational) tasks

We are inviting you to participate in a study to investigate the potential impacts of adaptive or functional metacognitions and meta-emotions on challenging job tasks or projects. The study will be conducted as a semi-structured interview which will last approximately 40 minutes.

Background

Metacognitions can be conceptualised as knowledge about one's own cognitive processes and the individual's ability to deconstruct and understand their own cognitive processes involving reflection and awareness of various types of problem solving (Milne, 2003). This ability to 'think about one's own thinking' has been widely investigated in Educational Psychology – and more recently in Clinical Psychology where the focus is on the role of maladaptive metacognitions on mental problems such as Generalised Anxiety Disorder or Obsessive Compulsory Disorder (E.g. Teasdale, Segal & Williams, 2003).

As a novel approach within the framework of Positive Psychology rather than Psychopathology this study will be investigating the potential impacts of functional (adaptive) metacognitions and meta-emotions on occupational functioning.

The 'interview scenario'

Prior to your very much appreciated participation in the (semi-structured) interview we would like to ask you to reflect upon an occupationally challenging project (or alternatively a major not job-related task) which started with some significant obstacles and difficulties but in the end turned out as a success! Can you possible segment your thoughts, sense of agency/mastery/self-directedness *(Did you do something actively?)* but also your sense of or your need for cooperativeness/communion *(Did you choose a more listening approach? Did you seek advice, approval or support from other people involved in the project?)* into phases? You could think of the difficult starting phase and then try to identify the 'turning point' and the subsequent phase when 'things went well'. In addition to your

thought processes could you possibly describe your awareness, e.g. in terms of (positive) emotions, beliefs and focussed or broadened attention?

You will be guided through the interview by means of semi-structured questions.

Your precious participation could provide the basis for the subsequent development of a novel questionnaire measuring Positive Metacognitions. **Please let us know a convenient date for the interview.** Many thanks in advance!

If you do have any queries please contact me: N.Beer@londonmet.ac.uk or N.Beer@wmin.ac.uk, 020 7320 3408. You can also contact my supervisor Dr Giovanni Moneta: g. moneta@londonmet.ac.uk, Tel.: 020 7320 2360

Appendix 3 – Briefing Sheet and Consent Form for Study 2

London Metropolitan University
School of Psychology

BRIEFING & CONSENT FORM

Title of study: Development and validation of the "**Positive Metacognitions [and Meta-Emotions] Questionnaire**" (PMC[E]Q)

Investigators: Nils Beer & Dr Giovanni Moneta

This research aims at developing and psychometrically validating a novel questionnaire which shall be utilized in follow-up research to investigate how positive metacognitions and meta-emotions contribute to psychological well-being. Your participation in this study requires you to fill in three-page long questionnaire. On page 1 you will be asked demographic questions that will be used to perform statistical comparisons between groups with different backgrounds. On the following pages you will be asked questions on your thoughts, emotions and behaviours when coping with slightly challenging tasks. The questionnaire should take no longer than 15 minutes to complete.

All information you provide will be anonymous and kept confidential.
Thank you very much for participating in this study.

Participant's Consent

I have been informed of and understand the purpose of this study and its procedures and wish to participate. I also understand that in the debriefing at the end of my participation I will have a further opportunity to ask any questions about this study. I understand that the data collected for this study is strictly confidential and I will not be identifiable in any report of this study. I further understand that I may withdraw from the study at any time without prejudice to me.

Print name **Signature** **Date**

Investigator's Statement

I have informed the above named participant of the nature and purpose of this study and have sought to answer any question to the best of my ability. I have read, understood, and agree to abide by the Ethical Principles for Conducting Research with Human Participants set out by the British Psychological Society in carrying out this study.

Signed: Date:

Appendix 4 – Prototype of the (49-item) PMCEQ

For each questions please tick <u>one</u> response (column) which appears to be the most appropriate one for you: ***1 Don't agree*** ***2 Agree Slightly*** ***3 Agree moderately*** ***4 Agree very much***	***1***	***2***	***3***	***4***
1. Even when I am in trouble I can focus on my thoughts and regulate my feelings and actions in positive ways.				
2. When facing difficult situations I focus more on what the situation requires than on monitoring my 'performance'.				
3. To what extent do you agree with the following statement: "If you can't control certain things and you try to do so, it's a waste of effort, better spent on things you can control"?				
4. I feel that I can tolerate a healthy bit of frustration when things are not working out.				
5. When facing difficult or unpredictable situations I am good at suspending my worrying thoughts.				
6. I am aware that I can make a deliberate choice between actively directing and 'contemplatively accepting' my thoughts, feelings and actions.				
7. When I encounter ambiguous situations I try to be extra vigilant to check whether they might imply some kind of threat.				
8. I can easily divide important long-term goals into achievable and short-term sub-goals.				
9. When certain problems grow I tend to 'bottle things up'.				
10. I find it difficult to purposefully direct my thoughts, to take 'charge of my mind' when under pressure.				
11. When I have to face difficult circumstances I try to assess them rationally rather getting 'panicky' and I try to focus on what I can do.				
12. If I am overwhelmed by a big task I would stop and take smaller steps.				
13. Even when under stress or when things are going wrong I lose my temper only temporarily.				
14. Even when I encounter some long-term problems I rarely feel self-pity.				
15. I feel that I can beneficially control my thoughts and feelings because I am aware that 'feeling low and depressed' are just brief and transient states.				
16. When confronted with ongoing troublesome circumstances I often start 'brooding' and find it difficult to stop.				
17. I find it hard to break down huge goals into a set of smaller sub-goals – I rather get them out of the way quickly.				
18. I tend to overreact when things are really going wrong.				

19. If things go really badly I tend to brood and dwell on my negative thoughts.				
20. When the 'blues' overcomes me I tend to struggle with controlling my low mood.				
21. When I experience taxing demands I try to act as in the motto: "There are no problems, only solutions".				
22. I find it fairly easy to identify important needs and goals for me.				
23. I tend to enter novel situations with an open mind and try to avoid making premature judgements.				
24. When I start worrying I can easily stop – I would not make myself sick with worrying thoughts.				
25. I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face some troublesome events.				
26. I believe that it is better to tackle urgent problems and conflicts sooner rather than later.				
27. I feel it's difficult to decide between conflicting goals.				
28. I like to encounter novel situations and challenges rather than sticking to familiar routines.				
29. Even when under 'duress' (in difficulty) it's up to me to be in charge of my thoughts and emotions.				
30. In difficult situations I tend to focus on what can be done rather than closely 'monitoring' my behaviour.				
31. I can prioritise my needs and formulate a hierarchy of goals.				
32. I easily lose my temper in the heat of the moment.				
33. In times of 'feeling in the dumps' it's hard for me to regulate my low mood.				
34. I tend to rationally evaluate unpredictable situations rather than getting anxious.				
35. When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.				
36. If I encounter or engage in unfamiliar, novel situations or tasks it's important for me to have a flexible and non-evaluative mindset.				
Questions 37-44 refer to the following brief scenario: You are confronted with an unfamiliar and challenging situation in which you might be evaluated by other people. Suppose that this situation induces a bit of fear.				
37. I tend to think that my worrying thoughts might reflect the reality.				
38. I can 'step back' and assess whether my worry reflects the reality.				
39. I start worrying and thinking of avoiding the situation.				
40. I quickly 'rationalise' my fear by assessing cost and benefits of 'confronting versus escaping'.				
41. I can stop any 'negative thinking spirals' and focus on what I can do in the situation.				
42. I am torn between escaping and facing the situation.				
43. I feel that negative or anxious thoughts do not depict				

the reality – I regard them just as 'events' which I have to evaluate.				
44. I can easily prevent ongoing bouts of anxiety by just confronting the situation.				
45. When it seems that the cause of a problem is external to me I remind myself that I am part of the problem.				
46. When I face a complex situation I explore several approaches to it before committing to one.				
47. When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.				
48. When a problem appears to be insurmountable I know that it's just a matter of breaking it down into smaller problems.				
49. When the going gets tough I find solutions by stepping down momentarily and looking at things from different angles.				

Thank you very much for your appreciated participation!

Appendix 5 – PMCEQ-27

This questionnaire is concerned with beliefs people have about their thinking and emotions in difficult situations. Listed below are a number of such beliefs that people have expressed. Please read each item and indicate how much you generally agree with it. ***For each question please tick <u>one</u> response (box) which appears to be the most appropriate one for you:*** ***1 Do not agree*** ***2 Agree Slightly*** ***3 Agree moderately*** ***4 Agree very much***	***1***	***2***	***3***	***4***
1. In times of "feeling in the dumps" it's hard for me to regulate my low mood.				
2. In difficult situations I quickly "rationalise" my fear by assessing costs and benefits of "confronting versus escaping".				
3. I can easily divide important long-term goals into achievable and short-term sub-goals.				
4. If things go really badly I tend to brood and dwell on my negative thoughts.				
5. I can "step back" and assess whether my worry reflects the reality.				
6. I can prioritise my needs and formulate a hierarchy of goals.				
7. When the "blues" overcomes me I tend to struggle with controlling my low mood.				
8. I feel that negative or anxious thoughts do not depict the reality – I regard them just as "events" which I have to evaluate.				
9. When I find it difficult to cope with a huge task I tend to tackle it in smaller steps.				
10. I tend to overreact when things are really going wrong.				
11. I can stop any "negative thinking spirals" and focus on what I can do in the situation.				
12. When progress becomes slow and difficult I can readily adopt a step-by-step approach to remove obstacles.				
13. When confronted with ongoing troublesome circumstances I often start "brooding" and find it difficult to stop.				
14. If I encounter or engage in unfamiliar, novel situations or tasks it's important for me to have a flexible and non-evaluative mindset.				
15. When a problem appears to be insurmountable I know that it's just a matter of breaking it down into smaller problems.				
16. I tend to think that my worrying thoughts might reflect the reality.				
17. I tend to rationally evaluate unpredictable situations rather than getting anxious.				
18. I find it hard to break down huge goals into a set of smaller sub-goals – I rather get them out of the way quickly.				
19. I easily lose my temper in the heat of the moment.				
20. When facing difficult and/or unpredictable situations I am good as suspending my worrying thoughts.				

21. If I were overwhelmed by a big task I would stop and take smaller steps.				
22. I find it difficult to purposefully direct my thoughts, to take "charge of my mind" when under pressure.				
23. I tend to enter novel situations with an open mind and try to avoid making premature judgements.				
24. I find it fairly easy to identify important needs and goals for me.				
25. I feel it's difficult to decide between conflicting goals.				
26. I can make a volitional (free) decision to keep on top of things and remain confident even when I have to face some troublesome events.				
27. When I experience taxing demands I try to act as in the motto: "There are no problems, only solutions".				

Appendix 6 – Meta-Cognitions Questionnaire 30 (MCQ-30)

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and indicate how much you generally agree with it. ***For each question please tick <u>one</u> response (box) which appears to be the most appropriate one for you:*** ***1 Do not agree*** ***2 Agree Slightly*** ***3 Agree moderately*** ***4 Agree very much***	***1***	***2***	***3***	***4***
1. Worrying helps me to avoid problems in the future.				
2. My worrying is dangerous for me.				
3. I think a lot about my thoughts.				
4. I could make myself sick with worrying.				
5. I am aware of the way my mind works when I am thinking through a problem.				
6. If I did not control a worrying thought, and then it happened, it would be my fault.				
7. I need to worry in order to remain organised.				
8. I have little confidence in my memory for words and names.				
9. My worrying thoughts persist, no matter how I try to stop them.				
10. Worrying helps me to get things sorted out in my mind.				
11. I cannot ignore my worrying thoughts.				
12. I monitor my thoughts.				
13. I should be in control of my thoughts all the time.				
14. My memory can mislead me at times.				
15. My worrying could make me go mad.				
16. I am constantly aware of my thinking.				
17. I have a poor memory.				
18. I pay close attention to the way my mind works.				
19. Worrying helps me to cope.				
20. Not being able to control my thoughts is a sign of weakness.				
21. When I start worrying, I cannot stop.				
22. I will be punished for not controlling certain thoughts.				
23. Worrying helps me to solve problems.				
24. I have little confidence in my memory for places.				
25. I think it's bad to think certain thoughts.				
26. I do not trust my memory.				
27. If I could not control my thoughts I would not be able to function.				
28. I need to worry in order to work well.				
29. I have little confidence in my memory for actions.				
30. I constantly examine my thoughts.				

Appendix 7a – Work Preference Inventory (WPI), Adult Version

Work Preference Inventory, Working Adult Version
Professor Teresa M. Amabile,Harvard Business School

Please rate each item in terms of how true it is of you. Please circle one and only one letter for each question according to the following scale:

N = Never or almost never true of you; **S = Sometimes** true of you
O = Often true of you; **A = Always** or almost always true of you

N S O A	1. I am not that concerned about what other people think of my work.
N S O A	2. I prefer having someone set clear goals for me in my work.
N S O A	3. The more difficult the problem, the more I enjoy trying to solve it.
N S O A	4. I am keenly aware of the income goals I have for myself.
N S O A	5. I want my work to provide me with opportunities for increasing my knowledge and skills.
N S O A	6. To me, success means doing better than other people.
N S O A	7. I prefer to figure things out for myself.
N S O A	8. No matter what the outcome of a project, I am satisfied if I feel I gained a new experience.
N S O A	9. I enjoy relatively simple, straightforward tasks.
N S O A	10. I am keenly aware of the promotion goals I have for myself.
N S O A	11. Curiosity is the driving force behind much of what I do.
N S O A	12. I'm less concerned with what work I do than what I get for it.
N S O A	13. I enjoy tackling problems that are completely new to me.
N S O A	14. I prefer work I know I can do well over work that stretches my abilities.
N S O A	15. I'm concerned about how other people are going to react to my ideas.
N S O A	16. I seldom think about salary and promotions.
N S O A	17. I'm more comfortable when I can set my own goals.
N S O A	18. I believe that there is no point in doing a good job if nobody else knows about it.
N S O A	19. I am strongly motivated by the money I can earn.
N S O A	20. It is important for me to be able to do what I most enjoy.
N S O A	21. I prefer working on projects with clearly specified procedures.
N S O A	22. As long as I can do what I enjoy, I'm not that concerned about exactly what I'm paid.
N S O A	23. I enjoy doing work that is so absorbing that I forget about everything else.
N S O A	24. I am strongly motivated by the recognition I can earn from other people.
N S O A	25. I have to feel that I'm earning something for what I do.
N S O A	26. I enjoy trying to solve complex problems.
N S O A	27. It is important for me to have an outlet for self-expression.
N S O A	28. I want to find out how good I really can be at my work.
N S O A	29. I want other people to find out how good I really can be at my work.
N S O A	30. What matters most to me is enjoying what I do.

Please also complete the following. This information is essential for our statistical records.

Name _____ Age_____ Sex_____

Occupation _____ # years in occupation _____

Highest educational degree _____ Today's e _____

Appendix 7b – Work Preference Inventory (WPI)
College Student Version

Please rate each item in terms of how true it is of you. Please circle one and only one letter for each question according to the following scale:

N = Never or almost never true of you; **S = Sometimes** true of you
O = Often true of you; **A = Always** or almost always true of you

1. I am not that concerned about what other people think of my work.
2. I prefer having someone set clear goals for me in my work.
3. The more difficult the problem, the more I enjoy trying to solve it.
4. I am keenly aware of the goals I have for getting good grades.
5. I want my work to provide me with opportunities for increasing my knowledge and skills.
6. To me, success means doing better than other people.
7. I prefer to figure things out for myself.
8. No matter what the outcome of a project, I am satisfied if I feel I gained a new experience.
9. I enjoy relatively simple, straightforward tasks.
10. I am keenly aware of the GPA (Grade Point Average) goals I have for myself.
11. Curiosity is the driving force behind much of what I do.
12. I'm less concerned with what work I do than what I get for it.
13. I enjoy tackling problems that are completely new to me.
14. I prefer work I know I can do well over work that stretches my abilities.
15. I'm concerned about how other people are going to react to my ideas.
16. I seldom think about grades and awards.
17. I'm more comfortable when I can set my own goals.
18. I believe that there is no point in doing a good job if nobody else knows about it.
19. I am strongly motivated by the grades I can earn.
20. It is important for me to be able to do what I most enjoy.
21. I prefer working on projects with clearly specified procedures.
22. As long as I can do what I enjoy, I'm not that concerned about exactly what grades or awards I can earn.
23. I enjoy doing work that is so absorbing that I forget about everything else.
24. I am strongly motivated by the recognition I can earn from other people.
25. I have to feel that I'm earning something for what I do.
26. I enjoy trying to solve complex problems.
27. It is important for me to have an outlet for self-expression.
28. I want to find out how good I really can be at my work.
29. I want other people to find out how good I really can be at my work.
30. What matters most to me is enjoying what I do.

Appendix 8 – Brief Cope

Please try to think of the most challenging life event / situation you have experienced within the last six months or so and see which coping methods you have been using.

1 = I have not been doing this at all.
2 = I have been doing this a little bit.
3 = I have been doing this a medium amount.
4 = I have been doing this a lot.

1. I've been turning to work or other activities to take my mind off things. ___
2. I've been concentrating my efforts on doing something about the situation I'm in. ___
3. I've been saying to myself: "this isn't real". ___
4. I've been using alcohol or other drugs to make myself feel better. ___
5. I've been getting emotional support from others. ___
6. I've been giving up trying to deal with it. ___
7. I've been taking action to try to make the situation better. ___
8. I've been refusing to believe that it happened. ___
9. I've been getting help and advice from other people. ___
10. I've been using alcohol or other drugs to help me get through it. ___
11. I've been trying to see it in a different light, to make it seem more positive. ___
12. I've been trying to come up with a strategy about what to do. ___
13. I've been getting comfort and understanding from someone. ___
14. I've been giving up the attempt to cope. ___
15. I've been looking for something good in what is happening. ___
16. I've been making jokes about it. ___
17. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping. ___
18. I've been accepting the reality of the fact that it has happened. ___
19. I've been trying to get advice or help from other people about what to do. ___
20. I've been learning to live with it. ___
21. I've been thinking hard about what steps to take. ___
22. I've been making fun of the situation. ___

Appendix 9 – Perceived Stress Scale (PSS)

Instructions

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, do not count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

For each question please choose from the following alternatives:

0 = never; 1 = almost never; 2 = sometimes; 3 = fairly often; 4 = very often

1. In the last month, how often have you been upset because of something that happened unexpectedly? ___
2. In the last month, how often have you felt that you were unable to control the important things in your life? ___
3. In the last month, how often have you felt nervous and stressed? ___
4. In the last month how often have you dealt with irritating life hassles? ___
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life? ___
6. In the last month, how often have you felt confident about your ability to handle your personal problems? ___
7. In the last month, how often have you felt that things were going your way? ___
8. In the last month, how often have you found that you found that you could not cope with all the things you had to do? ___
9. In the last month, how often have you been able to control irritations in your life? ___
10. In the last month, how often have you felt that you were on top of things? ___
11. In the last month, how often have you been angered because of things that happened that had been outside your control? ___
12. In the last month, how often have you found yourself thinking about things that you have to accomplish? ___
13. In the last month, how often have you been able to control the way that you spend your time? ___
14. In the last month, how often have you felt difficulties piling up so high that you could not overcome them? ___

Appendix 10 – Hospital Anxiety and Depression Scale (HADS)

Instructions

This questionnaire is designed to assess how you feel. Please ignore the numbers printed on the left of the questionnaire. Read each item and **underline** the reply which comes closest to how you have been feeling in the **past month.**
Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

A **I feel tense or 'wound-up':**
3 Most of the time
2 A lot of the time
1 From time to time, occasionally
0 Not at all

D **I still enjoy the things I used to enjoy:**
0 Definitely as much
1 Not quite so much
2 Only a little
3 Hardly at all

A **I get a sort of frightened feeling as if something awful is about to happen:**
3 Very definitely and quite badly
2 Yes, but not too badly
1 A little, but it doesn't worry me
0 Not at all

D **I can laugh and see the funny side of things:**
0 As much as I always could
1 Not quite so much now
2 Definitely not so much now
3 Not at all

A **I can sit at ease and feel relaxed:**
0 Definitely
1 Usually
2 Not often
3 Not at all

D **I feel as if I am slowed down:**
3 Nearly all the time
2 Very often
1 Sometimes
0 Not at all

HADS continued...

A **I get a sort of frightened feeling like 'butterflies' in the stomach:**
0 Not at all
1 Occasionally
2 Quite often
3 Very often

D **I have lost interest in my appearance:**
3 Definitely
2 I don't take as much care as I should
1 I may not take quite as much care
0 I take just as much care as ever

A **I feel restless as I have to be on the move:**
3 Very much indeed
2 Quite a lot
1 Not very much
0 Not at all

D **I look forward with enjoyment to things:**
0 As much as I ever did
1 Rather less than I used to
2 Definitely less than I used to
3 Hardly at all

A **I get sudden feelings of panic:**
3 Very often indeed
2 Quite often
1 Not very much
0 Not at all

D **I can enjoy a good book or radio or TV programme:**
0 Often
1 Sometimes
2 Not often
3 Seldom

Now please check that you have answered all questions. Thank You!

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