

**EXPERIMENTAL STUDIES ON THE INFLUENCE OF APPRAISAL ON EMOTIONAL ACTION
TENDENCIES AND ASSOCIATED FEELINGS**

Evelien Bossuyt



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Experimental studies on the influence of appraisal on emotional action tendencies and associated feelings

Evelien Bossuyt

Promotor: Prof. Dr. Agnes Moors
Co-promotor: Prof. Dr. Jan De Houwer

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Doctoreren is...

weekendwerk, nachtwerk, programmeren, experimenteren, analyseren, nulresultaten, vage resultaten, schrijven, herschrijven, schrappen, overlezen, ontschrapen, beoordeeld worden op factoren waar je zelf geen invloed op hebt, bijstellen van ambities, opbergen van ideeën, hoop, wanhoop, teleurstelling...

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CONTENTS

Chapter 1	<i>General introduction</i>	1
Chapter 2	<i>The influence of the appraisal of self- vs. other-agency on the tendency to repair vs. attack</i>	27
Chapter 3	<i>The relation between the appraisal of self- vs. circumstances-agency, the tendency to repair, and the feeling of regret</i>	59
Chapter 4	<i>The influence of the appraisals of expectancy and proximity on the tendency to repair</i>	91
Chapter 5	<i>Angry approach and fearful avoidance: The goal-dependent nature of emotional approach and avoidance tendencies</i>	119
Chapter 6	<i>General Discussion</i>	145
Nederlandstalige samenvatting		177

A century ago, psychologists articulated the idea that emotions are byproducts of an evolutionary shaped motivational system. In his seminal paper, William James (1884) proposed that emotions are the felt bodily changes that accompany predisposed sequences of perception and action. McDougall (1908) identified emotions as the affective aspect of the operation of what he called instincts, such as to flee from danger (fear), to repel noxious stimuli (disgust), and to destroy obstructions (anger). These ideas have set the stage for many contemporary emotion theories (e.g., Arnold, 1960; de Rivera, 1977; Frank, 1988; Frijda, 1986; Griffiths, 1990; Haidt, 2003; Lazarus, 1991; Levenson, 1999; Oatley & Johnson-laird, 1987; Panksepp, 1982; Plutchik, 1980; Prinz, 2004; Roseman, 2011; Scherer, 2009; Solomon, 1977). To date, ample researchers endorse the idea that a full understanding of human emotion requires insight in human motivation and behavior.

In contemporary theories, emotions are often defined as syndromes with multiple components (Moors, 2009; Scherer, 2005). One of these components is a motivational component, consisting of the activation of an action tendency or goal to change the relation between the self and the stimulus (Frijda, 1988, 2010). Other components are (a) a somatic component, consisting of neuroendocrine and physiological changes that prepare the organism for action (Bull, 1951; Frijda, 1988; Lazarus, 1982; Levenson, 1994), (b) a motor component that flows from the action tendency, consisting of gross behavior, facial expression, and/or vocal output (Mortillaro & Scherer, 2009), (c) a cognitive component, consisting of the appraisal of a stimulus in terms of the significance for well-being (Arnold, 1960; Frijda, 1986; Lazarus, 1991; Scherer, 1988), and (d) a feeling or subjective experience component, consisting of the reflection of the other components (cognitive, motivational, somatic, and motor) in consciousness (Bull,

1951; Frijda & Mesquita, 1998; Grandjean, Sander, & Scherer, 2008; Moors, 2009; Scherer, 2004).

Current knowledge about the motivational component of emotion primarily involves its reflection in the feeling component. More in particular, there is a substantial degree of consensus about the relations between specific feelings (or emotion/feeling labels¹) and specific action tendencies (see Table 1). Moreover, these ideas have been confirmed via a multiplicity of research methods, such as autobiographical recall (Roseman, Wiest, & Swartz, 1994; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998), hypnosis (Bull, 1951), inspection of the brain (Panksepp, 1982), and observations in animals (Plutchik, 1980). On the other hand, the question of how the organism in a given situation determines which action tendency to pursue (e.g., to fight or flight, repair or withdraw) presently lacks an unanimous answer and systematic empirical testing. Thus, despite the age-old idea that motivation is the key to understanding emotion, little is known about the processes involved in the elicitation and differentiation of the action tendencies that underpin our emotions. It is our aim to investigate these processes by identifying a number of variables that potentially play a role in these processes and by experimentally investigating a subset of these variables. We employ the general framework of appraisal theories as a basis for this quest.

Appraisal theories propose that the process of stimulus evaluation or appraisal activates and coordinates action tendencies (see Figure 1; Frijda, 1993; Frijda, Kuipers, & ter schure, 1989; Scherer, 2009; Scherer & Ellsworth, 2009). Individual appraisal theories make specific predictions about the way in which stimuli are appraised to select the most adaptive action tendency for a given situation (Roseman & Smith, 2001; Scherer, 2009). Many of these predictions, however, still lack strong empirical support (Frijda & Zeelenberg, 2001). Part of the reason is that the empirical work on appraisal theories has primarily focused on other relations, such as those between appraisals and feelings and those between action tendencies and feelings. Additionally, several of the conventional research methods in appraisal research, such as autobiographical recall (e.g., Roseman, Antoniou, & Jose, 1996; Scherer, 1993b) and scenario studies (e.g., C. A.

¹Words such as anger, fear, sadness, and regret are sometimes used to refer to the emotion as a whole (with all its components) and sometimes to denote a particular feeling or conscious experience (i.e., the feeling component only). Not all authors specify whether they use these words in the first or the second way.

Smith, Haynes, Lazarus, & Pope, 1993; Zeelenberg, van Dijk, & Manstead, 1998), are not ideal to investigate this type of hypotheses (Parkinson & Manstead, 1993).

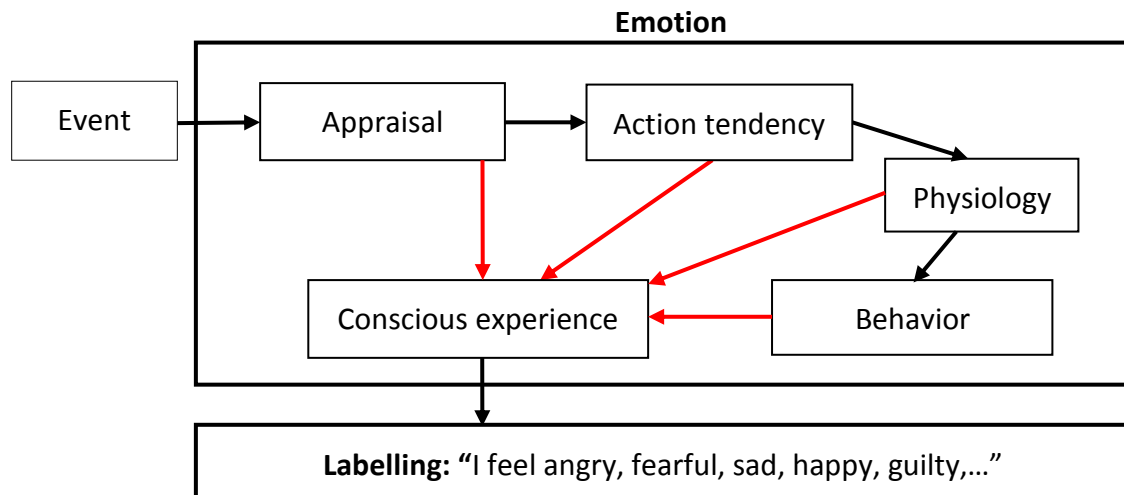


Figure 1. The unfolding process of an emotion according to appraisal theories (Moors, 2009). Red arrows denote the fragmental reflection in awareness; black arrows refer to the causal relations among the other components.

The dissertation is structured as follows: First, we provide a general introduction to the core assumptions of appraisal theories, their hypotheses on the relation between appraisals and action tendencies, and how these hypotheses differ from other theories. Second, we give a detailed overview of methods for studying the causal influence of appraisals on action tendencies with a focus on the measurement of action tendencies. Third, in four empirical chapters (Chapter 2 to 5) we investigate the relation between specific appraisals and action tendencies and their reflection in feelings. Each chapter starts by organizing existing experimental research and by discussing limitations of this research. Most of this research stems from outside the field of appraisal theories. The next step is to remedy several of these limitations in our own experiments. In the general discussion (Chapter 6) we integrate the findings of the empirical chapters and offer suggestions for future research.

Table 1.*Relations between feeling/emotion labels and action tendencies according to different authors.*

<i>Feeling</i>	<i>Tendency to...</i>	<i>Authors</i>
<i>Anger</i>	attack/fight	Berkowitz, 1989; Bull, 1951; Lazarus, 1991; Levenson, 2011; Panksepp, 1982
	destroy	Plutchik, 1980
	punish	Solomon, 1977
	remove obstruction	Frijda, 1986; McDougall, 1908
	remove/move away from self	de Rivera, 1977
	try harder/aggress	Oatley & Johnson-laird, 1987
	hurt	Roseman, 2011
<i>Fear</i>	avoid/escape/flight	Berkowitz, 1989; Bull, 1951; Lazarus, 1991; Levenson, 2011; McDougall, 1908; Panksepp, 1982; Solomon, 1977
	protect oneself	Frijda, 1988; Plutchik, 1980
	move the self away	de Rivera, 1977
	be vigilant/escape	Oatley & Johnson-laird, 1987
	get to safety	Roseman, 2011
<i>Disgust</i>	avoid/(r)ect/repulse/remove	Frijda, 1986; Lazarus, 1991; Levenson, 2011; McDougall, 1908; Oatley & Johnson-laird, 1987; Plutchik, 1980; Roseman, 2011
	vomit/escape	Bull, 1951
<i>Sadness</i>	become inactive/withdraw	Frijda, 1986; Lazarus, 1991
	reintegrate	Plutchik, 1980
	seek help	Levenson, 2011
	regain loss	Solomon, 1977
	do nothing/search new plan	Oatley & Johnson-laird, 1987
	recover	Roseman, 2011
<i>Joy</i>	Approach, increase contact	Frijda, 1988; Lazarus, 1991
	act/move	Bull, 1951
	share mood	Solomon, 1977
	continue plan	Oatley & Johnson-laird, 1987
	sustain	Roseman, 2011
<i>Guilt</i>	repair/seek punishment	Lazarus, 1991
	punish oneself	Solomon, 1977
	atone/redress	de Rivera, 1977; Roseman, 2011
<i>Regret</i>	repair	Zeelenberg, van Dijk, Manstead, et al., 1998
	devalue loss	Solomon, 1977
	correct	Roseman, 2011
<i>Shame</i>	hide self	de Rivera, 1977; Frijda, 1988; Lazarus, 1991; Roseman, 2011
	atone/expiate	Solomon, 1977
<i>Surprise</i>	reorient (toward stimulus)	Frijda, 1986; Levenson, 2011; Plutchik, 1980

	understand	Roseman, 2011
<i>Pride</i>	expand/show off	Lazarus, 1991
	display self	de Rivera, 1977; McDougall, 1908
	seek recognition	Roseman, 2011; Solomon, 1977

APPRAISAL THEORIES OF EMOTION: FROM APPRAISAL TO MOTIVATION AND FEELING

Appraisal theories of emotion are a set of theories that provide detailed assumptions about the way in which the appraisal of a stimulus, rather than the stimulus itself, shapes the emotional response (Scherer & Ellsworth, 2009). We first define the concepts of appraisal and action tendencies before turning to the influence of appraisal on action tendencies.

Appraisal

The term appraisal refers to the continuous process of evaluating encountered stimuli with respect to their significance for well-being (Arnold, 1960; Frijda, 1986; Lazarus, 1991; Scherer, 1988). Several appraisal theorists suggest that the appraisal process often occurs automatically (Arnold, 1960; Frijda & Zeelenberg, 2001; Lazarus, 1991; Oatley & Jenkins, 1996; Roseman & Smith, 2001; Scherer, 1993a, 2001; Moors, 2009), meaning that it often has one or more of the following properties: uncontrollable, unconscious, fast, and efficient (Moors & De Houwer, 2006). Although aspects of the appraisal process, such as its input, output, or the translation from input to output can leave traces in awareness, they often do not (Frijda & Mesquita, 1998; Grandjean, et al., 2008; Lazarus, 1995; Moors & Scherer, in press; Parrott & Hertel, 1999; Roseman, 2008).

Each individual appraisal theory presents a set of appraisal variables that are involved in the appraisal process. Examples of variables that are shared by the majority of the appraisal theories are goal relevance, goal congruence, coping potential, agency, and expectancy (Arnold, 1960; Lazarus, 1991; Roseman, et al., 1996; Scherer, 1988). Goal relevance refers to the extent to which a stimulus touches on goals or concerns of the individual. Its values range from goal irrelevant to goal relevant. Goal congruence refers to the degree of (mis)match between a stimulus and these goals or concerns, with values ranging from goal incongruent to goal congruent. Coping potential, also called

control potential or power, pertains to the ability to cope with (or obtain control over) the stimulus, with values ranging from low to high coping potential. Agency refers to the cause of the stimulus, with the values self, other, and circumstances. Expectancy refers to whether a stimulus is expected or unexpected. Examples of less agreed-upon appraisal variables are suddenness, familiarity, urgency, intrinsic valence, intrinsic controllability, compatibility with internal or external standards (Scherer, 1988), appetitive vs. aversive motive, intrinsic vs. instrumental problem, certainty (Roseman, 2001), future expectancy, type of ego-involvement (Lazarus, 1991), presence or absence of a stimulus (Arnold, 1960), stability and globality of the cause (Weiner, 1985).

The significance of a stimulus for well-being emerges from the pattern of values on the appraisal variables. For instance, the pattern of values goal relevant, goal incongruent, low coping potential, and circumstances agency signifies a danger or threat (C. A. Smith & Lazarus, 1990). Put differently, appraisal values can be considered molecules that combine to form a molar unity or value (Lazarus, 1991; C. A. Smith & Lazarus, 1990; C. A. Smith & Pope, 1992). Examples of molar values are demeaning offense (anger), irrevocable loss (sadness), and failure to live up to an ego-ideal (shame, Lazarus, 1991). Molar values can be considered as summaries or gestalts of patterns of molecular values (C. A. Smith & Lazarus, 1993).

Action tendencies

An action tendency is a goal² to establish, change, or maintain a particular relation between the self and a stimulus (Frijda, 2010; Frijda & Mesquita, 1998). Once activated, the action tendency is assumed to take priority over other goals and to focus all energy on achieving its desired end state, a quality that Frijda (1986) termed “control precedence” (see also Arnold, 1960; Levenson, 1994; Oatley & Johnson-laird, 1987; Roseman, 2008). It is typically assumed that the action tendency can be accomplished by a range of behaviors and that the individual can switch behaviors when a first behavior

² Frijda (2010) suggests that action tendencies do not involve a representation of the desired end state (e.g., obtain safety) but simply a representation of the appraisal of the current state and the desire to change it (e.g., away from danger). He uses the term “goal” to refer to the former and the term “aim” to refer to the latter and suggests that maintaining a goal involves effort whereas maintaining an aim does not. More in line with the literature on goals, we suggest that the content of a goal can both be described in terms of changing a current state and in terms of achieving a future state and that it is not clear which takes more effort. We thus use the term goal in a broader sense than Frijda (2010).

turns out to be unsuccessful. For instance, when the angry individual experiences that his/her nasty comments do not hurt the target, he/she may select other strategies such as ignoring or physically attacking the target. Action tendencies are assumed to be consumable goals (Oatley & Johnson-Laird, 2011), meaning that their activation dissipates when the desired end state is achieved (Austin & Vancouver, 1996). An action tendency is not always translated into actual behavior (Coombes, et al., 2009; Frijda, 2010), and whether it does depends on a number of factors, such as the strength of the action tendency (Leeper, 1948; Scherer, 1994), the possibility to implement the action tendency (i.e., to execute the action, e.g., the tendency to escape cannot be implemented when one is locked in), and the presence and effectiveness of goals to regulate the action tendency. It is important to keep in mind that regulation can be conscious as well as unconscious (Bargh & Williams, 2007; Mauss, Cook, & Gross, 2007; Williams, Bargh, Nocera, & Gray, 2009).

Influence of appraisal on action tendencies

Most appraisal theories address the relation between appraisal and action tendencies in an indirect way (e.g., Lazarus, 1991; Scherer, 1988). More specifically, they separately describe the relation between appraisals and feelings (or feeling/emotion labels) and the relation between action tendencies and feelings (or feeling/emotion labels; see Table 1). Roseman (2001, 2008, 2011) is one among the few appraisal theorists who integrates this information (see also Moors & Scherer, in press). In his theory, each combination of appraisal values produces a specific action tendency and feeling. For instance, stimuli appraised as incongruent with an appetitive goal, caused by others, and easy to cope with elicit the tendency to hurt and feelings of anger, whereas stimuli appraised as goal incongruent, caused by circumstances, difficult to cope with, and uncertain elicit the tendency to obtain to safety and feelings of fear.

Several authors have formulated alternative proposals about the elicitation and differentiation of action tendencies and/or emotions. A number of these proposals are highly similar to appraisal theories but do not announce themselves under the name of appraisal theory (e.g., Kemper, 2006; Nesse, 1990, 2009). A number of proposals is also highly similar but less comprehensive than appraisal theories because they focus either on the eliciting conditions of a single action tendency, such as the tendency to aggress

(e.g., Anderson & Bushman, 2002; Berkowitz, 1989) or on the motivational consequences of a single appraisal variable, such as coping potential (Mikulincer, 1988; Wortman & Brehm, 1975) or agency (Weiner, 1985). Another set of proposals is also compatible with appraisal theories but is less comprehensive in a different way. For instance, a number of theories from evolutionary psychology map each specific emotion, such as fear and disgust, onto a specific adaptational challenge, such as danger and contamination (e.g., Ekman, 1994; Ekman & Cordaro, 2011; Levenson, 1999; Matsumoto & Ekman, 2009; Oatley & Duncan, 1994; Oatley & Johnson-laird, 1987; Panksepp, 1982; Plutchik, 1980). In these proposals, the individual evaluates the challenge that is at stake and activates the action tendency that deals most effectively with that challenge. For instance, Plutchik (1980) suggested that evaluations such as danger, enemy, and poison elicit action tendencies aimed at protection, destruction, and rejection respectively. These evaluations closely resemble the molar appraisal values proposed by Lazarus and colleagues (Lazarus, 1991; C. A. Smith & Lazarus, 1990; C. A. Smith & Pope, 1992). Rather than analyzing these molar challenges into molecular appraisals, however, these theories merely offer some examples of stimuli that represent these challenges. For instance, an object moving very quickly toward you may represent a danger (Ekman, 1994) and the smell of rotten fruit may represent contamination (Matsumoto & Ekman, 2009). Unfortunately, these authors do not present an exhaustive list of the types of stimuli that are related to each challenge. The molecular appraisal variables of appraisal theories offer insight in this matter (e.g., stimuli that are goal relevant, goal incongruent, low on coping potential, and caused by circumstances signify a danger). Finally, some proposals are more difficult to reconcile with appraisal theories because they explain emotion elicitation and differentiation via a completely different set of variables. For instance, Tomkins (1962) proposed that the quantity rather than the quality of stimulation determines the emotion. He assumed that fear stems from a (sudden) increase in stimulation, joy from a decrease in stimulation, and anger from a steady level of stimulation.

To summarize, appraisal theories are one of the many proposals about the way in which action tendencies are elicited and differentiated. Considering that appraisal theories are one of the most elaborated frameworks (Scherer & Ellsworth, 2009) and considering their compatibility with several other proposals, they provide an ideal

starting point for research on the elicitation and differentiation of action tendencies. In the next section we describe methods for investigating this relation.

INVESTIGATING THE CAUSAL RELATION BETWEEN APPRAISALS AND ACTION TENDENCIES

In the first empirical chapter (Chapter 2), we provide a detailed overview of the procedural elements that we consider necessary to draw strong conclusions about the causal influence of appraisals on action tendencies. A key element is an adequate measurement of action tendencies. Since Chapter 2 only briefly touches upon issues of measurement, we elaborate on them in the next paragraphs.

Action tendencies are mental constructs that cannot be observed directly. Therefore, rather than aiming for one ultimate measure, we advocate the combination of different measures that complement each other (Larsen & Frederickson, 1999). In appraisal research, action tendencies are most frequently measured with self-report methods. In other research fields, action tendencies are often inferred from behavior. In the following sections we discuss advantages and disadvantages of self-reports and behavioral measures of action tendencies.

Measuring action tendencies via self-report

A substantial number of studies have measured action tendencies via self-reports (e.g., Fast & Chen, 2009; Fischer & Roseman, 2007; Frijda, et al., 1989; Kuppens, Van Mechelen, & Meulders, 2004; Lammers, Galinsky, Gordijn, & Otten, 2008; Roseman, et al., 1994; P. K. Smith & Bargh, 2008). The advantage of self-reports is that the measurement method is relatively simple and realizable in most contexts. Potential costs of collecting self-reports are that it may (a) interrupt the natural flow of a situation and/or (b) arouse suspicion about the goal of the study and/or the dependent variable(s) under study (Parrott & Hertel, 1999). The interpretation of self-report measures is, moreover, complicated by a number of issues. First, self-reports are considered to be particularly susceptible to participant effects, such as demand characteristics (Orne, 1962; Weber & Cook, 1972) and social desirability concerns (Mauss & Robinson, 2009; Nederhof, 1985). Second, people generally seem to have only limited access to their

mental processes (Nisbett & Wilson, 1977) and thus also to their emotions and action tendencies. Emotion researchers typically presume that only part of the emotion is reflected in consciousness and that only part of this reflection can be expressed verbally (Larsen & Frederickson, 1999; Parrott & Hertel, 1999; Rosenberg & Ekman, 1994; Scherer, 2004). Third, self-reports tend to contain information that is not a genuine part of the emotion, but that is part of the translation process from non-verbal experience into verbal statements (Rosenberg & Ekman, 1994; Scherer, 2004).

Measuring action tendencies via aspects of overt behavior

An action tendency does not necessarily translate into overt behavior (Levenson, 1999; Scherer, 1994), but if it does, behavior can be a useful source of information. There are various aspects of the behavior that one can measure: (a) the presence or absence of a behavior with a certain quality, (b) the intensity of a behavior, and (c) the latency of a behavior. The use of these measures bears on the assumption that stronger action tendencies (a) are more likely to become implemented in actual behavior, (b) lead to more intense behaviors, and (c) lead to a faster onset of the behavior.

Presence or absence of a behavior.

In order to measure the presence or absence of a behavior, one can either register spontaneously occurring behavior or explicitly instruct participants to choose between different behaviors. Research from outside the domain of appraisal has shown that appraisal(like) variables influence the tendency to attack or repair as inferred from spontaneous problem-solving (Galinsky, Gruenfeld, & Magee, 2003), helping (Konecni, 1972), apologizing (Neumann, 2000), and aggressive behaviors (Doob & Gross, 1968) or from instructed choices between aggressive vs. non-aggressive behaviors in ultimatum games and prisoners dilemmas (Ketelaar & Au, 2003; Xiao & Houser, 2005; Yamagishi, et al., 2009).

Intensity of behavior.

One can also measure how eager participants are to perform a particular behavior by measuring the intensity of their responses. Several aggression studies adopted this

reasoning and asked participants to select a number of sound blasts, electroshocks, difficult tasks, hot sauce, or other unpleasant stimuli for another participant (Chen, Lee-Chai, & Bargh, 2001; Fast & Chen, 2009; Geen, 1978; Ritter & Eslea, 2005; Tedeschi & Quigley, 1996). Likewise, helping behavior (related to the tendency to repair) is often operationalized by the size of money donations or the amount of help that is offered (e.g., Cialdini, Darby, & Vincent, 1973; Regan, 1971).

Latency of behavioral responses.

By measuring the latency of behaviors in various conditions, one can examine whether these conditions facilitate or hamper the execution of those behaviors. Ample studies have used this reasoning to investigate the conditions for approach and avoidance tendencies. These responses are often operationalized as the flexing or extending of an arm (by pushing or pulling a joystick) or the moving of a manikin toward or away from a stimulus (De Houwer, Crombez, Baeyens, & Hermans, 2001; Krieglmeier & Deutsch, 2010). In this line of research there are two types of studies that are of interest to appraisal theories. In the first type, the features of the to-be-approached or to-be-avoided stimuli are manipulated. Sometimes these features correspond to one or more appraisal variable(s). For example, Moors and De Houwer (2001; Experiment 2) found that an approach response was performed faster toward goal-congruent stimuli than toward goal-incongruent stimuli, whereas the reverse was true for a withdrawal response. In the second type of studies there is no manipulation of the characteristics of the to-be-approached and to-be-avoided stimuli. Rather, in these studies, participants are first primed with stimuli referring to appraisal variables (e.g., high-power words vs. low-power words) and then the latencies of approach and avoidance responses to unrelated stimuli are measured (e.g., Maner, Kaschak, & Jones, 2010; P. K. Smith & Bargh, 2008).

Behavioral measures may alleviate some of the problems associated with self-reports. First, in various situations it is more natural to respond than not to respond and behavior can thus from time to time be measured without interrupting the natural course of an event. Second, it may be easier to hide the dependent variable under study when it is not measured via direct questions. This, in turn, has implications for demand effects and social desirability effects, which are less likely to occur when participants do

not know what is measured. Third, behavioral measures may not require participants to be aware of the action tendency. For instance, Smith and Bargh (2008) found that priming participants with high and low power affected the distance they left when sitting next to another participant (high-power primes led to a closer seating distance) without participants being aware of their seating distance. Fourth, behavioral measures circumvent problems concerning the translation of the variable of interest into a verbal format.

Behavioral measures are, however, not entirely free from the biases troubling self-reports. People can regulate their behavior in order to comply with what others expect, especially if the behavior has a socially undesirable connotation (e.g., in case of aggression). Hence, studies on aggression may reveal the conditions under which people think it is allowed to behave aggressively, rather than the conditions under which aggressive tendencies are elicited. In Chapter 2, we will therefore argue that it is necessary to take further steps to circumvent regulation, for instance by adding speeded response instructions to the measure (e.g., Ranganath, Smith, & Nosek, 2008) and/or by obscuring the topic of study using a between-subjects design or cover story.

We propose that different measures of action tendencies can complement each other. Some action tendencies remain under the radar of self-report measures (e.g., unconscious and/or non-reportable action tendencies), but can be picked up by behavioral measures (Nisbett & Wilson, 1977). Conversely, there may be action tendencies of which participants are aware and which they can report but that do not surface in their behavior, for instance, because the behavior is disadvantageous for the individual. In addition, participants may be more likely to spontaneously regulate some aspects of their behavior, such as its content, but less likely to regulate other aspects, such as its timing. For these reasons, the empirical chapters of the dissertation always include multiple measures.

EMPIRICAL STUDIES ON THE RELATION BETWEEN APPRAISALS, ACTION TENDENCIES, AND FEELINGS

In this section we provide an overview of our own empirical work described in detail in Chapters 2 to 5. A first aim of this work is to unravel causal relations between specific

appraisal values and specific action tendencies. A second aim is to embed these relations in a framework of relations between appraisals and feelings, on the one hand, and feelings and action tendencies, on the other hand. As a starting point for this research we employed a simple model in which each specific action tendency coincides with one specific feeling (see also Roseman, 2001). If such a model holds, then all knowledge with respect to the appraisal patterns associated with feelings of anger, fear, regret (guilt), and sadness (disappointment) should generalize to the tendency to attack, withdraw, repair, and become passive respectively (see Table 1).

In Chapters 2 to 4, we describe a number of experiments in which we manipulate appraisals and measure action tendencies and feelings. In these experiments, we focus primarily on the tendency to repair. We consider the tendency to repair as one of the most basic and frequently occurring action tendencies. Upon encountering a goal-incongruent event, instead of running away, attacking another person, or hiding oneself, individuals often have the tendency to turn the goal mismatch into a match and to repair the event. The tendency to repair refers to the basic distinction of holding on to the goal and trying to undo the mismatch (i.e., the readiness to act) vs. abandoning the goal and activating a new goal or becoming passive (i.e., the unreadiness to act). We briefly list the hypotheses that we investigate in the empirical chapters.

A first hypothesis is that the appraisal of agency influences the strength of the tendency to repair and plays a role in the differentiation of the tendency to repair from other action tendencies. We inferred this hypothesis from research on (a) the relations between appraisals and feelings and (b) the relations between action tendencies and feelings. The first type of research suggests that goal-incongruent events appraised as caused by oneself (self-agency) elicit feelings of regret or guilt; goal-incongruent events appraised as caused by another person (other-agency) elicit feelings of anger; and goal-incongruent events appraised as caused by circumstances (circumstances-agency) elicit feelings of disappointment, sadness, or fear (Roseman, 2001; Roseman, et al., 1996; C. A. Smith & Lazarus, 1993; van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998). The second type of research suggests that feelings of regret and guilt are associated with the tendency to repair; feelings of anger are associated with the tendency to attack; feelings of disappointment and sadness are associated with the tendency to become passive; and feelings of fear are associated with the tendency to withdraw (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998). Taken

together these findings suggest that the appraisal of self-agency will elicit the tendency to repair, the appraisal of other-agency will elicit the tendency to attack, and the appraisal of circumstances-agency will elicit the tendency to become passive / withdraw. A subset of these hypotheses is examined in Chapters 2 and 3. In Chapter 2, we contrast the appraisal of self-agency with the appraisal of other-agency and measure the tendency to repair vs. to attack. Additionally, we measure feelings of regret, anger, and disappointment. Hypothesis 1a states: An appraisal pattern of goal incongruence plus self-agency elicits the tendency to repair, whereas an appraisal pattern of goal incongruence plus other-agency elicits the tendency to attack. In Chapter 3, we contrast the appraisal of self-agency with the appraisal of circumstances-agency. In this chapter, we measure the strength of the tendency to repair as well as feelings of regret, anger, and disappointment. Hypothesis 1b states: An appraisal pattern of goal incongruence plus self-agency elicits a stronger tendency to repair than an appraisal pattern of goal incongruence plus circumstances-agency. Actually, all our hypotheses should be conceived of as relative, assuming that the tendency to repair is relatively stronger in the case of self-agency but not completely absent in the case of other- or circumstances-agency.

A second hypothesis is that the appraisal of expectancy influences the tendency to repair. Previous research suggested that unexpected goal-incongruent events elicit stronger negative feelings and enhance the motivation to act compared to expected goal-incongruent events. In most of these studies, the manipulation of expectancy was confounded with goal congruence (i.e., the unexpected outcome was more goal incongruent than the expected outcome) or proximity (i.e., the unexpected outcome more often involved just missing a desired outcome than the expected outcome). In the experiments in Chapter 4 we manipulate expectancy while keeping goal congruence and proximity equal. We measure the tendency to repair and feelings of disappointment, frustration, and anger. Hypothesis 2 states: An appraisal pattern of goal incongruence plus unexpected elicits a stronger tendency to repair than the appraisal pattern of goal incongruence plus expected.

Third, we examine the influence of the appraisal of proximity on the tendency to repair. Proximity does not occur in existing appraisal theories, yet the idea that it plays a role in the elicitation of action tendencies is compatible with an appraisal view. Proximity is appraised as high (vs. low) when the hypothetical situation in which a

desired stimulus would have been obtained is a single step (vs. multiple steps) removed from the actual situation (Kahneman & Varey, 1990). Previous studies suggest that an appraisal of high (vs. low) proximity is associated with more negative feelings about the goal-incongruent outcome and with an increased motivation to act. In these studies, however, proximity is often confounded with expectancy. In our experiments (also described in Chapter 4) we were able to clearly separate the influence of proximity from the influence of other appraisals, such as expectancy. Hypothesis 3 states: An appraisal pattern of goal incongruence plus high proximity elicits a stronger tendency to repair than an appraisal pattern of goal incongruence plus low proximity.

The final empirical chapter has a different aim. This chapter focuses exclusively on the relation between action tendencies and feelings. It seeks support for the idea that action tendencies can best be understood in terms of desired end states (e.g., to hurt a person), rather than in terms of (a) specific behaviors (e.g., to slap a person), (b) patterns of muscle activation (the flexing and extending of specific muscles in the arms, hands, and the rest of the body), or (c) kinematic aspects of a behavior (e.g., lift arm, orient hand, accrue speed, and reduce distance). A recent trend in emotion research is to focus on one kinematic aspect of behavior: the reduction or increase of the distance between the self and the stimulus. The idea is that the basic decision organisms make is to approach or avoid stimuli (Davidson, 2009). Several researchers therefore attempt to relate specific feelings or emotions to approach and avoidance tendencies. For instance, there is currently a debate whether anger is related to approach or avoidance, which seems to settle on the conclusion that anger is related to approach (Carver & Harmon-Jones, 2009; Harmon-Jones, 2003; Harmon-Jones & Allen, 1998; Harmon-Jones & Sigelman, 2001; Maayan & Meiran, 2011; Yan & Dillard, 2010). We propose, however, that anger is related to approach because approaching the stimulus is often at the service of the desired end state of the angry person: aggression and/or dominance. Likewise, we propose that other negative feelings, such as fear and disgust, are often related to avoidance, because avoidance is at the service of the desired end state related to those feelings: safety and purity. We test these ideas for anger and fear in five experiments. We hypothesize that anger is related to approach and fear to avoidance when approach is an aggressive and/or dominant behavior (attacking another person) and avoidance a self-protective and/or submissive behavior (fleeing from another person), but that anger is related to avoidance and fear to approach when approach is a

self-protective and/or submissive behavior (begging the other person) and avoidance an aggressive and/or dominant behavior (stubbornly turning the back). Thus, Hypothesis 4 states: Anger is associated with the tendency to hurt/dominate and is related to approach or avoidance behaviors depending on which of these behaviors are at the service of this action tendency. Fear is associated with the tendency to self-protect/submit and is related to approach or avoidance behaviors depending on which of these are at the service of this action tendency.

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CHAPTER

2

THE INFLUENCE OF THE APPRAISAL OF SELF- VS. OTHER-AGENCY ON THE TENDENCY TO REPAIR VS. ATTACK

Appraisal theories of emotion specify when and how stimuli elicit emotional episodes (Arnold, 1960; Scherer, 2001). An emotional episode is often conceptualized as a conglomerate of changes in the human system, consisting of (a) a cognitive component, corresponding to the appraisal of the stimulus, (b) a motivational component, corresponding to the activation of an action tendency or other form of action readiness, (c) a physiological component, supporting the preparation and execution of motor responses, (d) a motor component, corresponding to expressive behavior and gross behaviors, and (e) a feeling or experience component (Moors, 2009; Roseman, 2001; Scherer, 2005). Appraisal theorists posit that the first stage of the emotional episode is the appraisal of the stimulus on a number of appraisal variables (Frijda, 1993; Scherer, 2009). The output of this process, a pattern of appraisal values, then activates an action tendency, which in turn shapes the physiological and behavioral changes (Frijda, 1986). A feeling or emotional experience emerges when aspects of the cognitive, motivational, physiological, and motor component permeate into consciousness (Frijda, 1993).

Appraisal theories thus posit that (a) changes in appraisal drive the other changes in the emotional episode and that (b) the link between appraisal and action tendencies is the gate toward changes in the remaining components (Frijda, 1993; Frijda, Kuipers, & ter schure, 1989; Scherer, 2009). For instance, physiological changes such as an increased heart rate and skin conductance can be explained by the activation of an action tendency aimed at changing the environment (C. A. Smith, 1989). Behavioral changes such as an abrupt disruption of the ongoing behavior and widely opening the eyes (a behavior pattern typically accompanying a feeling of surprise, Roseman, 2001)

can be explained by a tendency to gather new information. There has been a recent surge in research on the influence of appraisals on physiological responses (Aue, Flykt, & Scherer, 2007; Aue & Scherer, 2008; C. A. Smith, 1989; Tomaka, Blascovich, Kelsey, & Leitten, 1993) and the influence of appraisals on facial and vocal expressions (Bonanno & Keltner, 2004; Dimberg, Thunberg, & Grunedal, 2002; Johnstone, et al., 2007; Lanctot & Hess, 2007). Yet, few appraisal researchers have addressed the question of how appraisal patterns translate into the action tendencies that organize and coordinate these changes. In the present chapter, we first discuss existing hypotheses about the influence of appraisal on action tendencies. After that, we review previous research and consider ways in which the methods used in this research can be improved. Finally, we report on an empirical study in which we incorporated several of the suggested methodological improvements. In this study, we investigated the influence of the appraisal of agency on the tendency to repair vs. the tendency to hurt or attack. In sum, we hope to provide new empirical information about the relation between agency and action tendencies as well as novel conceptual and methodological ideas about the relation between appraisal and action tendencies in general.

HYPOTHESES ABOUT THE INFLUENCE OF APPRAISAL ON ACTION TENDENCIES: A CONCEPTUAL ANALYSIS

Before addressing the link between appraisal and action tendencies, we spend a few lines on each of these concepts. Appraisal theorists suggest that people continuously appraise the stimuli in their environment in an automatic way (Arnold, 1960; Frijda & Zeelenberg, 2001; Lazarus, 1991; Oatley & Jenkins, 1996; Roseman & Smith, 2001; Scherer, 1993). Appraisal is a process that evaluates the implications of a stimulus for well-being (Scherer, 2001; C. A. Smith & Lazarus, 1990). More in particular, a stimulus is evaluated on a number of appraisal variables that each deal with a different aspect of the stimulus. Examples of appraisal variables are goal relevance, goal congruence, coping potential, and agency. This way of decomposing appraisal into appraisal variables has been called a molecular approach to appraisal (C. A. Smith & Lazarus, 1990). Some appraisal theorists supplement the molecular approach with a molar approach (e.g., Lazarus, 1991; C. A. Smith & Lazarus, 1990). The molar approach treats appraisal as a

unitary variable with values such as threat, demeaning offense, and irrevocable loss. These values can be considered as summaries of patterns of molecular values (Lazarus, 1991). For instance, the variable of threat can be considered as a summary of the appraisal values goal relevant, goal congruent, low coping potential, and circumstances-agency (C. A. Smith & Lazarus, 1990).

Several emotion theories postulate that emotions have a motivational component consisting of action tendencies or other forms of action readiness (Frijda, 1986, 2009; Haidt, 2003; Prinz, 2010; Roseman, 2001; Scherer, 2005; C. A. Smith & Lazarus, 1990; Solomon, 1977). Action readiness refers to the extent to which one is inclined to have or maintain a relation with a stimulus (Frijda, et al., 1989). It refers to a general tendency to act or not to act, or to a more specific action tendency. Action tendencies and related concepts, such as Roseman's (2008) notion of emotivations¹, were invoked to account for part of the variety in the behavioral expression of emotions. They refer to goals or end states that can be accomplished by a range of behaviors. For example, the goal to hurt a person can be accomplished by physically or verbally attacking the person or by ignoring him/her.

We propose that action tendencies can also be described in a molar or in a molecular way (for similar a position see Roseman, 2001; 2008). Appraisal theories usually adopt a molar approach to action tendencies. Examples of molar action tendencies can be found in research on the relation between action tendencies and feelings (Fischer & Roseman, 2007; Frijda, et al., 1989; Roseman, Wiest, & Swartz, 1994; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998). For example, (a) anger has been related to the tendency to punish, hurt, attack, destroy, or act in an antagonistic way, (b) regret to the tendency to correct or repair a situation, (c) fear to the tendency to obtain safety, (d) shame to the tendency to remove the self out of sight, and (e) disgust to the tendency to remove the disgusting object (Frijda, 1986; Plutchik, 2003; Roseman, 2001; Solomon, 1977). The molecular approach to action tendencies defines a number of action tendency variables that each represent one aspect of the molar action

¹ Roseman (2008) makes a distinction between action tendencies and emotivations. For him, the concept action tendency denotes the tendency to perform a particular response (e.g., hitting someone) and the concept of emotivation denotes broader motivations and goals (e.g., hurting the other person). We decided not to make such a distinction, and use the concept of action tendencies in the way that it was employed by Frijda (1986).

tendencies. Examples of action tendency variables (and their values) are level of activity (active vs. passive), direction of movement (toward vs. away from the evoking stimulus), coping strategy (change the environment vs. adjust the self), and target of the behavior (the self, another person, or the environment; Roseman, 2001; Scherer, 2009). Molar values (e.g., the tendency to obtain safety) can be considered as summaries of patterns of molecular values (e.g., high activity, withdrawal, and adjustment of the self).

Appraisal theories assume that the outcome of the appraisal process triggers an action tendency instead of directly triggering the behavior (Scherer, 1994). Because of this, we have a flexible system that can quickly switch from one behavior to another when the first behavior turns out to be unsuccessful at achieving the goal (Roseman, 2008). Appraisal theorists further argue that the appraisal process allows the individual to select the best action tendency to cope with the current situation (Roseman, 2001; Roseman & Smith, 2001; Scherer, 2009).

Most existing hypotheses about the relation between appraisals and action tendencies treat appraisal in a molecular way and action tendencies in a molar way: Molecular appraisal values combine to form a pattern that elicits one molar action tendency. For example, Roseman (2001) hypothesizes that an appraisal pattern of goal incongruence, other-agency, and high coping potential elicits the tendency to attack. Many hypotheses stem from combining studies on appraisal patterns and feelings with studies on feelings and action tendencies. For example, people tend to label a feeling as “anger” if they appraise the situation as goal incongruent and caused by another person (Kuppens, Van Mechelen, & Rijmen, 2008; Roseman, Antoniou, & Jose, 1996; Tong, et al., 2005), but also if they have the tendency to attack (Frijda, et al., 1989; Roseman, et al., 1994).

Another approach to the study of the relation between appraisal and action tendencies treats both appraisal and action tendencies in a molecular way: Each molecular appraisal value elicits one molecular action tendency value. For example, goal congruence determines the direction of movement (when the event is goal congruent/incongruent, the person tends to approach/withdraw), coping potential determines the coping strategy (when coping potential is low/high, the person tends to change the self/the environment), and urgency determines the activity level (when urgency is low/high, the activation level is low/high; Frijda, 1986; Roseman, 2001; Scherer, 1988).

PREVIOUS RESEARCH ON THE INFLUENCE OF APPRAISAL ON ACTION TENDENCIES: A REVIEW AND METHODOLOGICAL ANALYSIS

Based on a review of the literature, we can classify previous research on the influence of appraisal on action tendencies with regard to the design (correlational or experimental) and the methods used to measure action tendencies (self-report or behavioral). A much-cited study that explicitly addressed the link between appraisal and action tendencies is that by Frijda, Kuipers, and ter Schure (1989). In this study, participants recalled instances of specific emotions (e.g., anger, fear, hope) and indicated the extent to which they were characterized by specific appraisals and specific action tendencies. Correlations were calculated between self-reported appraisals and self-reported action tendencies. The study showed, for instance, that an appraisal of other blame co-occurred with the tendency to respond in an antagonistic way and an appraisal of high coping potential with the tendency to respond in a reactive way.

There are a number of studies that were not explicitly set up to investigate the relation between appraisal and action tendencies but that can be considered as providing support for this relation. These studies often employ experimental designs and/or behavioral measures of action tendencies (Galinsky, Gruenfeld, & Magee, 2003; Lammers, Galinsky, Gordijn, & Otten, 2008; Maner, Kaschak, & Jones, 2010; Moors & De Houwer, 2001; P. K. Smith & Bargh, 2008). For instance, several studies have examined the relation between appraisal(like) variables and aggressive behavior (Chen, Lee-Chai, & Bargh, 2001; Doob & Gross, 1968; Fast & Chen, 2009; Geen, 1978; Nelissen & Zeelenberg, 2009). Action tendencies prepare and support overt behavior. Thus, the characteristics of an overt behavior (such as its presence, intensity, or latency) can be used as an index for the presence and intensity of action tendencies.

Despite the considerable amount of studies that can be framed as investigating the influence of appraisal on action tendencies, few studies combine the procedural elements that are necessary to draw strong conclusions about the causal influence of specific appraisal variables on specific action tendencies. We list these elements in turn.

A first element is the use of an experimental design instead of a correlational design. To demonstrate that certain appraisal values cause particular action tendencies, the appraisal output needs to be manipulated and its effect on action tendencies needs

to be measured, instead of measuring both appraisals and action tendencies and examining the relation between the two.

A second element is that the appraisal variable needs to be manipulated in a pure way (i.e., without affecting other variables). In many studies this is not the case. For example, Maner et al. (2010) and Smith and Bargh (2008) primed participants with high-power or neutral-power words and measured approach and avoidance tendencies. None of them, however, verified whether the prime categories were matched for valence.

A third element is a manipulation check that evaluates the manipulation itself and its potential influence on confounding (appraisal) variables. Even pure manipulations may have an unintended effect on other variables. For instance, increasing an appraisal of uncertainty seems to increase an appraisal of other blame (de Kwaadsteniet, van Dijk, Wit, & De Cremer, 2010).

A fourth element concerns the measurement of action tendencies. In a number of experiments, action tendencies are measured via self-report (Fast & Chen, 2009; Lammers, et al., 2008; P. K. Smith & Bargh, 2008). As argued in Chapter 1, self-reports have a number of drawbacks: (a) They can only be used to assess the conscious part of the action tendency, (b) they require a translation from non-verbal to verbal format, and (c) they are sensitive to several biases such as the bias to respond to social norms and demand characteristics (Parrott & Hertel, 1999; Scherer, 2004). The use of behavioral measures can solve some of the problems related to self-reports. First, behavioral measures may be more sensitive to unconsciously activated action tendencies than self-reports. Support for this claim can be found in a study of Bargh, Gollwitzer, Lee-Chai, Barndollar, and Trötschel (2001). They primed participants with achievement goals and found that these goals influenced behavioral performance on a consecutive task, but not self-reported performance motivation. Second, the difficulty of translating an experienced action tendency into verbal report is circumvented by using a behavioral measure. Third, behavioral measures may allow one to reduce the presence and/or impact of self-presentation strategies and demand effects, because it is easier to hide the construct of interest (and the hypotheses) when it is not measured via direct questions. Importantly, as argued in Chapter 1, behavioral measures are not necessarily free from the influence of self-presentation and other regulation strategies.

This leads us to a fifth element that is necessary to draw strong conclusions about the influence of specific appraisal variables on specific action tendencies: the use of

procedural characteristics that diminish the influence of demand effects and regulation strategies that can overshadow or be mistaken for action tendencies. Examples are the use of speeded response instructions (Ranganath, Smith, & Nosek, 2008) and obscuring the topic of study and/or the dependent variable. Some dependent variables may be more suitable for this purpose, for instance, participants often seem unaware that their response latencies are being measured (e.g., Guyll & Madon, 2003; Onorato & Turner, 2004; Robie, et al., 2000).

Sixth, it is important that the design of a study allows one to pinpoint exactly which action tendency is measured and to exclude the possibility that a measure picks up differences in appraisal rather than differences in action tendencies. Many studies that measure the presence, intensity, or latency of one particular response in different experimental conditions are difficult to interpret in this respect. For instance, in a field study, Doob and Gross (1968) measured the latency of horn-honk responses to a low-status or high-status car that blocked the road. They found that low-status cars elicited faster horn-honk responses than high-status cars. This finding may be interpreted as evidence that low status activates the tendency to aggress, but it could also indicate that people are faster to process that low-status cars block the road. To solve this problem, one needs to measure a contrasting response and show that this response does not present the same speed-up. Similarly, in many studies, the obtained intensity differences in aggression cannot unequivocally be ascribed to the activation of a tendency to attack, because they may reflect the activation of a molecular part of the tendency to attack, such as the tendency to be active or physically approach the stimulus, or the activation of a different molar action tendency altogether, such as the tendency to repair the negative situation (i.e., by rectifying an unjust outcome). To conclude that the tendency to attack was activated, one should compare the aggressive response with other responses that are active, that involve physical approach, and that are aimed in some way at repairing the situation, such as the response of seeking a compromise.

To conclude, many hypotheses on the influence of appraisal on action tendencies still need to be tested with carefully controlled experiments that employ adequate measures of action tendencies. Additionally, there is much room for improvement with respect to diminishing the presence and impact of demand effects and conscious regulation strategies. An example of a hypothesis that has not yet been tested under these stringent conditions is the hypothesis that attributing a negative event to oneself

or another person determines whether the tendency to repair the negative event is activated or the tendency to attack another person. We set up a study to investigate this question.

CURRENT STUDY

Several appraisal theorists posit that stimuli appraised as goal incongruent or negative lead to different feelings and action tendencies depending on the value that they receive on the appraisal variable of agency (self, other, or circumstances): Negative events appraised as caused by oneself (self-agency) elicit feelings of regret or guilt and the tendency to repair; negative events appraised as caused by another person (other-agency) elicit feelings of anger and the tendency to attack/hurt the person that caused the event; negative events appraised as caused by circumstances (circumstances agency) elicit feelings of disappointment or sadness and the tendency to remain passive (Roseman, 2001; Roseman, et al., 1996; C. A. Smith & Lazarus, 1993; van Dijk & Zeelenberg, 2002). Some theorists additionally posit that the effect of agency depends on the appraisal variable of intentionality. They argue that guilt, regret, and anger arise only when the person appraises that the agent (self or other) caused the event intentionally (Lazarus, 1991; Scherer, 1988; Weiner, 1985).

A number of studies have investigated the influence of the appraisal of agency/intentionality on the tendency to attack. To our knowledge, however, none of these studies have combined the elements that we consider necessary for drawing strong conclusions about the causal influence of agency/intentionality on the tendency to attack. First, few studies employed a design in which agency was manipulated experimentally. Without such a design it remains unclear whether the appraisal causes the action tendency or the other way around: The tendency to attack may evoke an appraisal of intentionality or stimulate the search for an intentional agent (Berkowitz & Harmon-Jones, 2004b). Moreover, Berkowitz and Harmon-Jones (2004a) argued that many studies found effects of agency on anger and aggression because participants tend to report only cases of aggression and anger that are “reasonable”, which are cases in which the negative event can be attributed to an external cause. It thus seems

important that future studies take measures to avoid demand effects and self-presentation strategies.

Second, some studies do not have a pure manipulation of agency or intentionality. For example, Krieglmeyer, Wittstadt, and Strack (2009) investigated whether an appraisal of intentionality influenced anger and aggression. Their participants first received a negative evaluation from another person (he disliked their ideas in a brainstorming task). After that, participants in the unintentional condition received a message from the other person that he had not intended to give a bad evaluation but had confused the response scale. Participants in the intentional condition did not receive this message. The results showed a difference between the conditions on a measure of overt aggression toward the other person, but not on a more “implicit” anger measure. The authors concluded that the appraisal of intentionality only influenced whether people consciously tried to suppress their aggressive responses, but not the initial activation of these responses. Their experiment, however, does not provide a clear test of the effect of intentionality because the two conditions were not matched for valence: Only in the unintentional condition, the other person ended up liking the ideas of the participant. It is thus possible that a difference in valence rather than a difference in intentionality gave rise to the results.

Geen (1968) found that participants who were unable to solve a task framed as an IQ-test (i.e., goal-incongruent or negative event) expressed an equal amount of aggression (giving shocks) toward another person irrespective of whether the failure was caused by this person (other-agency) or not (self-agency or circumstances-agency). In his study, however, the experimental conditions also differed in other respects. For instance, only participants in the other-agency condition first interacted with the person they later delivered the shocks to. This may have attenuated the aggressive responses in this condition.

Kulik and Brown (1979) instructed participants to persuade a person to donate money for charity, but the person refused. Agency was manipulated as follows: In the other-agency condition, the person refused because he could not afford it or did not believe in charity. In the self-agency condition, he refused because the participant had not been convincing. The researchers found that agency influenced self-reported anger but not aggressive behavior. It is possible, however, that the agency manipulation was not sufficiently strong. In both conditions, the person refused to donate; hence, in both

conditions there was other-agency. This might explain the failure to obtain an effect for the behavioral measure.

Other studies did manipulate agency in a pure manner but they measured feelings instead of action tendencies or behavior. For instance, Neumann (2000) brought participants in an appraisal mindset of “caused by self” or “caused by other”, before exposing them to an ambiguous event in which another person snarled at them. He found that the manipulation affected participants’ feelings of anger and guilt as well as their verbal behavior. The verbal behavior was classified by two independent raters as associated with feelings of anger and guilt, but not as manifesting specific action tendencies. Moreover, no descriptions were provided of the behaviors that were taken up in each of the categories, making it difficult to identify the action tendencies that were at stake.

To conclude, existing studies provide only weak support for the hypothesis that the appraisal of agency influences the tendency to attack/hurt. The lack of support for this claim can be ascribed to the suboptimal manipulations of agency (or intentionality) and/or inadequate measures of action tendencies. Our study aims to be an improvement on these points. We also measured both attack and repair tendencies and therefore avoided the interpretation difficulties related to the measurement of a single action tendency. Additionally, we measured action tendencies via the latencies of attack and repair responses to diminish demand effects and self-presentation strategies.

We investigated the hypothesis that a goal-incongruent or negative situation caused by oneself results in the tendency to repair the situation whereas a goal-incongruent or negative situation caused by another person results in the tendency to attack the other person. More formally, we predicted that an appraisal pattern of goal incongruence or negative valence plus self-agency results in the tendency to repair, whereas an appraisal pattern of goal incongruence or negative valence plus other-agency results in the tendency to attack (Roseman, 2001). Our hypothesis that self-agency leads to the tendency to repair is derived from research on regret. Various studies show that regret is elicited in response to an appraisal of self-agency (Roseman, et al., 1996; van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998). Regret has also been associated with the tendency to repair a negative situation (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998).

Our experiment had the format of a choice game. The game allowed us (a) to manipulate agency in a pure way and (b) to assess action tendencies on-line (i.e., immediately after the events in the game) on multiple occasions and thus to calculate the average response latency of each action in each agency condition. We manipulated both the variables of goal congruence or valence (goal congruent/positive vs. goal incongruent/negative) and agency (self vs. other) in a within-subjects design. The participants played the choice game on a computer against a female confederate of the experimenter. The goal of the game was to win points. The game consisted of a series of trials on which either the participant or the confederate walked a manikin in the upper or lower road of a fork. There was a piece of food at the end of each road: On one road, the food yielded ten points; on the other road, the food yielded zero points (the points were revealed after the manikin had reached one of the pieces of food). On trials on which the participant controlled the manikin, he/she could either win ten points (i.e., goal-congruent or positive trials) or zero points (i.e., goal-incongruent or negative trials). Half of the positive and negative trials were self-agency trials, the other half were other-agency trials. On self-agency trials, the participant decided which road to take. On other-agency trials, the confederate intentionally blocked one of the roads and the participant was forced to take the road that was left. On negative trials (when the participant received zero points), we measured the relative activation of the tendency to repair vs. attack. The participant could choose to repair the situation by adding points to his/her own score or to attack the confederate by subtracting points from her score. Both behaviors were equally functional in the game: At several times during the game, the scores of both players were compared and the player with the highest score won a lottery ticket. We registered both the quality (attack or repair) and the latency of the response. We also assessed self-reported action tendencies after the experiment in a questionnaire. This questionnaire furthermore included manipulation checks in which we measured the participants' appraisals of agency, expectancy, valence, and fairness. Finally, although our main focus was on action tendencies, the questionnaire asked participants to report the extent to which they had feelings of disappointment, regret, and anger when they obtained a negative outcome on self- and other-agency trials.

Method

Participants.

Thirty-one bachelor students of Psychology or Sport Sciences at Ghent University (28 women, 3 men) took part in the study in return for course credits. None of the participants was color blind.

Apparatus and procedure.

All participants were tested individually in a session of one hour. Each participant was picked up at a meeting point together with the confederate. During the experiment, the participant and the confederate sat in two different rooms that ended in a common corridor. The set-up and the instructions prevented communication between the participant and the confederate, thus increasing the likelihood that emotions would be expressed via responses in the game.

The experiment was programmed in C++ and run in Visual Studio 6.0. It was conducted on a computer connected to two 19" CRT screens and two keyboards, one screen and keyboard in the room of the participant and one in the room of the confederate. Both screens displayed the same screen image: A maze with turquoise walls and grey paths forming six forks (in horizontal position; see Figure 1 for an example of a fork) and a connection between them that was blocked by a brown wall. The six forks were arranged in three layers of two forks. If a manikin had reached the end of the sixth fork, it was automatically transported back to the first fork. In the participant room there was a mouse-shaped response box with two buttons connected to the parallel port of the computer, which allowed for a ms-accurate registration of the reaction times (following the guidelines of Voss, Leonhart, & Stahl, 2007). The participant was asked to use the right hand for the response box and the left hand for the keyboard. The sounds of the game were administered through a speaker in the common corridor.

After both players signed an informed consent form and completed the practice phase (see below), they continued with the experimental phase consisting of 160 trials. At the start of each trial, an orange or blue manikin (with a neutral expression) appeared at the beginning of the fork, together with two pieces of food at the end of the upper

and lower road of the fork. On half of the trials, the participant's manikin (the orange manikin) appeared, which signaled that the participant could walk his/her manikin on that trial. On the other half of the trials, the confederate's manikin (a blue manikin) appeared, which signaled that the confederate could walk her manikin on that trial. Simultaneously with the manikin and the food, a message appeared. On half of the trials, a message (i.e., "blue place your manikin" or "orange place your manikin") stated that the player whose manikin did not appear at the fork (i.e., the player who could not walk his/her manikin) could place his/her manikin in one of three locations, indicated by three brown squares: in the upper or lower road in order to block this road, or in between both roads so that no road was blocked. The confederate blocked the participant whenever she had the opportunity, producing the other-agency trials for the participant (Figure 1, top). On the other half of the trials, a message (i.e., "orange wait for start" or "blue wait for start") stated that the player whose manikin did appear at the fork had to wait for a signal before he/she could start walking. On these trials, the manikin of the other player was automatically placed on a grey square in between both roads and the game was put on hold for an amount of time equal to the amount of time the other player had used to place his/her manikin on a previous trial. The trials with the message "orange wait for start" were the self-agency trials (Figure 1, bottom). We carefully matched the amount of time participants had to wait before walking their manikin on the different types of trials². The end of the waiting period was signaled by removing both the wait message and the brown wall tiles that closed off the next fork.

After the waiting period had ended or the other player had placed his/her manikin in one of the three locations, the participant or confederate walked his/her manikin toward one of the pieces of food. Our cover story provided participants with explicit instructions for how to choose a road/food during the game:

"The computer determines via a very complex algorithm which number is behind which food. This algorithm is too difficult to discover, but research has shown that if

² This was done to avoid that different waiting times in both types of trials would create different levels of frustration. The average time difference between trial onset and the time at which the participants' manikin could start moving toward the food did not differ significantly on other-agency trials (1575 ms) and self-agency trials (1588 ms), $t(30) = 0.5$, $p = .61$.

people follow their intuition they perform better than according to chance level³. We would like to test this hypothesis. This is why we ask you to make choices according to your intuition. Ask yourself each time the following question: Which choice feels best?"

When the manikin walked over the food, the points of both pieces of food (ten and zero) were presented next to the food locations for 500 ms, together with a positive or negative sound. The player earned the points that appeared next to the food covered by his/her manikin. If a player earned ten points, the presentation of the points was followed by an extra positive feedback message for 3000 ms in the middle of the screen: a picture of the player's manikin with a happy expression (mouth corners up) and the message "+10" written in green letters on a black rectangle covering half of the screen. After this, a new trial immediately started. In case a player earned zero points, the presentation of the points was followed by a +/- or -/+ symbol next to the zero points. Instructions stated that the zero points could be compensated for either by winning back part of the ten points (repairing the situation) or by making the other player lose points (attacking the other person). The +/- symbol of the participant consisted of an orange plus-sign (the color of the participants manikin) and a blue minus-sign (the color of the confederate's manikin). In the +/- symbol of the confederate, the colors were reversed. The participant selected a response via the left or right button of the response box. The repair response was selected by clicking the button on the side of the plus-sign; the attack response by clicking the button on the side of the minus-sign. The plus-sign was on half of the trials presented on the left and on half of the trials on the right. Trial-by-trial switching of the meaning of the response buttons allowed us to distinguish between participants who would always perform the same response (repair or attack) from participants who would always click the same button (left or right) without processing the meaning of the response buttons.

To obtain sufficient repair and attack responses in both the self- and other-agency trials (to be able to analyze response latencies), we added an extra element to the procedure. Instructions stated that the computer determined on each trial whether the

³ In reality, there was no such algorithm. The program determined that the chosen food would yield ten points and the non-chosen food zero points on half of the trials and vice versa for the other half of the trials.

utility value would be higher for the repair response or the attack response: On half of the trials, the repair response increased the player's own score with four points and the

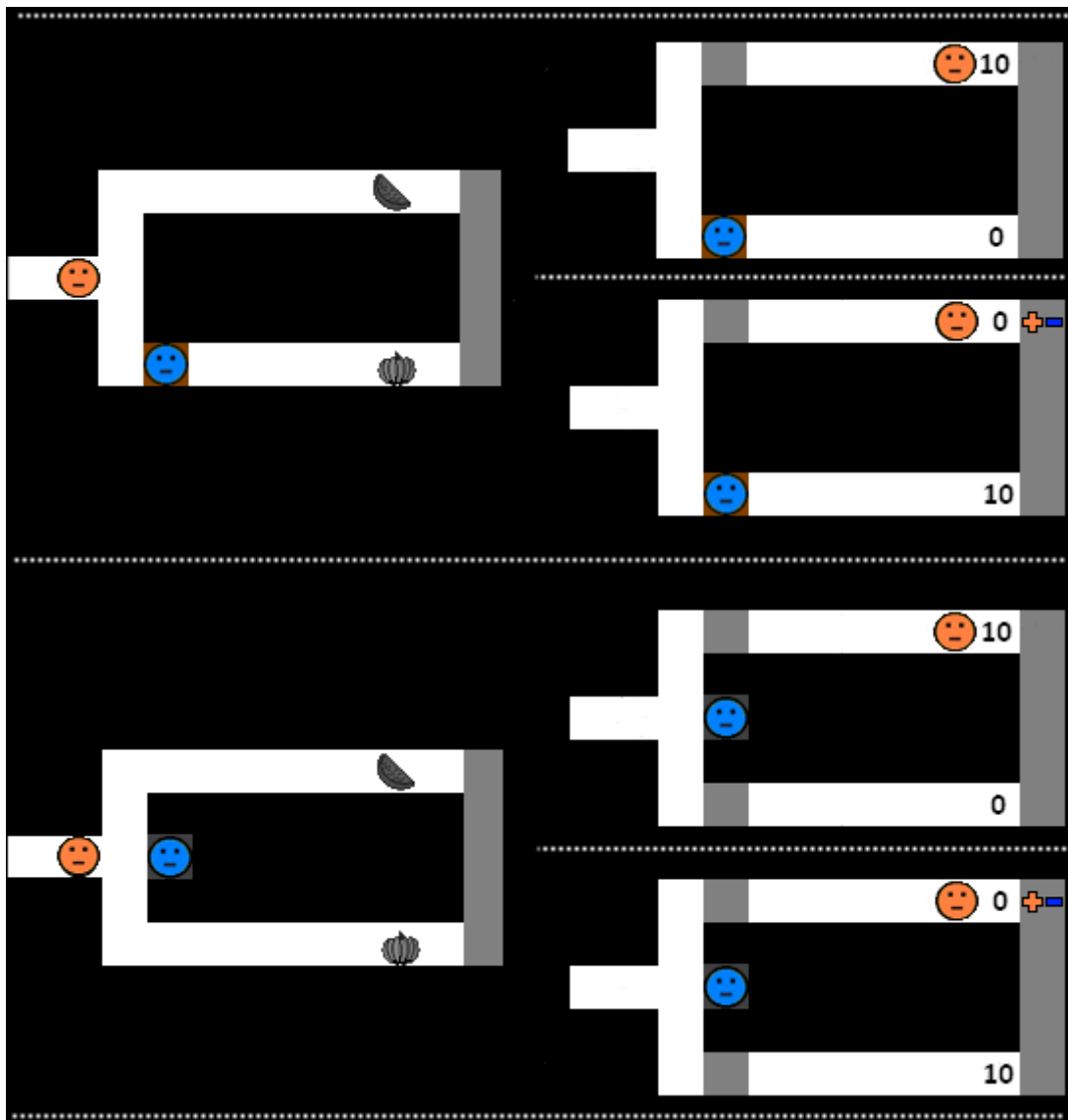


Figure 1. Pictures of the trials. The top left figure depicts the starting phase of an other-agency trial (the confederate's manikin blocks one of the roads); the bottom left depicts the starting phase of a self-agency trial (the confederate's manikin is automatically placed on a grey square in a non-blocking position). The top right depicts the outcome phases of a positive and negative other-agency trial. The bottom right depicts the outcome phases of a positive and negative self-agency trials.

attack response decreased the other player's score with six points (+4/-6 schedule); on the other half of the trials, the repair response increased the own score with six points

and the attack response decreased the other's score with four points (+6/-4 schedule). We instructed participants to follow their intuition in trying to choose the most beneficial option:

"The computer determines according to a complex algorithm whether the +6/-4 schedule or the +4/-6 schedule holds. It is not possible to find out what the algorithm is, but here also, it helps to choose according to your intuition. So again ask yourself for this action: Which action (WIN BACK or MAKE LOSE) feels best?"

Response latencies were calculated from the onset of the presentation of the response cue (+/- or -/+) until a button was pressed. Immediately after a choice was registered, the program provided feedback for 3000 ms: Repair responses were followed by the message "+6" or "+4" in green letters, a picture of the own manikin with a happy expression (mouth corners up), and a positive sound. Attack responses were followed by the message "-6" or "-4" in red letters, a picture of the other player's manikin with a sad expression (mouth corners down), and a negative sound. The computer determined randomly whether the feedback of four or six points was presented, with the constraint that each feedback had to be presented an equal number of times. If no response was recorded before the 5000 ms response deadline, the message "too late" appeared in the middle of the screen (for 3000 ms). In that case, the scores of both players remained unchanged. A new trial started immediately after the feedback or the "too late" message had disappeared from screen.

The scores of the participant and the confederate were always displayed in the upper left corner of the screen. At four times during the experiment (after the maze was completed for the 6th, 13th, and 19th time and after the last trial) the game was stopped and the computer compared both scores. The computer signalled whether the player of the blue or orange manikin had the highest score and won a lottery ticket, or whether there was a tie and nobody won. The lottery tickets were scratch tickets that yielded a money prize between one and ten thousand euro in one out of four chances. They were located on a desk in the common corridor, visible to both players. The winner was instructed to take a ticket from the desk, return to the experiment room, and press ENTER to restart the game. After this, the scores were reset to zero.

The participant walked his/her manikin through the maze with the four arrow keys and placed the manikin in one of three locations with the numerical pad (7 for blocking the upper road, 1 for blocking the lower road, and 4 for the location in between both

roads). The repair and attack responses were performed with the index and middle finger on the left and right key of the response box. The confederate steered her manikin with the numerical pad (8, 6, 2, and 5) and pressed one key (6) to place the manikin on other-agency trials, and another key (R) to perform the attack or repair response. The program determined the qualities of these responses by a randomization algorithm run before the start of each experiment. The confederate blocked the upper and lower roads an equal number of times. She also selected the attack response and the repair response an equal number of times (20 times each) equally divided across trials on which the participant could block a road (10 times each) and trials on which the participant could not block a road (10 times each).

The 160 experimental trials consisted of 80 trials on which the participant could walk his or her manikin (participant trials) and 80 trials on which the confederate could walk her manikin (confederate trials). On 40 confederate trials the participant had the opportunity to block the confederate; on 40 participant trials the confederate blocked the participant. On the remaining 40 participant trials and the remaining 40 confederate trials, the participant or confederate could choose a road. On half of all trials, a player earned ten points; on the other half, a player earned zero points. Goal-congruent or positive trials were those on which the participant earned ten points; goal-incongruent or negative trials were those on which the participant earned zero points. We only analyzed the 40 negative participant trials (i.e., those on which the participant earned zero points). Twenty of these were self-agency trials (i.e., those on which the participant could choose a road) and 20 of these were other-agency trials (i.e., those on which the confederate blocked the participant). On half of the negative trials, the participant's attack or repair response led to the six point feedback (+6/-6); on the other half, it led to a four point feedback (+4/-4).

The practice phase, which was administered before the experiment, consisted of two blocks of trials. The first consisted of five trials without repair and attack responses (instead the game froze for 3000 ms when the zero and ten points were presented). The second block consisted of six trials that were identical to the experimental trials.

At the end of the experiment, a questionnaire was administered. The first part depicted and described the self- and other-agency trials. For each trial type, questions were asked about various appraisal variables (agency, unexpectedness, valence, and fairness, as manipulation checks), action tendencies (the tendency to perform an attack

and a repair response), and feelings (anger, regret, and disappointment). All items were on a 7-point scale. The anchor points were *not at all (1)* and *yes completely (7)*, unless indicated otherwise. In the experiment, we manipulated agency of the action (the to-be-followed road was determined by self vs. other) thus hoping to manipulate agency of the outcome (outcome caused by self vs. other). To examine whether we had successfully manipulated agency of the outcome, we asked participants whether they ascribed the outcomes on self-agency trials more to themselves than on other-agency trials with the item “to what extent do you feel you can influence the winning of the ten points?”. For expectancy, participants rated how high they estimated the likelihood to win ten points at the start of the self- and other-agency trial on a scale with the anchor points *very low (1)* and *very high (7)*. Participants rated the valence and fairness of zero point outcomes on self- and other-agency trials on a scale with the anchor points *negative (1)* and *positive (7)*, and *very unfair (1)* and *very fair (7)*.

Half of the participants first answered these questions for the other-agency trials; the other half first answered these questions for the self-agency trials. The second part of the questionnaire assessed participants’ motivation and feelings about winning the lottery tickets, their feelings about the confederate, and the extent to which the deception had worked. After filling in the questionnaire, participants were thanked and invited to the debriefing.

Results

Two participants (both female) were removed from the analyses because we suspected that they employed a response strategy that was not compliant with our instruction to choose actively between the repair and attack response. These participants pressed the same response button on respectively 95% and 100% of the trials and thereby deviated more than 3 SDs from the average (50.80% left response button presses and 49.80% right response button presses). It may be recalled that we switched the meaning of the response buttons randomly from trial to trial. Participants who always pressed the same response button (and who were removed) were not the ones who always chose to repair or to attack.

Manipulation checks.***Deception.***

We checked whether participants noticed that the other player was a confederate by asking “Do you think your opponent has more knowledge about this game than you do?” on a scale ranging from *not at all (1)* to *yes completely (7)*. The mean rating was 2.45 ($SD = 1.64$). The experimenter interviewed all participants who gave a rating of more than four, but no participant mentioned anything about the other player being a confederate. We also asked participants to describe what they thought was the goal of the experiment. No participant mentioned anything about response latencies. Five participants did suspect we measured behavioral choices in response to particular situations and one of them mentioned agency.

Appraisal variables.

First, we examined whether agency was successfully manipulated. Participants reported they had more influence on obtaining ten points on self-agency trials ($M = 3.72$, $SD = 1.71$) than on other-agency trials ($M = 2.62$, $SD = 1.50$), $t(28) = 2.99$, $p = .006$. Second, we measured whether the manipulation was pure or had affected other appraisal variables. Zero points were evaluated as equally negative on self-agency trials ($M = 2.83$, $SD = 0.97$) and other-agency trials ($M = 3.07$, $SD = 1.25$), $t(28) = 1.10$, $p = .28$. Moreover, participants’ expectancy to win ten points was equally high on self-agency trials ($M = 4.59$, $SD = 0.87$) and other-agency trials ($M = 4.62$, $SD = 0.82$), $t(28) = 0.20$, $p = .85$. However, participants did rate zero points as more fair on self-agency trials ($M = 5.07$, $SD = 1.25$) than on other-agency trials ($M = 4.17$, $SD = 1.42$), $t(28) = 2.92$, $p = .007$.

Action tendencies.

We examined whether negative self- and other-agency trials elicited different action tendencies. Our main aim was to investigate action tendencies via participants’ response latencies, but we also investigated whether there were any effects on behavioral choices and on self-reports. On self-agency trials we expected a stronger activation of the repair response; on other-agency trials we expected a stronger activation of the attack response. In other words, we expected a significant interaction between agency (self vs.

other) and response (attack vs. repair), indicating a facilitation of responses that we hypothesized to be congruent with the situation (attack on other-agency trials; repair on self-agency trials) relative to responses that we hypothesized to be incongruent with the situation (attack on self-agency trials; repair on other-agency trials). Before analyzing the behavioral data, we removed all trials on which no response was registered (0.08%) or in which the response latency was below 150 ms (3%).

Response latencies.

Four cells of attack and repair responses in self- and other-agency trials were subjected to a repeated measures ANOVA. Three participants could not be included in the analysis, because one of the four cells contained no observation. Two participants never attacked on self-agency trials and one participant never attacked on other-agency trials. Therefore, the analysis was carried out with 26 instead of 29 participants. As predicted, we found a significant agency (self vs. other) x response (attack vs. repair) interaction for the response latencies, $F(1, 25) = 5.06, p = .034$ (see Table 1). Congruent responses ($M = 722$ ms, $SD = 243$ ms) were 43 ms faster ($CI_{.95} = 4$ ms, 83 ms) than incongruent responses ($M = 765$ ms, $SD = 270$ ms). In addition, there was a main effect of response. Participants were faster to repair ($M = 700$ ms, $SD = 236$ ms) than to attack ($M = 786$, $SD = 276$ ms), $F(1,25) = 21.1, p < .001$. There was also a trend towards a main effect of agency: After self-caused negative events participants tended to respond slower ($M = 766$, $SD = 282$) than after other-caused negative events ($M = 721$, $SD = 235$), $F(25) = 3.51, p = .073$.

Behavioral choices.

For each response (attack and repair) we calculated the percentage of times it was registered on the self- and other-agency trials (see Table 1). Because each valid response was either an attack or a repair response, the results for one response can be inferred from the results for the other response. Therefore, we only report the analyses for the attack response. A paired samples t-test on the percentage of attack responses on self-agency trials ($M = 28.32\%$, $SD = 15.00$) and other-agency trials ($M = 30.81\%$, $SD = 17.03$) indicated that there was no significant difference, $t(28) = 0.88, p = .39$ (difference = 2.50%, $CI_{.95} = -3.34, 8.33$). We also tested whether participants had a general preference for one of the two responses. A one sample t-test was performed in which the null

hypothesis was that the attack and repair response were performed equally often (test value = 50%). The percentage of attack responses across agency conditions ($M = 29.61\%$; $SD = 14.15$) differed significantly from the test value, $t(28) = 7.76$, $p < .001$. Thus, participants more often chose to repair than to attack.

Table 1.

Overt choices in percentages, mean response latencies in milliseconds and mean ratings on two questions in the manipulation check questionnaire (standard deviations) for the agency x action interaction

		<i>Agent (cause of the 0 points)</i>	
	<i>Action</i>	<i>Self</i>	<i>Other</i>
Overt choices	Attack	28.32 (15.0)	30.81 (17.0)
	Repair	71.68 (15.0)	69.19 (17.0)
Response Latencies	Attack	830 (328)	742 (254)
	Repair	701 (252)	700 (228)
Self-reports	Tendency to Attack	3.72 (1.6)	4.06 (1.6)
	Tendency to Repair	5.55 (0.9)	5.21 (1.0)
	Valence of -6 feedback	5.69 (1.7)	5.93 (1.5)
	Valence of +6 feedback	6.38 (0.7)	6.14 (1.5)

Self-reported action tendencies.

In the questionnaire participants indicated on a scale from 1 (*not at all*) to 7 (*yes completely*) to what extent they had the tendency to repair (“win back”) and to attack (“make loose”) on the self- and other-agency trials. A repeated measures ANOVA showed a significant interaction between agency and response, $F(1, 28) = 6.21$, $p = .019$. Participants reported a stronger tendency to perform congruent responses ($M = 4.81$, $SD = 0.68$) than incongruent responses ($M = 4.47$, $SD = 0.61$; difference = 0.35, $Cl_{.95} = 0.06$,

0.63)⁴. Participants also reported a stronger tendency to repair ($M = 5.38$, $SD = 0.82$) than to attack ($M = 3.90$, $SD = 1.50$), $F(1, 28) = 15.1$, $p = .001$ (see Table 1). There was no main effect of agency ($F < 1$).

Participants also rated for both the self- and other-agency trials how negative/positive they evaluated a “+6” feedback after repairing and a “-6” feedback after attacking (see Table 1). There was a trend for an agency x response interaction, $F(1, 28) = 3.43$, $p = .075$. Participants tended to feel more positive when receiving a 6-point feedback (either +6 or -6) after a congruent response, ($M = 6.16$, $SD = 0.95$) than after an incongruent response ($M = 5.92$, $SD = 1.09$; difference = 0.24, $CI_{.95} = -0.03, 0.51$). There was also a trend for a main effect of response, $F(1, 28) = 3.65$, $p = .066$. Participants tended to evaluate the “+6” feedback as more positive ($M = 6.26$, $SD = 0.65$) than the “-6” feedback ($M = 5.81$, $SD = 1.50$).

Self-reported feelings and motivation.

One set of questions measured feelings of anger, regret, and disappointment with regard to an outcome of zero points. Obtaining zero points elicited the same amount of regret on self-agency trials ($M = 4.17$, $SD = 1.79$) as on other-agency trials ($M = 3.52$, $SD = 1.81$), the same amount of anger on self-agency trials ($M = 2.45$, $SD = 1.84$) as on other-agency trials ($M = 2.28$, $SD = 1.44$), and the same amount of disappointment on self-agency trials ($M = 4.17$, $SD = 1.61$) as other-agency trials ($M = 4.07$, $SD = 1.67$), all t s < 1.47 .

Another set of questions asked about the participants’ motivation to win lottery tickets and their feelings about winning and not winning. Several appraisal theories posit that events must be appraised as goal relevant to elicit emotions. Participants rated their motivation to win lottery tickets on average as 4.97 ($SD = 1.66$) on a scale of 1 (*not at all motivated*) to 7 (*very motivated*). The total number of lottery tickets won by participants ranged from one to three and most participants (69 %) won two tickets.

⁴ To make sure that the difference between the measures (response latencies, behavioral choices, and self-reports) did not emerge because the analysis of the response latencies was performed on a subset of 26 out of 29 participants, we checked whether these results would be replicated when the subset of 26 participants was used for the analysis of the overt choices and the self-reports. This was indeed the case. The agency x response interaction remained non-significant for the overt choices, $t(25) < 1$, and significant for the self-reports, $F(1, 25) = 4.72$, $p = .040$.

Paired samples t-tests showed that ratings of pride when winning the lottery ticket ($M = 5.31$, $SD = 1.39$) were higher than ratings of regret when not winning the ticket ($M = 4.45$, $SD = 1.59$), $t(28) = 2.79$, $p = .009$. Also, participants were more grateful ($M = 4.86$, $SD = 1.60$) than angry ($M = 2.14$, $SD = 1.55$), $t(28) = 7.03$, $p < .001$, and more happy ($M = 5.76$, $SD = 1.12$) than disappointed ($M = 4.14$, $SD = 1.69$), $t(28) = 4.85$, $p < .001$.

A final set of questions probed for participants' feelings about the confederate: Participants rated on 7-point scales how *negative* (1) or *positive* (7) they felt about the confederate, and how *dishonest* (1) or *honest* (7) they thought the confederate was. The mean valence rating was 4.41 ($SD = 1.32$) and the mean honesty rating was 5.62 ($SD = 1.47$). In addition, participants rated their anger towards the confederate during the game as 3.17 ($SD = 1.77$) on a scale ranging from 1 (*not at all*) to 7 (*yes completely*). The data of the confederate trials showed that most participants attempted to block the confederate whenever possible: Median hindering rate was 39 out of 40 trials.

DISCUSSION

We argued that to unravel the process of emotion causation, it is crucial to understand how the causal sequence of appraisals and action tendencies unfold. In this light, we provided a conceptual and a methodological framework for the research on the influence of appraisal on action tendencies. We started by describing existing hypotheses in the literature on the influence of specific appraisal variables (e.g., goal relevance, goal congruence, agency, coping potential) on specific molar action tendencies (e.g., the tendency to attack, repair, hide, seek safety) and specific molecular action tendencies (e.g., the tendency to be active/passive, approach/avoid). Then, we delineated a number of conditions that are necessary for studies to provide strong conclusions about the causal influence of a specific appraisal variable on specific action tendencies. These conditions consist of an experimental design with a pure manipulation of the appraisal variable, an extensive manipulation check, an adequate measurement of action tendencies (i.e., that allows to identify exactly which action tendency was activated and that does not solely rely on self-reports), and the use of procedures that diminish the influence of demand effects and regulation strategies. Finally, in an empirical study we investigated one of the hypotheses on the influence of appraisal

on action tendencies. In this study, we implemented several of the methodological suggestions of the introduction.

We investigated the role of the appraisal of agency in the differentiation of the tendencies to repair and to attack. Participants played a game with positive and negative outcomes that were either caused by themselves (on self-agency trials) or caused by another person (on other-agency trials). On each negative trial, participants had the opportunity to repair the negative situation or to attack the other player. As expected, we found that agency influenced the latencies of repair and attack responses. We also found an influence of agency on the self-reported tendencies to engage in these responses. However, agency had no influence on the frequency of attack and repair responses. A possible explanation for this pattern of findings is that we instructed participants to choose a response based on an intuitive estimation of which response would yield the largest difference in points (four vs. six points). This instruction may have induced strategies that overruled initially activated action tendencies, yielding a null effect for the frequency of the responses, but not for the latencies and the self-reports.

The present study provides support for appraisal theories and more specifically for the idea that a pattern of negative valence (or goal incongruence) combined with self-agency activates the tendency to repair, whereas a pattern of negative valence (or goal incongruence) combined with other-agency activates the tendency to attack or hurt the agent (Roseman, 2001). Our manipulation check confirmed that agency was successfully manipulated and that it had not affected valence nor expectancy. Next, we elaborate on a number of limitations of our study.

A first limitation is that the manipulation check showed that negative outcomes (zero points) on other-agency trials were rated as more unfair than on self-agency trials. Hence, it is possible that our effects were not driven by an appraisal of agency, but rather by an appraisal of fairness or by a combination of both. Future studies may be set up to disentangle these variables more carefully. On the other hand, it may be difficult to completely disentangle them because fairness and agency might be intrinsically related (see also Kulik & Brown, 1979).

A second limitation is that, due to the small number of male participants in our study ($n = 3$), our findings mainly pertain to female-female interactions. Despite the extensive literature on differences between male and female aggression (Bettencourt &

Miller, 1996; Eagly & Steffen, 1986), we expect gender differences to be rather small in our study. A first reason is that most gender differences reported in the literature pertain to physical forms of aggression (e.g., delivering shocks or loud noise) rather than to psychological forms (e.g., being unfriendly or punishing someone by taking away points; Eagly & Steffen, 1986). A second reason is that research shows that gender differences are partly erased when aggression is caused by a provocation (Bettencourt & Miller, 1996).

A third limitation concerns the extent to which our design reduced the impact of certain forms of regulation. In our study, we took measures to reduce the impact of the conscious regulation of the behavioral component by obscuring both the dependent variable that was measured (participants did not know their response latencies were measured) and the topic of study. It was thus unlikely that participants had the conscious goal to change their response latencies. We did not, however, fully exclude the possibility that the effect on the response latencies was produced by this form of conscious regulation. For instance, it is possible that the conscious reflection that attacking on self-agency trials is inappropriate caused a slowing down of this behavior. Future studies may take extra precautions to exclude these kinds of alternative explanations, for instance, by using speeded response instructions.

A final challenge for future research is explaining when and how the appraisals of self- and other-agency and/or the tendency to attack and repair translate into the conscious experience that people label as “anger” and “regret”. In the present study, self-caused and other-caused negative events did not differ with respect to reported feelings of anger and regret. There are several possible explanations for this finding. For instance, people may only use these labels when they encounter events that are sufficiently goal incongruent, or the appraisal variables that differentiate the feelings of regret and anger may differ from the appraisal variables that differentiate the tendency to attack vs. to repair. Several appraisal theories suggest that appraisals can elicit action tendencies without activating corresponding feelings, yet this raises the question why action tendencies and feelings go together in some cases but not in others.

We have argued that understanding the relation between appraisals and action tendencies is the gate towards unravelling the process of emotion causation. Our study suggests that the appraisal of agency influences subsequent action tendencies, which exemplifies its important role in emotion causation.

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**THE RELATION BETWEEN THE APPRAISAL OF
SELF- VS. CIRCUMSTANCES-AGENCY, THE
TENDENCY TO REPAIR, AND THE FEELING OF
REGRET**

Although the time-space continuum restricts travel through time, most of us are familiar with the powerful desire to turn back time and undo a thoughtless course of action or an imprudent choice. Mental time travel, vivid simulations of alternative actions, and other reverie are considered to be characteristic for the emotion of regret (Landman, 1993). As long as time travel does not transcend its mental format, regret is bound to play a prominent role in our lives (Shimanoff, 1984; Zeelenberg, van Dijk, Manstead, & van der Pligt, 2000). The aim of the present chapter is to shed a new light on regret, more particularly, on its constituent parts and the relations among these parts.

Contemporary emotion theories define emotions as multicomponential phenomena, consisting of (a) a cognitive component or appraisal of the situation, (b) a motivational component or action tendency, (c) a somatic component or neurophysiological responses, (d) a motor component or emotional behavior, and (e) a feeling component or subjective experience (Frijda, Kuipers, & ter schure, 1989; Moors, 2009; Roseman, 2001; Scherer, 2005). The feeling component is considered a reflection of (aspects of) the other components (appraisal, action tendencies, physiology, and/or behavior) in consciousness (de Rivera, 1977; Scherer, 2005; Sonnemans & Frijda, 1994). Authors have used the word regret to refer to an entire emotion (covering various components) or to a feeling (one component) only. In the remainder of this chapter, we use the words regret, disappointment, and anger in the second sense.

Several previous studies on regret investigated the appraisals that shape the feeling of regret. These studies typically reveal that regret is associated with the appraisal that a stimulus is goal incongruent and caused by the self (Shefrin & Statman, 1985; Zeelenberg, et al., 2000). Other negative feelings are associated with the appraisal that a stimulus is goal incongruent and caused by others (e.g., anger) or by circumstances (e.g., fear, sadness, and disappointment; Roseman, Antoniou, & Jose, 1996; van Dijk, van der Pligt, & Zeelenberg, 1999; van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998). The appraisal of agency thus seems crucial to differentiate regret from other negative feelings.

Other studies on regret suggest that it is associated with a specific action tendency: the tendency to repair the negative event (Roseman, Wiest, & Swartz, 1994; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998; Zeelenberg, et al., 2000). Regret differs in this respect from other feelings. For instance, anger is thought to be associated with the tendency to attack, fear with the tendency to obtain safety, and disappointment with the tendency to turn away from the negative event and become passive (Frijda, 1986; Lazarus, 1991; Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998).

In sum, existing research on regret suggests that it is related to (a) the appraisal of self-agency and (b) the tendency to repair. Based on these findings, we could suspect that the appraisal of self-agency and the tendency to repair are also related in some way. Existing research on regret, however, focused either on its underlying appraisals or on its underlying action tendencies, leaving the relation between the two unspecified. In the present chapter, we present two studies on the relation between the appraisal of self-agency and the tendency to repair.

We start by listing four possible ways in which the appraisal of self-agency and the tendency to repair can be related. A first possibility is that there is a causal relation. Appraisal theorists suggest that appraisals typically cause action tendencies (Frijda, et al., 1989; Scherer, 1994). Thus, it has been argued that the appraisal of self-agency causes the tendency to repair (e.g., Shani & Zeelenberg, 2007, p. 963). In principle, however, it is also possible that the tendency to repair causes the appraisal of self-agency or that they exert a mutual causal influence on each other (e.g., Scherer, 2009).

A second possibility is that there is not a causal relation between the appraisal of self-agency and the tendency to repair but only a temporal co-occurrence (Parkinson, 1997). A reason for such a co-occurrence may be that the appraisal of self-agency co-

occurs with another appraisal and that this other appraisal causes the tendency to repair. For instance, negative events caused by the self generally may be easier to cope with than negative events caused by others or by circumstances. In turn, high coping potential may lead to the tendency to repair the event.

A third possibility is that there is not an actual but only a semantic relation between the appraisal of self-agency and the tendency to repair (Parkinson, 1997). There are several ways in which the two can be semantically related. For instance, saying that one feels regret may have a dual meaning: it may refer to the experience of the appraisal of self-agency and to the experience of the tendency to repair. Alternatively, layman's theories about regret may assume a link between self-agency and the tendency to repair (culturally inherited or acquired otherwise) that does not reflect reality.

In Study 1, we examined the possibility that the appraisal of self-agency causes the tendency to repair. Previous research has examined the influence of the appraisal of self-agency on (a) the tendency to seek information, (b) the tendency to persist in the behavior that led to a negative outcome, and (c) prosocial behavior. These tendencies could be interpreted as serving the tendency to repair but other interpretations remain possible. Other studies have investigated the influence of self-agency on repair behavior more directly. In the following paragraphs, we review examples of each of these lines of research.

Several studies have shown that the appraisal of self-agency increases information seeking. Information seeking can help to repair a current situation or prevent the repetition of a negative situation in the future. In a scenario study, Shani and Zeelenberg (2007) found that participants were more motivated to seek information on alternative stock investments when they had made the stock investment themselves (self-agency) than when someone else made the investment for them (other-agency). Reb and Connolly (2009) showed that priming participants with self-blame (via the scrambled sentence task) increased their tendency to seek information on declined choice options when the information was useful to learn to avoid future failure.

Some studies show that self-agency leads to behavioral persistence or the escalation of commitment. Behavioral persistence can be considered as a manifestation of the tendency to repair if it is guided by the idea that it can undo a loss. In a study by Staw (1976), participants had to decide to invest money in one of two company sections after a first investment made by themselves (self-agency) or by someone else (other-

agency) had a positive or negative outcome. The author observed an escalation of commitment in case of a negative outcome in the self-agency condition: Participants invested more money in the same company section in this condition than in all other conditions. In a study by Clark, Lawrence, Astley-Jones and Gray (2009), the appraisal of self-agency increased persistence in gambling behavior compared to the appraisal of circumstances-agency (see also Clark, Crooks, Clarke, Aitken, & Dunn, 2012).

Some studies investigated the influence of the appraisal of self-agency (or self-blame) on the tendency to act prosocially toward a third, unrelated, party. Helping a third party can be seen as an expression of the tendency to repair one's image rather than the current negative situation. The results of these studies are mixed. Ketelaar and Au (2003) found that participants who wrote about a recent experience in which they felt guilty, ashamed, or self-blaming showed more cooperative behavior in a subsequent prisoner's dilemma game than participants who wrote about a typical day. In a field study by D.T. Regan, Williams, and Sparling (1972), one group of participants was led to believe that they broke a camera (self-blame) and another group that somebody else broke it (other-blame). In a subsequent phase, the first group was more inclined to help picking up items from someone's ripped grocery bag than the second group. Cunningham, Steinberg, and Grev (1980), however, used the same manipulation in the laboratory and found that the increase in prosocial behavior only occurred for participants whose mood was not boosted prior to the agency manipulation (Study 1) and only when the obligation to help was emphasized (Study 2). Other studies suggested that self-agency does not increase prosocial behavior toward a third party. J. W. Regan (1971) found that participants who believed they caused an experiment to go wrong (self-agency) did not donate more money for an unrelated project of an unrelated person than participants who simply witnessed something going wrong in an experiment (no self-agency). Similarly, Cialdini, Darby, and Vincent (1973) did not find differences in helping behavior toward a third party between participants who had previously messed up a box of computer cards (self-agency) and participants who witnessed someone else messing it up (other-agency).

A number of studies has investigated the influence of self-agency on the tendency to repair more directly. These studies measured the tendency to reconcile with or help a person that one has hurt, instead of helping a third party. Here also, the results were mixed. Parkinson and Illingworth (2009, Study 3) asked participants to recall instances of

events in which something bad happened to another person that they blamed themselves for vs. did not blame themselves for. They found that participants had a stronger desire to repair the relation with the other person and to apologize in situations in which they blamed themselves. Similar results were obtained in laboratory experiments (Carlsmit & Gross, 1969; de Hooge, Nelissen, Breugelmans, & Zeelenberg, 2011) and in a vignette study (de Hooge, et al., 2011). A number of studies, however, obtained different results. In a scenario study by Struthers, Eaton, Shirvani, Goerghiou and Edell (2008, Study 2) there seemed to be no effect of agency (self vs. circumstances) on the tendency to reconcile with (or apologize to) a person that was hurt. Moreover, in a field study, Konecni (1972) compared a group of participants who caused someone to drop a folder with cards (self-agency) with a group that saw someone else causing it (other-agency) and observed that the latter group was equally or more helpful in picking up the cards.

It may be noted that most of the cited studies manipulated self-agency in a social context (i.e., participants caused a negative situation for another person) because they focused on guilt, an emotion that typically stems from causing interpersonal harm (Baumeister, Stillwell, & Heatherton, 1994). Regret and guilt are believed to partly overlap. Like regret, guilt is assumed to be characterized by the tendency to repair (Baumeister, Stillwell, & Heatherton, 1995; Haidt, 2003; Roseman, et al., 1994). Yet, regret can arise in a broader range of situations than guilt, including non-social ones (Zeelenberg & Breugelmans, 2008). Thus, regret is considered the broader emotion that in some cases (i.e., those of interpersonal harm) is tied with guilt. The mixed results concerning the relation between self-agency and the tendency to repair could be due to the complex social contexts that are used to study guilt. Konecni (1972) observed that some participants in his self-agency condition felt embarrassed about causing someone to drop the folder of cards and therefore quickly disappeared from sight. In social contexts, feelings of shame and fear (e.g., for angry reactions from others) and the tendency to avoid may often be stronger than the tendency to repair. From this point of view, one could predict that the relation between self-agency and the tendency to repair may be more robust outside a social context. On the other hand, it could be that the social context is necessary to find this relation. The few studies that examined the role of self-agency outside a social context unfortunately used more indirect measures of the tendency to repair (such as the tendency to seek information, cf. supra, Shani &

Zeelenberg, 2007; Cialdini, et al., 1973; Clark, et al., 2009; Cunningham, et al., 1980; Ketelaar & Au, 2003; Reb & Connolly, 2009; D. T. Regan, et al., 1972; J. W. Regan, 1971; Staw, 1976).

In Study 1, we examined the influence of the appraisal of self-agency on the tendency to repair in a non-social context, using dependent measures that were designed specifically to pick up the tendency to repair. In a multiple trial game, participants encountered positive and negative outcomes caused by themselves (self-agency) vs. caused by a dice (circumstances-agency). Since a dice is a fair medium, we expected that the manipulation of agency would not be confounded with other appraisals, such as goal congruence, expectancy, or (un)fairness. The tendency to repair was measured via repair behavior after each encounter with a negative outcome and via self-reports at the end of the experiment. A schematic overview of the hypotheses is shown in Figure 1. Following appraisal theories, our first hypothesis (H1) was that there would be a causal relation between the appraisal of self-agency and the tendency to repair: Negative outcomes caused by the self elicit a stronger tendency to repair (as measured by behavior and self-reports) than negative outcomes caused by circumstances.

In addition to studying the relation between the appraisal of self-agency and the tendency to repair, Study 1 had the aim of studying (a) the relation between the appraisal of self-agency and the feeling of regret and (b) the relation between the tendency to repair and the feeling of regret. Previous studies using scenario methods (Zeelenberg, van Dijk, & Manstead, 1998) and recall methods (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998) have provided support for these relations before. However, both methods have met with serious criticisms (e.g., Parrott & Hertel, 1999). Therefore, we investigated whether we could replicate these findings in a carefully controlled experiment by collecting participants self-reports on feelings of regret, disappointment, and anger about negative outcomes caused by themselves vs. circumstances. In line with previous studies (van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998), our second hypothesis was that negative events appraised as caused by the self would elicit more regret than negative events caused by circumstances (H2a) but not more disappointment and anger (H2b). Moreover, also in line with previous studies (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998) our third hypothesis was that the tendency to repair would be associated with

feelings of regret (H3a) but not with other negative feelings such as disappointment and anger (H3b). Study 1 produced several findings that diverged from the literature. These were further examined in Study 2.

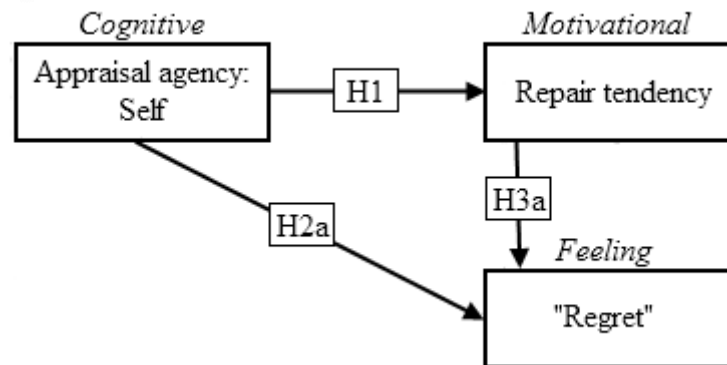


Figure 1. Hypotheses of Study 1 (H1, H2a, H3a) about the inter-relations between the appraisal of self-agency, the tendency to repair, and the feeling of regret.

STUDY 1

Participants played a choice game on the computer in which they tried to win points. The game consisted of a series of trials on which the participant moved a manikin in the upper or lower road of a fork. There was a piece of food at the end of each road. On one road, the food yielded ten points; on the other road, the food yielded zero points. On self-agency trials the participant could choose a road; on circumstance-agency trials the experimenter rolled a dice that determined which road the participant had to take. The participant then moved the manikin in the upper or lower road toward the piece of food and when the manikin reached the food, both pieces of food turned into points. Positive or goal-congruent trials were those on which the manikin took the road with ten points. Negative or goal-incongruent trials were those on which the manikin took the road with zero points. On each negative trial a fix button appeared. The participant could try to repair the negative outcome by moving the manikin toward this button and pressing it a number of times. On half of the negative trials, the ten points were regained after pressing the fix button a number of times. On the other half of the negative trials, pressing the fix button did not result in regaining the ten points.

The participant had to decide on each negative trial whether to repair (by moving toward the fix button or not) and how long to keep trying to repair (how many times to press the fix button). Both indices were used as measures for the tendency to repair. At the end of the experiment we also assessed the self-reported tendency to repair on self-agency trials and on circumstances-agency trials.

Method

Participants.

A total of 26 students ($M_{age} = 21$; 12 women) at Ghent University participated in the study, nineteen in return for course credits and seven in return for payment (8 €).

Apparatus.

The experiment was programmed in C++ and run in Visual Studio 6.0. It was displayed on a 19" CRT screen. The game map consisted of a two-dimensional maze with turquoise walls and grey paths, forming six horizontally positioned forks and a connection between them, that was blocked by a brown wall. The six forks were arranged in three layers of two forks. If the manikin had reached the end of the sixth fork, it was automatically transported back to the first fork. Participants used the arrow keys on the keyboard to move the manikin through the maze. Participants won scratch tickets of the National Lottery during the game (see below). Each ticket yielded 25% chance of winning a money prize between one and ten thousand euro.

Procedure.

All participants were tested individually in a session of one hour. The experimenter was seated next to the participant except when the participant filled in the questionnaire. The experiment was a choice game consisting of 160 trials. A trial started when the manikin reached the brown wall that blocked the next fork. The brown wall then disappeared and two food items appeared, one in the upper and one in the lower road of the fork. The participant then moved the manikin toward the start of the fork, at

which time a picture of a dice (on circumstances-agency trials) or the word ME (on self-agency trials) appeared in front of the manikin. On circumstances-agency trials, the experimenter rolled a physical dice with the labels B and O and named the outcome of the dice (if B then “boven” which is Dutch for “up”; if O then “onder” which is Dutch for “down”). The participant pressed ENTER to remove the picture of the dice and then moved the manikin in the road indicated by the dice. As soon as the manikin entered one of both roads, they were closed off by a brown wall to prevent the manikin from going back. On self-agency trials, the participant chose a road by saying “boven” or “onder”. He/she then pressed ENTER to remove the word ME and moved the manikin in the road of his/her choice. Like in Chapter 2, our cover story provided participants with explicit instructions on how to choose a road/food during the game:

The computer determines via a very complex algorithm¹ which number of points is behind which food. This algorithm is too difficult to discover, but research has shown that if people follow their intuition they perform better than according to chance level. We would like to test this hypothesis. This is why we ask you to make choices according to your intuition. Try to ask yourself each time the following question: Which choice feels best?

When the manikin reached the food in the upper or lower road, both food items were replaced with a number. On positive trials (60% of the trials), the food item next to the manikin was replaced with ten and the other item with zero, a positive sound was played, and the participant’s score was increased by ten points. After the points were shown, the game froze for 500 ms and a new trial began. On negative trials (40% of the trials), the food item next to the manikin was replaced with zero and the other item with ten, a negative sound was played, and the score remained unchanged. The game then froze for 500 ms before a sideways with a fix button appeared. The participant could either move the manikin toward the fix button and try to repair the negative outcome or move the manikin toward the brown wall that blocked the next fork to start a new trial.

On half of the negative trials, the ten points could be regained after pressing the fix button ten to thirty times. The exact number of required button presses was determined at random on each trial and was unknown to the participants (participants also did not

¹ In reality, there was no such algorithm. The program determined that 60% of the trials yielded an outcome of ten points.

know it would be a number between ten and thirty). If the participant pressed the fix button a number of times equal to the random number on that trial, the ten and zero points switched places, the fix button disappeared, a positive sound was played, and the participant's score was increased with ten points. After that, a new trial began. On the other half of the negative trials, the ten points could not be regained. The participant had to decide how long to keep pressing the fix button before starting the next trial (by moving the manikin toward the brown wall that blocked the next fork). The number of button presses on these trials was used as an index for the tendency to repair.

All instructions were given orally and were followed by two demonstration trials and five practice trials. The demonstration trials consisted of one positive self-agency trial and one negative circumstances-agency trial. On the negative trial, the experimenter demonstrated how to repair the negative outcome (the ten points were regained after 15 button presses). The practice trials consisted of one positive and two negative circumstances-agency trials (one repairable after 15 button presses) and two negative self-agency trials (one repairable after 15 button presses). We informed participants that on half of the trials repairing would not work, irrespective of how many times they pressed the fix button. Again, we told participants to use their intuition in deciding about the number of times to press the button.

Participants were told they would win a scratch ticket after finishing a maze combined with a score equal or higher than 450 points, 900 points, or 1350 points. In general, participants had to complete about ten mazes to reach a score of 450 points and twenty mazes to reach a score of 900 points. In these cases, a message appeared that the 450 or 900 threshold was reached and a scratch ticket was won. After the last trial, the total number of points was displayed (which was always below the threshold of 1350 points), together with a message that the third scratch ticket was not won.

At the end of the experiment, a questionnaire was administered in which we measured appraisals, action tendencies, and feelings separately for self-agency and circumstances-agency trials. For each trial type (self- and circumstances-agency), we presented four scenes. Scene 1 depicted the manikin at the start of a fork, when a dice or the word ME appeared; Scene 2 depicted a negative outcome; Scene 3 depicted success at winning back the ten points; Scene 4 depicted no success at winning back the ten points. Items were rated on seven-point scales ranging from 1 (*not at all*) to 7 (*yes completely*), unless stated otherwise.

For Scene 1, participants rated appraisals of expectancy and self-agency. For expectancy, participants estimated the chance to win ten points immediately (when the food turned into points) and eventually (at the end of the trial) on a scale ranging from 1 (*very low*) to 7 (*very high*). For self-agency, participants rated the extent to which they felt they could influence the number of points they would win immediately and eventually.

For Scene 2, we measured several appraisals about the zero point outcome: goal congruence or valence (1 = *very negative*, 7 = *very positive*), fairness (1 = *very unfair*, 7 = *very fair*), future expectancy (the likelihood of winning back the ten points after moving into the sideways, 1 = *very low*, 7 = *very high*), and coping potential (the experienced influence on winning back the ten points). We also measured feelings (regret, disappointment, and anger) and the tendency to repair. For the tendency to repair, participants indicated (a) the extent to which they were inclined to take the sideways and try to regain the points and (b) the extent to which they were inclined to keep trying if repairing did not immediately led to success.

For Scene 3, participants rated the valence of not being able to repair the ten points on a scale from 1 (*very negative*) to 7 (*very positive*). For Scene 4, participants rated the valence of being able to repair the ten points. These items were also assumed to reflect the tendency to repair.

Results

The behavioral and the self-report data were analyzed via paired samples t-tests, Pearson correlation coefficients, and Steiger Z-tests. Before discussing the results for H1 to H3, we tested whether the agency manipulation was successful and whether it had affected only agency or also other appraisal variables.

Manipulation check.

As can be seen in Table 1, self-agency trials scored significantly higher on the appraisal of self-agency than circumstances-agency trials, but did not differ significantly with respect to the appraisals of valence, expectancy of winning ten points immediately (i.e., when the food turned into points), fairness, future expectancy, and coping

potential. There was, however, a marginal difference between self- and circumstances-agency trials for the appraisal of expectancy of winning ten points eventually (i.e. at the end of the trial): The expectancy of winning ten points eventually was slightly elevated on self-agency trials.

The influence of the appraisal of agency on the tendency to repair.

To investigate whether self-agency trials elicited a stronger tendency to repair than circumstances-agency trials (H1), we inspected participants' repair behavior (on-line) and the self-reported tendency to repair (at the end of the experiment). Before investigating repair behavior, we first removed all trials on which repairing was possible² (leaving 16 self-agency and 16 circumstances-agency trials in the analysis). Next we calculated for each trial type (a) the percentage of trials with at least one repair response and (b) the average number of repair responses (including trials with zero repair responses) after removing all trials on which the number of repair responses deviated more than 2.5 *SDs* from the means on self-agency and circumstances-agency trials (1.56% of the trials)³. Neither of these behavioral measures suggested a difference in the tendency to repair between self-agency and circumstances-agency trials (see Table 1). Confirming the behavioral data, agency also had no significant influence on the self-reported tendency to repair: None of the four items that measured the tendency to repair revealed significant differences for self-agency and circumstances-agency trials (see Table 1).

The relation between the appraisal of self-agency and feelings of regret, disappointment, and anger.

We investigated whether feelings of regret were higher on self-agency trials than on circumstances-agency trials (H2a) and whether this was not the case for feelings of disappointment and anger (H2b). As predicted, self-agency trials gave rise to stronger

² We only analyzed trials on which repairing was impossible because only on those trials participants always had to decide themselves when to stop repairing. On trials on which repairing was possible, participants often regained the ten points after a number of button presses and the fix button disappeared.

³ Using other outlier criteria, no outlier criteria, or medians instead of means produced the same results.

Table 1.

Means (SDs) and dependent samples *t*-tests for the manipulation check, the measures of the tendency to repair, and feelings on self- and circumstances-agency trials.

		Agency		<i>t</i> (25)	<i>p</i>
		Self	Circumstances		
Manipulation Check	<i>Self-agency (immediate)</i>	3.62 (1.32)	2.15 (1.35)	4.21	<.001
	<i>Self-agency (eventual)</i>	4.04 (1.71)	2.92 (1.60)	3.92	<.001
	<i>Expectancy (immediate)</i>	4.31 (0.97)	4.15 (0.83)	1.16	.26
	<i>Expectancy (eventual)</i>	5.08 (1.32)	4.58 (1.10)	2.05	.051
	<i>Valence</i>	3.27 (1.15)	3.69 (1.19)	1.39	.18
	<i>Fairness</i>	4.27 (1.19)	4.23 (1.21)	0.13	.90
	<i>Future expectancy</i>	4.12 (1.42)	4.15 (1.22)	0.21	.83
	<i>Coping potential</i>	3.46 (1.84)	3.65 (1.77)	0.64	.53
Tendency to repair	<i>Tendency to take sideway</i>	5.92 (1.52)	6.08 (1.35)	1.07	.29
	<i>Tendency to keep repairing</i>	4.35 (1.74)	4.23 (1.58)	0.62	.54
	<i>Valence of not repairing</i>	2.81 (0.94)	3.12 (1.07)	1.69	.10
	<i>Valence of repairing</i>	5.92 (0.84)	6.00 (0.94)	0.39	.70
	<i>% trials at least one fix response</i>	95.79 (10.15)	96.51 (7.14)	0.74	.46
	<i>Number of fix responses</i>	39.66 (14.24)	39.71 (13.50)	0.03	.98
Feelings	<i>Regret</i>	3.85 (1.59)	2.31 (1.59)	3.84	<.001
	<i>Anger</i>	2.12 (1.37)	1.92 (1.44)	0.64	.53
	<i>Disappointment</i>	4.12 (1.66)	2.96 (1.48)	2.81	.009

feelings of regret than circumstances-agency trials and anger did not differ significantly between self-agency trials and circumstances-agency trials. Contrary to the predictions, however, self-agency trials also elicited stronger feelings of disappointment than circumstances-agency trials (see Table 1).

The relation between the tendency to repair and feelings of regret, disappointment, and anger.

We tested the hypotheses that the tendency to repair was associated with feelings of regret (H3a), but not with feelings of disappointment or anger (H3b). Table 2 presents correlations that were calculated separately for self-agency trials, circumstances-agency trials, the difference scores between self-agency trials and circumstances-agency trials, and the averages across self-agency and circumstances-agency trials. Again, we used both a behavioral measure and a self-report measure for the tendency to repair.

Before calculating correlations between the self-reported tendency to repair and feelings, we examined whether the four items used to measure the tendency to repair could be summated into one scale. Cronbach's α of this four-item scale was .72 for self-agency trials and .60 for circumstances-agency trials. The latter value was increased to .69 by removing one item from the scale (the item on valence of being able to repair). Thus, a four-item repair scale was used for self-agency trials and a three-item repair scale for circumstances-agency trials⁴. The results of the correlation analyses are presented in Table 2.

Contrary to the predictions, none of the correlations between regret and the tendency to repair were significant (for the self-reports nor for the behavioral measures). On the other hand, all correlations between disappointment and the tendency to repair were significant (or marginally significant) and a number of correlations between anger and the tendency to repair were significant. Steiger Z-scores were calculated to investigate whether the correlations were significantly higher for disappointment and for anger than for regret. As can be seen in Table 2, none of the correlations for anger were significantly different from those for regret, all z s < 1.51 , p s $> .13$. On the other hand, a subset of the correlations for disappointment differed significantly from the correlations for regret: The correlations between disappointment on self-agency trials and the tendency to repair on self-agency trials were significantly higher than these respective correlations for regret⁵ (behavioral measure, $z = 2.12$, $p = .034$, self-report measure, $z = 2.75$, $p = .006$). In addition the correlations for

⁴ The data were similar when using the four-item scale for the tendency to repair on circumstances-agency trials.

⁵ All two-tailed p-values.

disappointment across trials and the tendency to repair across trials were marginally higher for disappointment than for regret (behavioral measure, $z = 1.94$, $p = .053$, self-report measure, $z = 1.90$, $p = .058$). Finally, a similar pattern emerged for the difference score between self- and circumstances agency-trials but only for the behavioral measure, $z = 1.93$, $p = .053$ (see Table 2).

Table 2.

Correlations between feelings and the tendency to repair for self-agency trials (Self), circumstances-agency trials (Circ), the difference score between self- and circumstances-agency trials (Diff), and the aggregated scores across self- and circumstances-agency trials (Tot): () $p < .10$, * $p < .05$, ** $p < .01$. Correlations for disappointment and anger are depicted in black if not significantly different from the correlation for regret, in red if significantly different ($p < .05$), and in pink if marginally different ($p < .10$).*

		Disappointment				Regret				Anger			
		Self	Circ	Diff	Tot	Self	Circ	Diff	Tot	Self	Circ	Diff	Tot
Repair behavior	Self	.39^(*)				.01				.39 [*]			
	Circ		.39 ^(*)				.16				.29		
	Diff			.36^(*)				.01				.01	
	Tot				.45[*]				.12				.42[*]
Self- reported Repair Tendency	Self	.50^{**}				.17				.30			
	Circ		.40 [*]				.34 ^(*)				.25		
	Diff			.44 [*]				.20				.54 ^{**}	
	Tot				.51^{**}				.29				.23

Discussion

Study 1 did not provide support for a causal influence of the appraisal of self-agency on the tendency to repair (not confirming H1). Both the self-report and the behavioral measures suggested that participants were equally motivated to repair negative outcomes caused by themselves and caused by circumstances.

Additionally, our study contradicted several findings of past research. First, we found that self-caused negative events elicited both more regret and more disappointment than negative events caused by circumstances (confirming H2a, disconfirming H2b). A former study (Zeelenberg, van Dijk, & Manstead, 1998) manipulated agency (self vs. circumstances) via scenarios and showed that negative events caused by the self elicited more regret but less disappointment than negative events caused by circumstances. Second, we found that the tendency to repair was related to the intensity of disappointment but not to the intensity of regret (disconfirming H3a and H3b). Past research (Zeelenberg, van Dijk, Manstead, et al., 1998) has shown the exact opposite pattern. In sum, Study 1 provided support for one of the five hypotheses (H2a) only.

STUDY 2

Study 2 was set up to further explore several findings of Study 1. A first aim was to examine the finding that the feeling of disappointment but not the feeling of regret was characterized by the tendency to repair a negative event (disconfirming H3b and H3a). Support for a relation between regret and the tendency to repair has been obtained in studies using autobiographical recall (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998). In these studies, participants recalled an event in which they felt regret or another negative feeling and indicated to what extent they had the tendency to repair. Examples of items were: “When you felt regret/disappointment, to what extent did you want a second chance?” or “to what extent did you feel like correcting a mistake” (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998). A close look at these items suggests that they imply an appraisal of self-agency. Study 1 confirmed that there is a link between the appraisal of self-agency and regret, and this link may explain why previous studies found a strong association between regret and the tendency to repair.

To test this idea, we asked participants in Study 2 to recall an instance of regret or disappointment and measured the tendency to repair with two sets of items: one set in which the tendency to repair was confounded with the appraisal of self-agency (e.g., “to what extent did you want a second chance”) and another set that measured the

tendency to repair in a pure way (e.g. “to what extent did you have the tendency to undo the event”). Our fourth hypothesis was that the difference between recalled regret and disappointment with respect to the tendency to repair would be present for items that implied self-agency but not for items that did not imply self-agency (H4).

A second aim of Study 2 was to investigate whether we could replicate the finding that feelings of disappointment are a significant predictor of the tendency to repair (H5) whereas feelings of regret are not (H6). This question could be investigated by relating the intensity of recalled regret and the intensity of recalled disappointment to the tendency to repair as measured via the non-confounded items.

A third aim of this study was to shed a new light on the relation between self-agency and the tendency to repair. Study 1 did not provide support for the idea that the appraisal of self-agency increases the tendency to repair (not confirming H1). This finding may seem counterintuitive, but is not when framed in a functional view on emotions and action tendencies (e.g., Lazarus, 1991; Roseman, et al., 1996; Wortman & Brehm, 1975). It does not seem more functional to repair a negative event when it is caused by oneself than when it is caused by circumstances, unless one’s actions have more impact in the former than in the latter case, that is, when coping potential is increased. In daily life, self-agency and coping potential may be related: Negative events caused by the self often may be easier to cope with (e.g., easier to undo or repair) than negative events caused by others or caused by circumstances. In Study 1, however, coping potential was carefully matched for self-agency and circumstances-agency trials (see Table 1). As such, in Study 1, the natural co-occurrence between self-agency and the tendency to repair via coping potential may have been pulled apart artificially. In Study 2, we investigated this idea by asking the participants who recalled instances of regret and disappointment to also recall their appraisals of self-agency and coping potential. Hence we could investigate the hypotheses that self-agency is not directly related to the tendency to repair (H7), but that self-agency is related to coping potential (H8), and that coping potential is related to the tendency to repair (H9).

A fourth aim of our study was to investigate whether we could replicate the finding of Study 1 that the appraisal of self-agency is positively related to feelings of regret (H10) and also positively to feelings of disappointment (H11). Instead of estimating the strengths of all these relations separately via linear regressions, we estimated them simultaneously via structural equation modelling (SEM).

The investigated model is presented in Figure 2. We are aware that SEM does not allow us to test causal relations. Therefore all our hypotheses were framed in terms of “variable X is related to/ (statistically) predicts variable Y” and not in terms of causality. Since we were interested in predicting the values of some variables (i.e., the tendency to repair) and not of others (i.e., the appraisal of self-agency and coping potential), the former were entered as outcomes and the latter as predictors in the model. Feelings of regret and disappointment were sometimes entered as predictors and sometimes as outcomes. As can be seen in Figure 2, we additionally estimated the relation between coping potential and regret (H12) and coping potential and disappointment (H13) in order to investigate whether the (potential) effects of self-agency on feelings were mediated by coping potential.

Method

Participants.

A total of 659 psychology students at Ghent University were contacted via email to fill in an online questionnaire in return for participation in a prize lottery. After a first call for responses plus a reminder after two and five weeks, 114 responses were obtained for the regret questionnaire (response rate 34.55%) and 116 for the disappointment questionnaire (response rate 35.26%). Four non-native Dutch speaking participants were excluded because their level of Dutch (as written in the four open answer boxes in the questionnaire) was judged as insufficient by two independent raters. In total 114 regret respondents (21 men) and 112 disappointment respondents (22 men) remained in the study ($M_{age} = 18.95$, $SD = 3.67$). All answers were collected and stored anonymously.

Procedure.

Participants were asked to fill in a 15 minute online questionnaire (administered via Limesurvey) about regret or disappointment as part of a large-scale research project on emotions. The questionnaire contained more items than needed for the present study. We briefly mention the content of these irrelevant items to sketch the measurement context of the items under study.

The questionnaire started with a number of demographic questions (sex, age, nationality, and native language). Subsequently, participants were asked to take a few minutes to recall an event in their life in which they felt regret (in the regret condition) or disappointment (in the disappointment condition). The instructions encouraged participants to recall an event that was specific in time and space. Participants wrote down a short description of the recalled event in the designated field and indicated the approximate date of the event on a calendar. They also rated the intensity of regret (in the regret condition) or disappointment (in the disappointment condition) at the time of the event as well as at the time of recall on two scales ranging from 1 (*completely not intense*) to 9 (*very intense*).

Subsequently, several appraisals, ruminative thoughts (e.g., counterfactual thoughts), action tendencies, and behaviors were measured. Items were rated on scales ranging from 1 (*not at all*) to 9 (*yes completely*), unless stated otherwise. In respective order, the following appraisals were measured: novelty, expectancy, goal congruence for yourself and for others, valence for yourself and for others, prevention focus, promotion focus, agency, coping potential, future expectancy, intrinsic controllability, norm violation, and uncertainty. The appraisal of self-agency was measured via two items ($\alpha = .65$). One item asked participants to briefly describe the cause of the event and to indicate the extent to which the event was a consequence of their own behavior or choices⁶. The other item asked participants to rate the extent to which they had control over the occurrence of the event. The appraisal of coping potential was measured via four items ($\alpha = .77$): Participants rated whether (a) they were able to change the event after its occurrence, (b) they were able to undo the event, (c) they were able to improve the situation, and (d) their behavior determined whether the event could still change.

Action tendencies were measured by asking participants about particular thoughts about actions, wishes about action outcomes, and action tendencies that accompanied the feeling of regret and disappointment. Items of the latter type were preceded by a short introductory paragraph: “The feeling of regret (disappointment) is sometimes accompanied by the tendency to perform a particular behavior. Indicate to which extent

⁶ Participants also indicated the extent to which the event was a consequence of the behavior or choices of one or more other persons (other-agency) and a consequence of situational factors or circumstances (circumstances-agency). These items were not analyzed in the current study.

you had the tendency to behave in a particular way” (the word tendency was underlined). In total, three types of action tendencies were measured: The tendency to repair (6 items), the tendency to avoid (11 items), and the tendency to be passive (4 items). The tendency to repair was measured with two sets of items. A first set was not confounded with self-agency ($\alpha = .74$) and asked participants to which extent they had the tendency to (a) change the situation, (b) improve or rectify the situation, and (c) undo the event. A second set of items was confounded with self-agency ($\alpha = .62$) and asked participants to which extent they (a) thought about how they would handle the situation differently next time, (b) wished they could turn back time⁷, (c) wanted a second chance. The tendencies to avoid and to be passive were not analyzed in the current study.

After the questions on action tendencies, participants rated their actual behavior in the situation (not analyzed in the current study): repairing (3 items), avoidance (4 items), passivity (3 items), apologizing (1 item), and aggression (1 item). Finally, participants rated the intensity of feelings of fear, sadness, anger, guilt, happiness, powerlessness, energy, restlessness, calmness, despair, frustration, shame, relief, and regret or disappointment⁸. In the disappointment condition, participants were additionally asked to indicate whether the episode that they had recalled could be categorized as disappointment over an outcome or disappointment in a person.

The model was fitted on the entire sample (collapsing recalled regret and disappointment) via structural equation modelling using the Lavaan 0.4-12 package in R. Three variables were treated as latent variables: the appraisal of self-agency (2 items), the appraisal of coping potential (4 items), and the tendency to repair (3 items, not confounded with self-agency). The intensities of regret and disappointment were each measured with a single item. The goodness-of-fit was evaluated via four fit indexes: Chi-square (Chi-square divided by the degrees of freedom should be < 2), the comparative fit index (CFI, should be $> .95$), the root-mean-square error of approximation (RSMEA,

⁷ One might object that the item “wanting to turn back time” does not imply self-agency. On the other hand, turning back time is pointless if one believes that the event was caused by circumstances or others that one cannot influence (i.e., when self-agency is appraised as low). Therefore, this item is likely to also reflect the appraisal of self-agency and not only the tendency to repair.

⁸ At this time, participants in the regret/disappointment condition rated feelings of disappointment/regret only because they already rated feelings of regret/disappointment at the beginning of the questionnaire.

should be $< .06$), and the standardized root-mean-square residual (SRMR, should be $< .09$; Hu & Bentler, 1999). Standardized parameter estimates are reported.

Results

We discuss the results for H4 before turning to the results for the model fitting and H5-H13.

Hypothesis 4.

We tested via independent samples t-tests whether recalled regret and recalled disappointment only differed with respect to the tendency to repair when this tendency was measured via items that confound self-agency and the tendency to repair (H4). As predicted, all confounded items showed the expected difference. Recalled regret was accompanied by more thoughts on handling the situation differently next time (difference = 0.89, $CI_{.95} = 0.20, 1.58$; $t(224) = 2.54, p = .012$), with wanting to turn back time (difference = 1.68, $CI_{.95} = 1.04, 2.32$; $t(224) = 5.15, p < .001$), and with wanting a second chance (difference = 0.70, $CI_{.95} = 0.04, 1.36$; $t(224) = 2.08, p = .039$) than recalled disappointment (see Table 3). Also as predicted, there were no differences for any of the non-confounded items: the tendency to change the situation (difference = -0.47, $CI_{.95} = -1.15, 0.22$; $t(224) = 1.35, p = .18$), the tendency to improve or rectify the situation (difference = -0.06, $CI_{.95} = -0.76, 0.64$; $t(224) < 1$), and the tendency to undo the event (difference = 0.26, $CI_{.95} = -0.46, 0.98$; $t(224) < 1$, see Table 3).

Hypotheses 5-13.

Before fitting the model, multivariate normality for the data was inspected by plotting the quantiles of the Mahalanobis transformed data against the quantiles of a chi-square distribution with 11 degrees of freedom. The data points showed a systematic deviation from the expected distribution. We therefore applied the Satorra-Bentler correction (Hu, Bentler, & Kano, 1992; Satorra & Bentler, 1994; scaling factor 1.028).

Table 3.

Means (SDs) and independent sample t-tests for the tendency to repair items, split up into those that include reference to self-agency (Confounded) and those that do not (Non-confounded).

<i>Item type</i>	<i>Item (short description)</i>	<i>Disappointment</i>	<i>Regret</i>	<i>t</i>	<i>p</i>
<i>Confounded</i>	Handle the situation differently	5.91 (2.61)	6.80 (2.65)	2.54	.012
	Want to turn back time	6.26 (2.95)	7.94 (1.83)	5.15	<.001
	Want a second chance	6.61 (2.68)	7.31 (2.37)	2.08	.039
<i>Non-confounded</i>	Change the situation	6.10 (2.67)	5.63 (2.53)	-1.35	.18
	Improve or rectify the situation	5.96 (2.61)	5.90 (2.73)	-0.17	.86
	Undo the event	6.03 (2.79)	6.29 (2.68)	0.72	.47

We first investigated whether the model (Figure 2) reproduced the data sufficiently well (i.e., whether the absolute fit of the model was acceptable). Fit indexes indicated a good model fit, $\chi^2(37) = 61.50$, $p = .007$; CFI = .956, RMSEA = .054; SRMR = .047. Subsequently, we inspected the estimates for each of the discussed relations.

First, we examined the hypotheses pertaining to the relations between disappointment, regret, and the tendency to repair (H5-H6). Confirming the pattern of Study 1, the intensity of regret was not a significant predictor of the tendency to repair (confirming H6), $z = 1.38$, $p = .17$, but the intensity of disappointment was (confirming H5), $z = 3.37$, $p = .001$. To investigate whether disappointment predicted the tendency to repair significantly better than regret, we fitted the same model as in Figure 2, but with the additional constraint that the relation between regret and the tendency to repair had to be equal to the relation between disappointment and the tendency to repair. There was a trend toward a better fit for the unconstrained model, $\chi_D(1) = 3.29$, $p = .0696$ (scaled difference test, Satorra, 2000; Satorra & Bentler, 2010).

Second, we examined the hypotheses pertaining to the relations between the appraisals and the tendency to repair (H7-H9). As predicted, we found a direct positive relation between coping potential and the tendency to repair (confirming H9), $z = 2.78$, $p = .005$, and no direct relation between the appraisal of self-agency and the tendency to repair (confirming H7), $z = -0.36$, $p = .72$. The relation between the appraisal of self-agency and the appraisal of coping potential was positive and significant (confirming

H8), $z = 4.77, p < .001$. Finally, a Sobel test indicated that the indirect relation between the appraisal of self-agency and the tendency to repair via coping potential (with a strength of .16) was statistically significant, $z = 2.40, p = .017$, confirming that the relations described in H8 and H9 form an indirect pathway.

Third, we examined the hypotheses pertaining to the relation between the appraisals of self-agency and coping potential and feelings of regret and disappointment (H10-H13). Conform to Study 1, the appraisal of self-agency was directly related to regret (confirming H10), $z = 3.39, p = .001$, however, not conform to Study 1, self-agency was unrelated to disappointment (disconfirming H11), $z = -1.07, p = .28$. The appraisal of coping potential was not related to regret (H12), $z = -.619, p = .54$, nor to disappointment (H13), $z = 1.35, p = .18$.

Discussion

The first aim of Study 2 was to further explore the findings of Study 1 that were not in accordance with the literature. In Study 1, feelings of disappointment, but not feelings of regret were significantly related to the tendency to repair. This contrasted with past studies showing that regret is characterized by the tendency to repair whereas other negative feelings (such as disappointment) are not. Past studies, however, often measured the tendency to repair with items that confounded the tendency to repair with the appraisal of self-agency. Study 2 showed that when the tendency to repair was measured with items that were unlikely to pick up self-agency, recalled regret and recalled disappointment were associated with an equally strong tendency to repair (confirming H4). In addition, a trend effect in Study 2 suggested that disappointment was more strongly related to the tendency to repair than regret (confirming H5 and H6), thus replicating the pattern of results found in Study 1.

Another aim of this study was to investigate the relation between the appraisal of self-agency and the tendency to repair. More in particular, we tested the hypothesis (H7-H8-H9) that the two co-occur because both relate to a third variable: coping potential. Our analyses confirmed this idea: There was no direct relation between self-agency and the tendency to repair, but there was an indirect relation via coping potential.

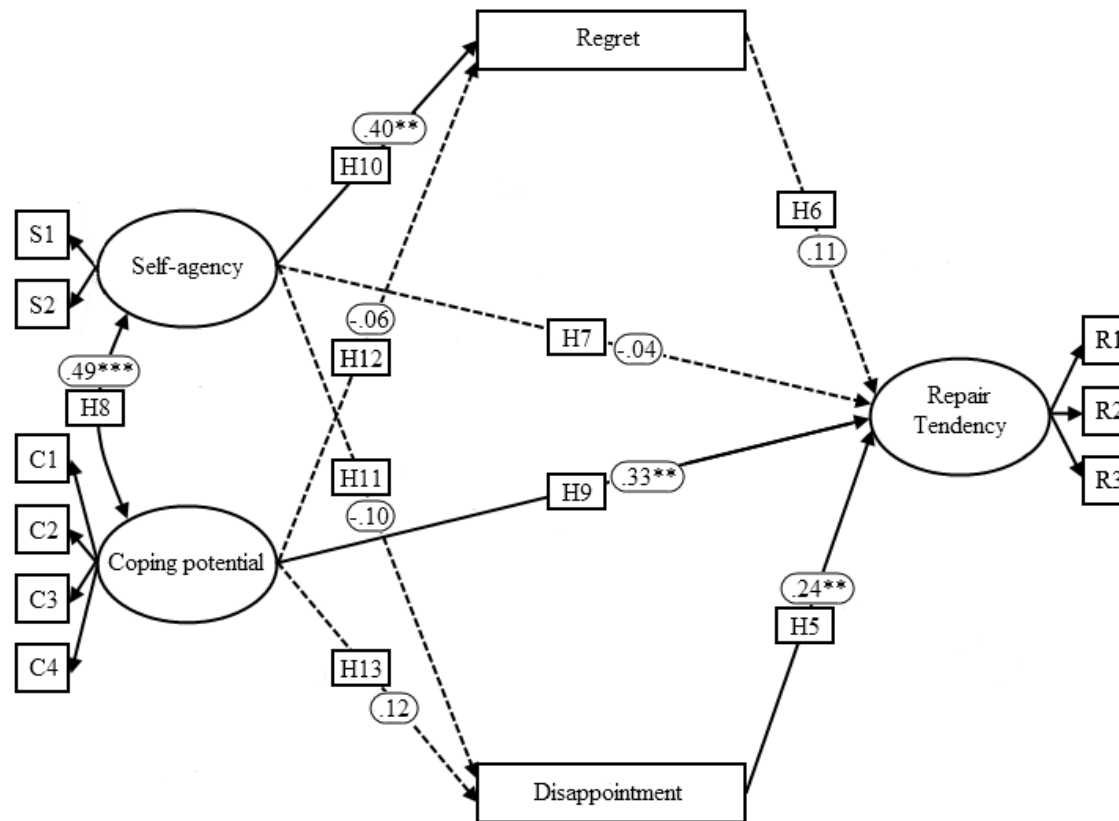


Figure 2. Hypotheses and results of the SEM of the relations between the appraisal of self-agency, the appraisal of coping potential, the feeling of regret, the feeling of disappointment, and the tendency to repair. Full lines represent significant relations (* $p < .05$; ** $p < .01$; *** $p < .001$); dashed lines represent non-significant relations ($p > .05$).

We also investigated whether the appraisal variables of self-agency and coping potential predicted the intensity of feelings of regret and disappointment (H10-13). Our data supported the idea of a positive significant relation between the appraisal of self-agency and regret (confirming H10) but not the idea of a relation between the appraisal of self-agency and disappointment (disconfirming H11). The appraisal of coping potential was unrelated to both feelings (H12 & H13).

GENERAL DISCUSSION

Our aim was to investigate the relation between the appraisal of self-agency and the tendency to repair. In addition, we investigated how each factor is related to regret and other negative feelings. In Study 1, we experimentally manipulated agency (self vs. circumstances) and measured the tendency to repair as well as feelings of regret, disappointment, and anger. In Study 2, participants recalled an event in which they felt regret or disappointment and rated their appraisals and action tendencies.

In the introduction we suggested that the appraisal of self-agency and the tendency to repair could be (a) causally related, (b) temporally related without a causal relation, (c) semantically related without an actual co-occurrence, or (d) unrelated. Neither of our studies provided support for a causal relation. In Study 1, a careful experimental manipulation of agency (self vs. circumstances) did not lead to a difference in the tendency to repair (failing to confirm H1). In Study 2, there also was no direct relation between the appraisal of self-agency and the tendency to repair (H7). Study 2 did provide support for a temporal or semantic relation between the appraisal of self-agency and the tendency to repair, via the appraisal of coping potential: Self-caused events tended to go together with more coping potential (confirming H8) and coping potential was positively related to the tendency to repair (confirming H9). To the extent that such a link actually exists or only exists in people's minds, it concerns either a temporal co-occurrence in the world or a semantic relation. We could not disentangle these possibilities in Study 2 because it relied on self-reports, which can reflect real-world co-occurrences as well as layman's theories. One could argue that the set of relations revealed by Study 2 is quite complex for a layman's theory, but future research is needed to investigate this issue further.

Our studies also examined the relation between the appraisal of self-agency and regret and other negative feelings. Previous studies suggested that regret can be differentiated from other negative feelings because it reflects the appraisal of self-agency. Our studies confirmed that regret is related to the appraisal of self-agency. In Study 1, participants indicated they felt more regret in situations caused by themselves than in situations caused by circumstances (confirming H2a) and in Study 2, there was a positive relation between the appraisal of self-agency and regret (confirming H10). We also found evidence for a relation between self-agency and disappointment, be it only in Study 1. A possible explanation for this pattern of findings is that self-agency relates to disappointment in certain contexts, for instance in achievement contexts, but not in other contexts, for instance, in the context of human relations. The relation between self-agency and regret may be more context free.

Finally, we investigated the relation between the tendency to repair and feelings of regret and disappointment. Neither of our studies provided support for the idea that regret is characterized by the tendency to repair a negative event, or at least not more than other negative feelings (H3a, H3b, H5, and H6). This finding may seem counterintuitive at first, but makes sense if one considers the appraisal patterns that might give rise to (a) the tendency to repair and (b) the feelings of regret and disappointment. With regard to (a), we propose that all events appraised as goal incongruent or negative lead to the tendency to repair. In addition, conform to what we observed in our studies, we propose that this tendency is increased when coping potential is appraised as high (H9), but not when the situation is appraised as caused by the self (H1, H7). Thus, we propose that the tendency to repair is elicited by an appraisal pattern of goal incongruence plus high coping potential. With regard to (b), it is reasonable to assume that regret and disappointment both arise in situations appraised as goal incongruent or negative. Our studies further suggested that regret was related to the appraisal of self-agency (H2a, H10) but not to the appraisal of coping potential (H12), whereas disappointment was not systematically related to either of these appraisals (H2b, H11, H13). Thus, we propose that regret is elicited by an appraisal pattern of goal-incongruence plus self-agency whereas disappointment is elicited by an appraisal of goal-incongruence only. The latter fits nicely with the idea that the feeling of disappointment is a general negative feeling (Zeelenberg, van Dijk, Manstead, et al., 1998) that directly reflects the appraisal of goal-incongruence and is not influenced by

other appraisal variables, such as self-agency. Taking (a) and (b) together, the appraisal pattern leading to the tendency to repair diverges more from the appraisal pattern leading to regret than from the appraisal pattern leading to disappointment. This may explain why disappointment is a better predictor of the tendency to repair than regret.

Our studies have a number of limitations that need to be overcome in future research. First, the data of Study 1 and 2 were collected in a sample of Dutch speaking Psychology students. The limitations concerning this sample are twofold. First, emotional experiences that are labeled in Dutch as regret (“spijt”) and disappointment (“teleurstelling”) may not be the same as those in English and in other languages. A replication across other language groups therefore seems crucial. On the other hand, several of the original studies on regret and disappointment also used a Dutch sample (van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, Manstead, et al., 1998), which makes our studies comparable to these studies at least. Second, although the program for first year psychology students at Ghent University does not contain any intensive courses on emotions, one could argue that psychology students more often think about their emotions than other students or non-students. Therefore, any differences between emotions that are so similar as regret and disappointment may be inflated by the fact that our participants elaborate more on their emotions than the average person (Tugade, Fredrickson, & Barrett, 2004).

A second limitation is that the manipulation of agency in Study 1 may have lacked the strength to evoke differences in the tendency to repair. Self-agency trials and circumstances-agency trials differed significantly with respect to the appraisal of agency and with respect to feelings of regret and disappointment, but perhaps a stronger manipulation was needed to elicit different action tendencies. The manipulation of agency could be stronger when participants could actually learn a set of rules about how to obtain positive outcomes than when they are told these rules are too difficult to discover (as in Study 1).

Third, the structural equation modelling of Study 2 provides information about the existence of relations between the variables under study, but not on the causal nature of these relations. In Study 1, we found evidence for a causal influence of the appraisal of self-agency on the feeling of regret. Future studies are needed to test the causal nature of other relations, such as the relation between the appraisal of coping potential and the tendency to repair.

Our studies furthermore hint at new avenues for research on the relation between the appraisal of self-agency and the tendency to repair. The studies we cited in the introduction suggest that in some contexts there is a causal relation between self-agency and the tendency to repair. They investigated self-agency in a social context and showed that people put more effort in repairing a negative event for another person when they did vs. did not cause the negative event themselves (e.g., Carlsmith & Gross, 1969; de Hooge, et al., 2011; Parkinson & Illingworth, 2009; but see, Cialdini, et al., 1973; J. W. Regan, 1971). The relation between self-agency and the tendency to repair may thus be moderated by the extent to which an event is negative at an intrapersonal or interpersonal level. Future studies could investigate this and other potential moderators, such as the likability of the other person, the presence of others, the appraisal of (un)intentionality, and the costs of repairing.

To conclude, our studies suggest that an appraisal of self-agency increases feelings of regret but not the tendency to repair. They further suggest that feelings of disappointment but not feelings of regret are characterized by the tendency to repair.

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CHAPTER 4

THE INFLUENCE OF THE APPRAISALS OF EXPECTANCY AND PROXIMITY ON THE TENDENCY TO REPAIR

Life is filled with opportunities, maybes, and pities: the political candidate that was ahead in the exit polls but eventually loses the elections by a couple of votes, the tennis champion that plays the final of her favorite tournament but loses the last set in a tie break, the audience of Romeo and Juliet that anticipates a happy ending, but ends up watching Romeo commit suicide a few seconds before Juliet wakes up from an induced coma. Negative outcomes seem to induce much more intense and long-lasting emotions when a positive outcome was highly anticipated and just missed than when a positive outcome was never anticipated and missed by far. To date, it remains unclear whether both the expectancy of a positive outcome and the perception that it was just missed (i.e., proximity) separately influence emotional responding or whether one of the two dictates the emotional response. We present two studies in which we experimentally tease apart expectancy and proximity to investigate the influence of each on negative emotions.

As in most contemporary emotion research, we adopt a componential view of emotions. This view suggests that emotions consist of various components: (a) a cognitive component consisting of the appraisal of the situation, (b) a motivational component consisting of changes in action readiness and specific action tendencies, (c) a somatic component consisting of (neuro)physiological changes, (d) a motor component consisting of emotional expression and gross behavior, and (e) a feeling or experience component (Moors, 2009; Scherer, 2005). In addition, we agree with the proposal of appraisal theories that not the stimulus itself, but the appraisal of the stimulus determines the content of the (other) componential changes (Arnold, 1960; Frijda, 1986). Each appraisal theory proposes a

number of variables that are continuously appraised in the environment. Examples of appraisal variables are goal relevance, goal congruence, coping potential, agency, and expectancy (Frijda, 1986; Lazarus, 1991; Roseman, Antoniou, & Jose, 1996; Scherer, 1988). Proximity of a desired outcome is not mentioned in most appraisal theories, yet the idea that it plays a role in emotion elicitation and/or differentiation is compatible with an appraisal view and could easily be incorporated in existing appraisal theories. Appraisal theorists further propose that the output of the appraisal process directly drives the action tendencies that prepare the organism to respond to its environment (Frijda, Kuipers, & ter Schure, 1989; Scherer, 1994). This preparation process has (neuro)physiological correlates, such as an increase in heart rate and activity in motor cortices, and can elicit actual behavioral changes (Frijda, et al., 1989; Scherer, 1994). A feeling or emotional experience arises when the other components (appraisal, action tendencies, physiology, and behavior) are reflected in consciousness (Grandjean, Sander, & Scherer, 2008).

We investigated the influence of the appraisals of expectancy¹ and proximity on the motivational and feeling components. Our first aim was to examine whether obtaining a goal-incongruent outcome that is appraised as expected vs. unexpected elicits different motivations and feelings, while controlling for proximity. Our second aim was to investigate whether obtaining a goal-incongruent outcome when the desired outcome is appraised as proximal vs. distal elicits different motivations and feelings, while controlling for prior expectancies. In testing this hypotheses, we assumed that a desired outcome is appraised as proximal vs. distal when a script in which the outcome would have been obtained is a single step vs. multiple steps removed from the actual situation (Kahneman & Varey, 1990). Our third aim was to directly compare the influence of expectancy and proximity. There is a bulk of research that investigates the influence of proximity or expectancy on motivations and/or feelings, but these studies often fail to control (experimentally or statistically) for the other variable. Moreover, to date there are no studies that compare the influence of both.

¹ We use the term (appraisal of) expectancy to denote the prior expectancy of obtaining a goal-congruent outcome, not the future expectancy of obtaining a goal-congruent outcome.

The next sections describe a handful of these studies organized according to the component of emotion (motivational or feeling) examined.

THE MOTIVATIONAL COMPONENT

Previous research suggested that when a goal-incongruent outcome is unexpected and proximal to the desired outcome, it elicits more active behavior, more problem-solving behavior, and more risk-taking behavior. Most existing studies, however, do not allow isolating the effect of expectancy and proximity. For instance, studies with animals and children (Amsel, 1958; Ryan & Watson, 1968) showed that expectancy violation in the format of a non-reward (i.e., the withholding of a reward) leads to an increase in vigor of the subsequent behavior. This line of research fails to provide clear support for the unique effect of expectancy for two reasons. First, many of these studies confound expectancy with goal congruence, because they contrast non-rewards with rewards (Amsel, 1958; Ryan & Watson, 1968). Second, expectancy is often manipulated together with proximity. For instance, Haner and Brown (1955) instructed children to fill a marble board in order to win a prize. At varying distances from the goal, the experimenter pushed a handle to release all marbles. The closer participants were to the goal, the more force they used to push a plunger that stopped a noise that was initiated together with by the release of the marbles (see also, Pederson & Mcewan, 1970; Endsley, 1966; for one replication and one failed replication). In studies like these, the distance to the goal is not clearly separated from the expectancy of reaching the goal, because as participants approached their goal, their expectancy of reaching the goal may have increased as well.

Studies on this topic with adult participants can be found in the gambling literature on the near-miss effect. Just missing a win when gambling seems to increase the motivation to continue gambling, both in laboratory studies (Clark, Crooks, Clarke, Aitken, & Dunn, 2012; Côté, Caron, Aubert, Desrochers, & Ladouceur, 2003; Qi, Ding, Song, & Yang, 2011) and in real life (Ariyabuddhiphongs & Phengphol, 2008). Again, most operationalizations of near-misses confounded expectancy and proximity. For instance, in a slot machine game by Clark et al. (2012) near-misses were trials on which the winning symbol stopped at one position

from the payline (high expectancy, high proximity) and full-misses were trials on which the winning symbol stopped at a position further away from the payline (low expectancy, low proximity). Some studies did succeed at isolating expectancy. Strickland and Grote (1967) manipulated the proportion of high-expectancy trials in a slot machine game in which three winning symbols led to a monetary gain. One group of participants was exposed to many high-expectancy goal-incongruent trials: Winning symbols frequently appeared in the first slot but infrequently in the last slot. Another group of participants was exposed to many low-expectancy goal-incongruent trials: Winning symbols frequently appeared in the last slot but infrequently in the first slot. They found that participants in the first group had a stronger tendency to continue gambling than participants in the second group (but see Reid, 1986, for a failed replication).

To summarize, existing research suggests that not reaching a goal in combination with high expectancy (high prior expectation of reaching the goal) and high proximity (almost reaching the goal) is associated with an increased readiness to act compared to low expectancy and low proximity. To date, it remains unclear whether both expectancy and proximity have this effect or whether it is driven primarily by one of the two variables. Moreover, it remains unclear whether these appraisals result in a general increase in motivation or whether they activate a specific set of action tendencies. Our studies focused on the tendency to repair a negative outcome. Repairing can be regarded as a problem-solving behavior but it is, unlike risk taking or gambling, not potentially harmful.

THE FEELING COMPONENT

The unexpectedness of an event often is considered as a general amplifier of positive and negative affect. For instance, Kahneman and Miller (1982) proposed that abnormal events (e.g., events that violate expectancies) produce more intense feelings. This idea was supported in studies that measured expectancies (McGraw, Mellers, & Ritov, 2004; Siemer, Mauss, & Gross, 2007) as well as in studies that experimentally manipulated expectancies (Mellers, Schwartz, Ho, & Ritov, 1997; Shepperd & McNulty, 2002; van Dijk & van der Pligt, 1997). These studies suggest that it is always better to expect the worse: Expecting that a

goal-incongruent event will occur (a) attenuates negative feelings when the goal-incongruent event (expectedly) does occur and (b) increases positive feelings when a goal-congruent event (unexpectedly) occurs. Expecting that a goal-congruent event will occur (a) attenuates positive feelings when the goal-congruent event (expectedly) does occur, and (b) increases negative feelings when a goal-incongruent event (unexpectedly) occurs (McGraw, Mellers, & Tetlock, 2005). On the other hand, a number of studies suggested that prior expectancies have no effect on the intensity of positive and negative feelings (Feather & Simon, 1971; Golub, Gilbert, & Wilson, 2009; Marshall & Brown, 2006; but see Sweeny & Shepperd, 2010, for a reply). Additionally, in several of the studies that did produce significant results, proximity is a valid alternative explanation (e.g., McGraw, et al., 2004; Mellers, et al., 1997; Siemer, et al., 2007).

Studies on proximity suggest that negative feelings in face of goal-incongruent outcomes are increased when the desired outcome is proximal (both in sports, Markman, McMullen, & Elizaga, 2008, and in gambling, Clark, et al., 2012; Clark, Lawrence, Astley-Jones, & Gray, 2009; Qi, et al., 2011). Conversely, there are reasons to believe that being close to a desired outcome partly releases the positive valence tied to the desired outcome even when the outcome is missed (Dixon & Schreiber, 2004; Reid, 1986; Skinner, 1953): Near-misses in gambling seemed to activate the same brain areas as wins (Clark, et al., 2009) and are associated with reduced feedback-related negativity in event-related potentials compared to full-misses (Luo, Wang, & Qu, 2011). Again, few studies clearly separated the influence of expectancy and proximity. An exception is a study by Medvec and Savitsky (1997) showing that students were less satisfied with a B when almost obtaining an A, after controlling for prior expectancies.

To summarize, previous research did not produce a clear pattern of results with respect to the influence of expectancy and proximity on the intensity of negative feelings. The disparity in the literature may partly be due to the lack of studies that clearly separate the two variables. In our experiments, we clearly manipulated expectancy and proximity separately to investigate the influence of each on feelings of disappointment, frustration, and anger.

THE EXPERIMENTS

In two experiments we teased apart the variables of expectancy and proximity in a slot machine game that participants played for actual money. The game consisted of a series of trials. Each trial started with the sequential presentation of three pieces of fruit, in one of four combinations: (a) a win trial (or AAA-trial; three times the same fruit), (b) a high-expectancy high-proximity loss trial (or AAB-trial; two times the same fruit followed by a different fruit), (c) a low-expectancy high-proximity loss trial (or ABA/ABB-trial; two times the same fruit in Slot 1 and 3 or in Slot 2 and 3), (d) a low-expectancy low-proximity loss trial (or ABC-trial; three times a different fruit). On each goal-incongruent or loss trial, we measured repair behavior via the amount of credits participants betted in a repair game. Participants also self-reported on the tendency to repair and feelings of disappointment, frustration, and anger. We did not formulate strong hypotheses given that previous studies leave open whether proximity and expectancy separately and equally influence all dependent variables or whether only one of the two variables produces significant differences.

We conducted two experiments with small variations in trial distribution. In Experiment 1, half of the participants received an equal number of high-expectancy and low-expectancy loss trials (i.e., the number of AAB-trials was equal to the sum of ABA-, ABB-, and ABC-trials) and the other half of the participants received an equal number of high-proximity and low-proximity loss trials (i.e., the number of ABC-trials was equal to the sum of ABA-, ABB-, and AAB-trials). In Experiment 2, the design was balanced in a third way: All participants received an equal number of AAB-, ABA/ABB-, and ABC-trials. This way, we could investigate whether the three loss trial types evoked different emotional responses independently of their frequency of occurrence. The procedure of the experiments was identical and a nearly identical data pattern emerged across the different trial distributions. We therefore describe the two experiments together and indicate minor differences where appropriate.

Method

Participants.

Thirty first year psychology students at Ghent University ($M_{age} = 19$, 8 males) participated in Experiment 1 in return for course credits. The students in this sample had a moderate to high experience with gambling in general ($M = 5.00$, $SD = 1.74$) but a low experience with slot machines ($M = 2.00$, $SD = 1.20$), as was evident from their ratings on scales from 1 (*completely not experienced*) to 7 (*very experienced*). Thirty-seven students at Ghent University ($M_{age} = 22$, 4 males) participated in Experiment 2 in return for payment (8 € augmented with the amount they won in the game). The students in this sample also had a moderate to high experience with gambling in general ($M = 4.92$, $SD = 1.93$) but a low experience with slot machines ($M = 2.00$, $SD = 1.27$).

Materials.

The experiment was programmed and run in Affect 4.0 (Spruyt, Clarysse, Vansteenwegen, Baeyens, & Hermans, 2010). It was administered on a computer connected to a keyboard, a 19" CRT screen, two speakers and a mouse-shaped response box (Voss, Leonhart, & Stahl, 2007). Additional materials in the room were a transparent money bank and a bag filled with ten cent coins.

The slot machine presented on the computer screen consisted of three parts (see Figure 1). The upper part contained the slots in which the fruits appeared. The middle part contained three information boxes, from left to right labelled as "credits" (with the number of available credits), "bet" (with the number of betted credits on that trial), and "winning bet" (the number of credits needed to repair a negative outcome; this information only appeared after a successful bet in the repair game). The lower part contained three spin buttons (in the first phase of each trial) or a feedback message (in the second phase of each trial).



Figure 1. The slot machine with the three slots (upper part), the three information boxes (middle part), and the three spin buttons (lower part).






Design.

Experiment 1 consisted of two between-subjects conditions (see Table 1): Condition 1 had 72 high-expectancy high-proximity loss trials (AAB-trials), 36 low-expectancy high-proximity loss trials (18 ABA-trials, 18 ABB-trials), and 36 low-expectancy low-proximity trials (ABC-trials). Condition 2 had 36 high-expectancy high-proximity loss trials (AAB-trials), 36 low-expectancy high-proximity loss trials (18 ABA-trials, 18 ABB-trials), and 72 low-expectancy low-proximity loss trials (ABC-trials; see Table 1). Experiment 2 consisted of one balanced condition with 48 high-expectancy high-proximity loss trials (48 AAB-trials), 48 high-expectancy low-proximity loss trials (24 ABA-trials, 24 ABB-trials), and 48 low-

expectancy low-proximity loss trials (ABC-trials). Participants in all conditions received 9 win trials (AAA-trials). For ease of communication, in the remainder of the text we will refer to these three conditions as respectively the 72-AAB/36-ABC condition, the 36-AAB/72-ABC condition, and the 48-AAB/48-ABC condition.

Table 1.

Overview of the trial types, associated appraisal values, game outcomes, and distributions in Experiment 1 (Condition 1 and Condition 2) and Experiment 2.

Trial Type	Example	Appraisal		Outcome	Experiment 1		Experiment 2
		Expectancy	Proximity		Condition 1	Condition 2	
ABC		Low	Low	0 cent	36	72	48
ABA		Low	High	0 cent	18	18	24
ABB		Low	High	0 cent	18	18	24
AAB		High	High	0 cent	72	36	48
AAA		High	-	10 cent	9	9	9

Procedure.

All participants were tested individually in a session of 45 minutes. The participant was seated at a table facing the CRT screen, holding the left hand on the numerical part of the keyboard and the right hand (index and middle finger) on the response box. The experimenter was seated at a table placed orthogonally to the participants’ table and was unable to see the computer screen. The money bank was positioned between the participant and the experimenter and was visible to both. At the start of the experiment, the money bank was empty and participants received 1200 credits to bet throughout the experiment.

The experiment consisted of 153 trials presented in a random order in three blocks of 51 trials. At trial start, the slot machine had three empty slots. Under each slot, there was a button with the word “spin”. When the participant pressed numerical key “1”, the spin button under the first slot was activated (indicated by a yellow border around the button) and the slot machine spun the wheel of the first slot for a time interval between 500 and 1500 ms (together with a wheel-spinning sound) until a piece of fruit appeared (together with a clicking sound). After the first fruit appeared, the participant could press numerical key “2” to activate the spin button under the second slot. After the second fruit appeared, the participant could press numerical key “3” to activate the spin button under the third slot. The pictures of pieces of fruit that could appear in the slots were a lemon (L), a prune (P), and a melon (M). They could appear in one of the five combinations: AAA, AAB, ABA, ABB, or ABC. The three pictures were on each trial randomly assigned to the function of A, B, and C. After the three pieces of fruit were presented for 1000 ms, a win feedback message (“10 cent”, printed in green) or a loss feedback message (“0 zero cents”, printed in red) appeared in the bottom part of the slot machine, replacing the spin buttons. The win feedback was accompanied by a positive sound and a deposit of ten cents by the experimenter in the money bank. The loss feedback was accompanied by pictures of two red buttons that appeared simultaneously on the screen and that were tagged “second chance” (left button) and “pass” (right button). Participants could choose a second chance or could pass by clicking the corresponding left or right button of the response box. When participants chose to pass, the next trial started after 1000 ms and a negative sound was played. When participants chose for a second chance, they could bet a number of credits to repair the negative outcome. The start bet was ten credits. Participants could choose to bet ten or more credits. When the second chance button was clicked for the first time, the start bet was made and the pass button turned into a stop button (i.e., the word “pass” was replaced by the word “stop”). Each additional click on the second chance button increased the bet by one credit and decreased the available credits by one. When participants pressed the stop button, the two buttons disappeared and the computer compared the number of betted credits to a random number between zero and fifty. If the bet was equal to or exceeded the random number, the win feedback message and the random number were

displayed, a positive sound was played, and the experimenter made a deposit of ten cents. If the number of betted credits was lower than the random number, the loss feedback message remained on screen and a negative sound was played (the random number was not shown). The feedback remained on screen for 3000 ms before a new trial started.

Prior to the experiment, participants received written and oral instructions, a demonstration trial, and a practice trial (both ABC-trials). On the demonstration trial, the experimenter demonstrated how the participant could repair the negative outcome and explained that higher bets yielded a higher chance at winning (a bet of 10 credits was said to correspond to a low chance at winning, 15 credits to a slightly higher chance, 25 credits to a chance of 50%, 35 credits to substantially more than 50%, and 50 credits to a 100% chance). The practice trial was identical to the experimental trials, except that participants could not win money, nor lose credits (the number of available credits was reset to 1200 after the practice trials). Before the actual experiment, participants were additionally instructed to use the 1200 credits in a sparing way, more specifically, to spend them equally across the three blocks of the experiment (i.e., ± 400 credits per block). After each block, the game paused and the number of available credits was displayed. The experimenter then evaluated whether the participant had followed the instructions and, if not, she repeated the instructions.

After the experiment, a questionnaire was administered in which different trial types had to be rated on scales ranging from 1 (*not at all*) to 7 (*yes completely*). The questionnaire displayed the different trial types in a sequential manner: the two-fruit display LL was followed by the three-fruit displays LLL and LLM; the two-fruit display LM was followed by the three-fruit displays LML and LMP. For the two-fruit displays LL and LM, participants rated their expectancy of winning ten cents (“to what extent do you expect to win 10 cents”). For all loss displays (LLM, LML, and LMP), participants rated negative feelings (anger, disappointment, and frustration), the tendency to pass, the tendency to choose a second chance, the number of credits they wanted to bet in the repair game, and coping potential (“when you bet 25 credits in the repair game, to what extent do you expect to win

back the ten cents in the repair game?²). We measured the appraisal of coping potential to be able to examine whether any effects of expectancy or proximity were moderated or mediated by their influence on coping potential. For instance, if participants believe that their coping potential was higher on AAB-trials than on ABC-trials, this may increase their tendency to repair the situation. The questionnaire was administered in three versions to counterbalance the order of appearance of the different trial types: In a first version the order was LL(M), LL(L), LM(L), and LM(P); in a second version it was LM(L), LM(P), LL(M), and LL(L); and in a third version it was LM(P), LM(L), LL(M), and LL(L). After completion of the questionnaire, participants were thanked and debriefed and the money in the money bank was exchanged into bigger coins.

Results

Instead of reporting the nearly identical data patterns of Experiments 1 and 2 in two separate results sections, we collapsed the data and report occasional differences between the experiments whenever they arise. An overview of the results for all dependent variables can be found in Table 2. Each dependent variable was analyzed via multivariate repeated measures ANOVAs³ in four steps. Step 1 was a global test with the within-subjects variable trial type (high-expectancy high proximity or AAB, high-expectancy low-proximity or ABA/ABB, and low-expectancy low-proximity or ABC) and the between-subjects factor trial distribution (36-AAB/72-ABC, 72-AAB/36-ABC, and 48-AAB/48-ABC). If this step indicated that trial distribution had an influence on our results, trial distribution was added as a between-subjects factor to the analyses of the following steps. In Step 2, we investigated the unique effect of expectancy by contrasting high-expectancy high-proximity trials (AAB)

² The appraisal of coping potential was measured in Experiment 2 only. Participants in Experiment 1 also rated the extent to which they expected to win ten cents in the repair game. Given that participants could choose the amount of credits they betted, however, it was possible that answers to this item were influenced by the size of the bets participants made (high vs. low), and did not reflect purely how much they believed the outcome could be repaired (i.e., high vs. low coping potential). To avoid this confusion in Experiment 2, we asked participants to rate their expectancy to win ten cents in the repair game given a bet of 25 credits.

³ Pillai's trace is reported in all analyses.

with low-expectancy high-proximity trials (ABA/ABB) in a repeated measures ANOVA. In Step 3, we investigated the unique effect of proximity by contrasting low-expectancy high-proximity trials (ABA/ABB) with low-expectancy low-proximity trials (ABC). In Step 4, we directly compared the effect of expectancy (i.e., the difference score between AAB-trials and ABA/ABB-trials) with the effect of proximity (i.e., the difference score between ABA/ABB-trials and ABC-trials) in a repeated measures ANOVA. Our design did not allow to investigate the interaction between expectancy and proximity because it did not contain high-expectancy low-proximity trials. Before turning to these analyses, we report the results of the manipulation check for expectancy.

Manipulation check.

A Trial Type (LL vs. LM) x Trial Distribution analysis for expectancy ratings of winning ten cents (as measured at the end of the experiment) revealed a main effect of trial type, $F(1, 65) = 89.39, p < .001, \eta^2_p = .58$, no main effect of trial distribution, nor an interaction, $F_s < 1$. Participants had a higher expectancy of winning ten cents on LL-trials ($M = 4.43, SD = 1.16$) than on LM-trials ($M = 2.36, SD = 1.36$).

The tendency to repair.

We investigated whether expectancy and proximity influenced the tendency to repair a goal-incongruent outcome. The tendency to repair was measured via repair behavior (online) and via self-reports (at the end of the experiment). We discuss the results for each measure in turn.

Behavioral measures.

We analyzed two aspects of repair behavior across the different trial types: (a) the percentage of choosing for a second chance and (b) the average bet placed after choosing for a second chance.

The Trial Type x Trial Distribution analysis for the percentage of choosing a second chance revealed an effect of trial type, $F(2, 63) = 14.98, p < .001, \eta^2_p = .32$, an effect of trial

distribution $F(2, 64) = 3.83, p = .027, \eta^2_p = .12$, but no interaction, $F < 1$. There was an effect of expectancy, $F(1, 66) = 9.59, p = .003, \eta^2_p = .13$, as well as an effect of proximity, $F(1, 66) = 24.65, p < .001, \eta^2_p = .27$ (see Table 2). The influence of proximity was significantly stronger than the influence of expectancy, $F(1, 66) = 6.58, p = .013, \eta^2_p = .091$ (see Table 2). The effect of trial distribution suggested that participants in the 36-AAB/72-ABC condition more often chose for a second chance ($M = 46.14\%, SD = 11.27$) than participants in the 72-AAB/36-ABC condition ($M = 36.20\%, SD = 9.24$), $t(28) = 2.64, p = .013$, as well as more often than participants in the AAB48/ABC48 condition ($M = 39.19\%, SD = 10.23$), $t(50) = 2.16, p = .036$. The difference between the latter two conditions was not significant, $t(50) = .98, p = .33$.

The Trial Type x Trial Distribution analysis for the average bet after choosing for a second chance did not reveal an effect of trial type, $F(2, 59) = 1.84, p = .168, \eta^2_p = .059$, nor of trial distribution, nor an interaction, $F_s < 1$. The effect of expectancy was significant, $F(1, 66) = 4.31, p = .042, \eta^2_p = .061$, the effect of proximity was not, $F < 1^4$, and there was no significant difference between the effect of proximity and the effect of expectancy, $F < 1$ (see Table 2).

Self-reports.

Three items of the questionnaire reflected the tendency to repair: (a) the tendency to choose a second chance, (b) the tendency to pass, and (c) the number of betted credits. We discuss each item in turn.

The Trial Type x Trial Distribution analysis for the tendency to choose a second chance revealed a significant effect of trial type, $F(2, 63) = 10.18, p < .001, \eta^2_p = .25$, no effect of trial distribution, $F(2, 64) = 1.95, p = .15, \eta^2_p = .06$, nor an interaction, $F < 1$. There was a

⁴ The analysis of proximity for this measure only could be performed on a subset of participants. Four participants never chose a second chance on ABC-trials, hence we could not collect data on their average bet after choosing a second chance. In order to make the results of the analysis of expectancy and proximity comparable to each other, we repeated the analysis of expectancy on the same subset of participants whose data were included in the analysis of proximity. The effect of expectancy for this subset of 63 participants was marginally significant, $F(1, 62) = 3.52, p = .065, \eta^2_p = .054$.

significant effect of expectancy, $F(1, 66) = 10.94, p = .002, \eta^2_p = .14$, a significant effect of proximity, $F(1, 66) = 9.20, p = .003, \eta^2_p = .12$, and no difference between the two, $F < 1$.

For the tendency to pass, there was a significant effect of trial type, $F(2, 63) = 8.31, p = .001, \eta^2_p = .21$, a trend effect of trial distribution, $F(2, 64) = 2.53, p = .087, \eta^2_p = .073$, and no interaction, $F(4, 128) = 1.04, p = .39, \eta^2_p = .03$. We found an effect of expectancy, $F(1, 66) = 5.84, p = .018, \eta^2_p = .081$, an effect of proximity, $F(1, 66) = 9.29, p = .003, \eta^2_p = .12$, and the two did not differ from each other, $F < 1$. A trend effect of trial distribution suggested that participants in the 72-AAB/36-ABC condition were generally more inclined to pass ($M = 4.24, SD = 1.08$) than participants in the 36-AAB/72-ABC condition ($M = 3.47, SD = 1.08$), $t(28) = 1.98, p = .058$, and more inclined to pass than participants in the AAB48/ABC48 condition ($M = 3.69, SD = 0.92$), $t(50) = 1.86, p = .068$. The difference between the latter two conditions was not significant, $t < 1$.

For the self-reported bet, there was an effect of trial type, $F(2, 63) = 5.46, p = .007, \eta^2_p = .15$, no effect of trial distribution, $F(2, 64) = 2.36, p = .10, \eta^2_p = .07$, nor an interaction, $F < 1$. The effect of expectancy was significant, $F(1, 66) = 7.87, p = .007, \eta^2_p = .11$; the effect of proximity was not, $F(1, 66) = 1.89, p = .17, \eta^2_p = .03$, but the later did not differ significantly from the former, $F < 1$.

Negative feelings.

In addition to the influence of expectancy and proximity on the tendency to repair we examined their influence on the self-reported feelings of disappointment, frustration, and anger.

For disappointment, we found a significant effect of trial type, $F(2, 63) = 15.61, p < .001, \eta^2_p = .33$, no effect of trial distribution, nor a significant interaction, $F_s < 1$. As can be seen in Table 2, the effect of expectancy was significant, $F(1, 66) = 35.54, p < .001, \eta^2_p = .35$, but the effect of proximity failed to reach significance, $F < 1$. The effect of expectancy was significantly stronger than the effect of proximity, $F(1, 66) = 10.50, p = .002, \eta^2_p = .14$.

Table 2.

Overview of the combined results of Experiment 1 and 2. The first three columns contain means (SDs) of the dependent variables on each trial type. The fourth and fifth column contain the unique effects of expectancy and proximity, including significance levels (^(*) $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$). The sixth column contains the p -value for the difference test between expectancy and proximity.

		AAB		ABA/ABB		ABC		Expectancy		Proximity		Diff		
Behavior	Second chance (%)	48.31	(17.96)	42.82	(15.63)	29.11	(16.41)	5.49	**	(14.52)	13.70	***	(22.61)	.013
	Bet	21.80	(5.83)	21.30	(5.70)	21.05	(5.24)	0.49	*	(3.66)	0.25	ns.	(2.08)	ns.
	Self-reported Bet	23.58	(59.41)	20.75	(10.25)	18.76	(11.53)	2.84	**	(8.27)	1.99	ns.	(11.81)	ns.
	Self-reports: Second chance	4.97	(1.36)	4.37	(1.35)	3.64	(1.78)	0.60	**	(1.48)	0.73	**	(1.97)	ns.
	Self-reports: Pass	3.22	(1.39)	3.70	(1.45)	4.37	(1.59)	-0.48	*	(1.62)	-0.67	**	(1.80)	ns.
Feelings	Disappointment	3.42	(1.74)	2.60	(1.48)	2.51	(1.54)	0.82	***	(1.13)	0.09	ns.	(1.14)	.002
	Frustration	2.61	(1.63)	2.17	(1.44)	2.03	(1.40)	0.44	**	(1.08)	0.14	ns.	(0.68)	.070
	Anger	2.21	(1.35)	1.90	(1.14)	1.93	(1.16)	0.31	**	(0.84)	-0.03	ns.	(0.76)	.026
	Anger (Exp 1 72- AAB/36-ABC)	1.73	(0.88)	2.07	(1.03)	1.93	(0.96)	-0.33	ns.	(0.82)	0.13	ns.	(0.74)	.220
	Anger (Exp 1 36- AAB/72-ABC)	2.33	(1.23)	2.00	(1.07)	2.27	(1.10)	0.33	(*)	(0.62)	-0.27	*	(0.46)	.014
	Anger (Exp 2 48- AAB/48-ABC)	2.35	(1.53)	1.78	(1.23)	1.78	(1.25)	0.57	***	(0.80)	0.00	ns.	(0.85)	.006

A similar pattern of results was found for frustration: a significant effect of trial type, $F(1, 62) = 3.31, p = .043, \eta^2_p = .096$, no effect of trial distribution, $F < 1$, nor an interaction, $F(4, 126) = 1.73, p = .15, \eta^2_p = .052$. The effect of expectancy was again significant, $F(1, 65) = 10.86, p = .002, \eta^2_p = .14$, and the effect of proximity was not, $F(1, 66) = 2.68, p = .11, \eta^2_p = .039$. The difference between the two was marginal, $F(1, 65) = 3.40, p = .070, \eta^2_p = .05$.

The pattern for anger was more complicated. There was no effect of trial type, $F(2, 63) = 1.68, p = .19, \eta^2_p = .051$, nor of trial distribution, $F < 1$, but a significant interaction of Trial Type x Trial Distribution, $F(4, 128) = 3.87, p = .005, \eta^2_p = .11$. Table 2 shows the results for each trial distribution. There was a significant interaction between trial type and experiment (1 vs. 2), $F(2, 64) = 4.70, p = .013, \eta^2_p = .13$. In Experiment 2, the effect of trial type was significant, $F(2, 35) = 11.24, p = .002, \eta^2_p = .24$. There was an effect of expectancy, $F(1, 36) = 18.60, p < .001, \eta^2_p = .34$, no effect of proximity, $F < 1$, and a significant difference between the two, $F(1, 36) = 8.40, p = .006, \eta^2_p = .19$. In Experiment 1, there was no effect of trial type, $F < 1$, but the Trial Type x Trial Distribution interaction was marginally significant, $F(1, 27) = 3.27, p = .054, \eta^2_p = .20$. For participants in the 36-AAB/72-ABC condition there was a trend effect of trial type, $F(2, 13) = 3.76, p = .051, \eta^2_p = .37$. For these participants, the effect of expectancy was marginal, and the effect of proximity was reversed, but significant, $F(1, 14) = 5.09, p = .041, \eta^2_p = .27$, and different from the effect of expectancy, $F(1, 14) = 7.88, p = .014, \eta^2_p = .36$. For participants in the 72-AAB/36-ABC condition, there was no effect of trial type, $F(2, 13) = 1.23, p = .33, \eta^2_p = .16$.

Additional analysis: the appraisal of coping potential.

We investigated whether differences in the appraisal of coping potential moderated or mediated the effects of expectancy and proximity on the tendency to repair and negative feelings. First, we investigated the effects of expectancy and proximity on the appraisal of coping potential. Coping potential (measured in Experiment 2 only) differed significantly across the trial types, $F(2, 35) = 3.47, p = .042, \eta^2_p = .17$. There was a significant effect of expectancy: Participants rated their coping potential as higher on high-expectancy high-proximity trials (AAB; $M = 4.49, SD = 1.04$) than on low-expectancy high-proximity trials (ABA/ABB; $M = 4.16, SD = 1.01$), $F(1, 36) = 6.34, p = .016, \eta^2_p = .15$. There was no effect of

proximity: Coping potential was rated as equally high on low-expectancy high-proximity trials (ABA/ABB) and low-expectancy low-proximity trials (ABC; $M = 4.22$, $SD = 1.03$), $F < 1$. To examine whether the effect of expectancy on the tendency to repair was mediated, moderated, or unaffected by coping potential, we regressed for each dependent variable the difference between AAB-trials and ABA/ABB-trials on two predictors: (a) the centered sum score of coping potential on AAB-trials and ABA/ABB-trials and (b) the difference score in coping potential on AAB-trials and ABA/ABB-trials (Judd, Kenny, & McClelland, 2001). The interpretation of this analysis is as follows (Judd, et al., 2001): (a) If the difference score of the dependent variable is significantly predicted by the centered sum score of coping potential, then coping potential moderates the effect of expectancy, (b) if the difference score of the dependent variable is significantly predicted by the difference score of coping potential, then coping potential mediates the effect of expectancy, (c) if the intercept is significant, the residual effect of the effect of expectancy is significant over and above the difference in coping potential. We performed eight regressions for each of the difference scores of the dependent variables (disappointment, frustration, anger, frequency of choosing a second chance, average bet, self-reported bet, self-reported tendency to choose a second chance, and self-reported tendency to pass). For none of the eight variables we found support for a moderation effect, $ts < 1$. We did find support for a mediation effect for two dependent variables: the self-reported bet, $\beta = .39$, $t(36) = 2.46$, $p = .019$, and the self-reported tendency to choose a second chance, $\beta = .34$, $t(36) = 2.08$, $p = .045$. The positive regression weights indicate that the more participants estimated their coping potential as higher on AAB-trials than on ABA/ABB-trials, the more their self-reported tendency to repair was increased on AAB-trials compared to ABA/ABB-trials. There was no residual effect of expectancy for the self-reported bet, $t(36) = 1.39$, $p = .18$, nor for the self-reported tendency to choose a second chance, $t(36) = 1.64$, $p = .11$, suggesting full mediation. The effects of none of the other variables were mediated by coping potential, $ts < 1$.

GENERAL DISCUSSION

Previous research suggested that goal-incongruent events hit harder when they are unexpected and when the goal was just missed than when they are expected and the goal was missed by far. However, the effect of expectancy and proximity has often been confounded. The aim of the present series of studies was to investigate whether emotions are separately enhanced by the appraisal of expectancy and proximity or whether only one of the two variables determines the emotional response. We manipulated expectancy and proximity in a gambling experiment and measured emotions via changes in action tendencies (the tendency to repair) and negative feelings (disappointment, frustration, and anger).

Both the self-report and behavioral measures suggested that expectancy and proximity separately augment the tendency to repair. Expectancy and proximity both influenced the decision to engage in repair behavior (i.e., to take a second chance) with proximity being the strongest determinant of this behavior. The number of credits that subsequently were invested was influenced by expectancy only, but the influence of expectancy was not significantly larger than the influence of proximity. Additional analyses proposed that our results could not be attributed to differences in coping potential, except for the influence of expectancy on the self-reported tendency to repair. More in particular, on high-expectancy trials, participants estimated coping potential as higher than on low-expectancy trials, and this difference in coping potential mediated the effects on two of the three self-report measures of repair tendencies (i.e., the self-reported tendency to choose a second chance and the self-reported bet). To summarize, both expectancy and proximity increased the tendency to repair but the influence of proximity was stronger on one of the measures (i.e., the percentage of choosing a second chance).

A different pattern of results emerged for feelings of disappointment, frustration, and anger. All feelings remained largely unaffected by the appraisal of proximity but were significantly increased by the appraisal of expectancy. Our data thus support the idea that expecting to attain a goal generally amplifies negative affect when the goal is not obtained. For feelings of anger, the effect of expectancy furthermore depended on the specific distribution of the trials: The effect dissipated for participants who received a high number

of high-expectancy or AAB-trials (and a low number of low-expectancy or ABC-trials), even though they did not rate their expectancy of gaining ten points as lower than participants in other conditions. This may suggest that when one's expectancies are frequently disconfirmed (as is the case in the 72-AAB/36-ABC condition) one can become habituated to it in the sense that the feeling of anger is attenuated.

The effects of expectancy and proximity were largely unaffected by the specific trial distribution (except when the effects on angry feelings were considered). Trial distribution did, however, have a global motivational effect. Participants in the condition with the least (36) high-expectancy high-proximity AAB-trials and the most (72) low-expectancy low-proximity ABC-trials were more inclined to repair the goal-incongruent outcomes than participants in the condition with the most (72) high-expectancy high-proximity AAB-trials and the least (36) low-expectancy low-proximity ABC-trials. Participants in the condition with an intermediate number (48) of each trial type scored in between. This confirms previous results that participants especially persist in gambling in face of moderate numbers of near-misses (Kassinove & Schare, 2001).

To summarize, our data hint at interesting similarities and dissociations between the influence of expectancy and proximity on emotional responding. Both had an independent and similar amplifying effect on the tendency to repair. On the other hand, feelings of disappointment, frustration, and anger were influenced by expectancy only. These effects generalized across different trial distributions.

Our studies have several limitations, some of which are bound to the use of specific samples and some to the use of a specific experimental context. First, the students in both our samples reported to have a moderate to high experience with gambling. Past research has suggested that experienced gamblers may be more sensitive to the effects of near-misses (Habib & Dixon, 2010, but see Reid, 1986). Therefore, the role of proximity was possibly overestimated in our studies. A replication with participants that are less experienced with gambling would solve this issue.

Second, it is unclear whether our results are bound to the specific context of the slot machine game or the context of gambling in general. It may be noted that in other, more naturalistic, settings it may be difficult to disentangle the influence of proximity and

expectancy from each other and from other (appraisal) variables. For instance, when a student receives a grade that is incongruent with his/her desired grade, the appraisal that the actual grade is close to the desired grade may often be correlated with the appraisal of coping potential (i.e., the student may believe that he/she can obtain the desired grade next time). Moreover, when the student had a strong expectation to obtain the desired grade, he/she may attribute the cause of not obtaining this grade externally (e.g., to an unfair grading method or professor) rather than internally (i.e., to the self). Thus, it will be crucial for future studies on this topic to control experimentally or statistically for other (appraisal) variables such as coping potential and causal agency.

Another objection may be that the obtained differences in the tendency to repair do not reflect “emotional” action tendencies, but elaborated strategies to maximize one’s chances at winning. It is extremely difficult to decide whether a particular action tendency or behavior is part of an emotional episode or not. In fact, it largely depends on the definition of emotions that one holds. Some would argue that positive and negative feelings are a defining property of emotions (Ortony & Turner, 1990) and that emotional behavior is behavior that stems from these positive and negative feelings (e.g., the affect-as-information model; Clore, 1994; Ketelaar & Au, 2003; Schwarz & Clore, 1983). According to this view, one might argue that the effect of expectancy on the tendency to repair is more “emotional” than the effect of proximity, because the former was accompanied by an increase in negative feelings, whereas the latter was not⁵. Others have defined emotions as states that tilt behavior towards irrationality (but see Damasio, 1994; Frank, 1988; Lazarus, 1995). This idea is especially popular in folk psychology (Parrott, 1995) and has some

⁵ To further inspect whether the tendency to repair was “emotional” according to the criterion that it should be accompanied by feelings, we calculated correlations between the tendency to repair and feelings. More in particular, we first correlated the tendency to repair on AAB-, ABA/ABB-, or ABC-trials as measured by five different measures (two behavioral and three self-report measures) with feelings of frustration, anger, and disappointment on AAB-, ABA/ABB-, or ABC-trials. None of these correlations reached significance (all $ps > .05$). Second, we correlated the effect of expectancy on the tendency to repair (same five measures) and the effect of expectancy on feelings of frustration, anger, and disappointment (i.e., AAB-trials minus ABA/ABB-trials). Most correlations did not reach significance ($ps > .05$) except for a positive correlation between the effect of expectancy on frustration and the effect of expectancy on the self-reported tendency to choose a second chance, $r(66) = .30, p = .016$. The same analyses for the effect of proximity (ABA/ABB-trials minus ABC-trials) revealed only a negative correlation between the effect of proximity on disappointment and the effect of proximity on the number of betted credits, $r(66) = -.27, p = .034$ (other $ps > .05$). This data pattern do not support the idea that the tendency to repair was accompanied by feelings.

adherents in the scientific world. For instance, some researchers propose that emotions were adaptive for our ancestors but give rise to suboptimal or irrational choices in the modern world (Haselton & Ketelaar, 2006; Sripada & Stich, 2004) and that emotional behavior typically relies on heuristics rather than on accurate cost-benefit analyses (Quartz, 2009). Repair behavior can be considered as rational or as stemming from a cost-benefit analysis when it is more frequent on trials on which the participant believes that repairing will be relatively easy (i.e., coping potential is high) than on trials on which the participant believes that repairing will be relatively difficult (i.e., coping potential is low). In this respect, the influence of expectancy on repair behavior could be considered more rational and less “emotional” than the influence of proximity, because expectancy was related to coping potential (participants rated their coping potential as higher on high-expectancy high-proximity trials than on low-expectancy high-proximity trials), whereas proximity was not (participants rated their coping potential as equal on low-expectancy high proximity trials than on low-expectancy low-proximity trials). Future studies may investigate the presence of other criteria that have been proposed to disentangle emotional from non-emotional states, such as accompanying physiological signals (Lazarus, 1982) or characteristic facial expressions (Ekman, 1994), or the extent to which the action tendency takes priority over other goals (Frijda, 1986).

To conclude, there is an ancient saying by Laozi (the founder of Taoism) that “loss is not as bad as wanting more.” Our studies are the first to show that high expectations as well as the thought that a better outcome was within reach independently increase the motivation to obtain that outcome. Disconfirmed expectations, moreover, led to feelings of disappointment, frustration and anger.

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**ANGRY APPROACH AND FEARFUL
AVOIDANCE: THE GOAL-DEPENDENT
NATURE OF EMOTIONAL APPROACH AND
AVOIDANCE TENDENCIES**

It is generally assumed that people are inclined to reduce the physical distance between themselves and positive stimuli (i.e., approach) and to increase the physical distance between themselves and negative stimuli (i.e., avoid; Chen & Bargh, 1999; Krieglmeier, Deutsch, De Houwer, & De Raedt, 2010). On the other hand, several researchers have suggested that negative stimuli do not invariably elicit the tendency or goal to avoid¹. More specifically, negative stimuli that evoke emotions such as fear, disgust, and contempt are assumed to elicit the goal to avoid the stimulus, whereas negative stimuli that evoke anger are assumed to elicit the goal to approach the stimulus (Carver & Harmon-Jones, 2009). Until now it remains unclear why anger is different from other negative emotions in this respect. In the present chapter we focus on anger and fear (two emotions that are comparable with respect to valence and arousal, Russell & Barrett, 1999). We address the question why anger is related to approach motivation and fear to avoidance motivation and under which conditions this set of relations emerges.

The link between anger and approach motivation has been established across various studies and research paradigms (Carver & Harmon-Jones, 2009). Studies have shown, for

¹ In the present context, we use the terms “action tendency”, “goal” and “motivation” interchangeably to refer to the dynamical representation of a behavior (Bargh & Barndollar, 1996). It may be noted that all behaviors can be described with a verb (e.g., to approach, to attack) or with a desired outcome (e.g., to reduce the physical distance, to inflict harm).

instance, that people who frequently feel angry often are more motivated to approach (Harmon-Jones, 2003; Harmon-Jones & Allen, 1998). Also, the induction of angry feelings has been shown to speed up approach movements rather than avoidance movements (Maayan & Meiran, 2011) and to influence other correlates of approach motivation, such as relatively greater left than right frontal cortical activity (Harmon-Jones & Sigelman, 2001) and scores on the BIS/BAS scale (Yan & Dillard, 2010).

Regarding the origin of the association between anger and approach motivation versus fear and avoidance motivation, one view prevails in the literature (e.g., Smits & Kuppens, 2005; Wilkowski & Meier, 2010). This view is based on the assumption that emotions are multicomponential phenomena consisting of various components: appraisal, motivation, somatic changes, motor expression, and feelings (Moors, 2009; Roseman, 2001; Scherer, 2005). The motivational component consists of action tendencies or goals to establish a particular relation with the environment. In case of anger, many authors mention the goal to aggress, attack, fight, hurt, or destroy a stimulus (Averill, 1983; Berkowitz & Harmon-Jones, 2004; Lazarus, 1991; Plutchik, 2003; Roseman, Wiest, & Swartz, 1994). Some authors mention the goal to obtain or display a powerful or dominant role in social interactions (Hess, Adams, & Kleck, 2009; Knutson, 1996; Morris & Keltner, 2000). Fear is most often linked with the goal to obtain safety (Roseman, et al., 1994), protect oneself (Frijda, 1986), and escape or avoid harm (Lazarus, 1991). In the context of social interactions, fear is associated with the goal to be submissive (de Waal, 2003; Fridlund, 1994; Marsh, Adams, & Kleck, 2005; Wilkowski & Meier, 2010) because submissive behavior appeases and averts aggressive responses from others (Marsh, Adams, et al., 2005; Schenkel, 1967).

Within this view, the goals associated with these emotions (e.g., to aggress/dominate in the case of anger, to be safe/submissive in the case of fear) are considered superordinate goals, and the goals to approach and avoid are considered subordinate goals that are at the service of these superordinate goals (Frijda, 2010). To fulfil the superordinate goals related to anger, it is often more functional to approach the stimulus, whereas to fulfil the superordinate goals related to fear, it is often more functional to avoid the stimulus. Indeed, aggression often requires that one approaches the stimulus first (Smits & Kuppens, 2005). Likewise, social power is more often obtained and displayed by performing approach

behaviors rather than avoidance behaviors, for instance, by keeping rather than avoiding eye contact (Mazur & Booth, 1998; Terburg, Hooiveld, Aarts, Kenemans, & van Honk, 2011). In contrast, seeking safety or protecting oneself often requires moving away from the stimulus and avoiding harm literally implies avoidance (Frijda, 1986; Roseman, et al., 1994). Likewise, to achieve the goal to be submissive, avoidance behavior may be more functional than approach behavior.

To date, few studies have addressed the question whether approach and avoidance goals in the context of specific emotions are at the service of any of the superordinate goals mentioned above. A number of studies did investigate the conditions under which anger is related to approach motivation. For instance, studies have shown that anger is accompanied by approach motivation (as measured by greater left than right frontal cortical activity) only when participants have the opportunity to approach (Harmon-Jones & Peterson, 2009; Harmon-Jones, Sigelman, Bohlig, & Harmon-Jones, 2003). These studies suggest that anger is not invariably related to approach motivation, yet they do not necessarily imply that approach motivation in the context of anger is at the service of a superordinate goal. To investigate this, one needs to manipulate the implications of approach and avoidance behavior for the superordinate goal. A number of studies have done so in the context of perceiving angry faces. Wilkowski and Meier (2010) set up an experiment in which participants had to approach angry faces and avoid neutral faces in one block and vice versa in another block. For one group of participants, the faces became fearful after approach and happy after avoidance; for another group, the faces became happy after approach and fearful after avoidance. In both groups, participants were faster to approach than to avoid the angry faces, but this was more pronounced in the group in which the faces became fearful after approach. This suggests that the tendency to approach angry faces was stronger when it allowed participants to dominate (a fearful face can be considered as more submissive and hence easier to dominate). This study shows that the *intensity* of the goal to approach is influenced by its implications for superordinate goals, yet it remains to be shown that anger (/fear) can be related to both approach and avoidance goals depending on whether these goals are functional in reaching the superordinate goals associated with anger (/fear). Moreover, the study provides

information on the flexibility of the relation between *perceiving* anger and fear in others and approach/avoidance goals but not on the flexibility of the relation between *experiencing* anger and fear and approach/avoidance goals. Our study examines the flexibility of both types of relations.

In four experiments, we investigated whether the relation between anger and approach and fear and avoidance is present when approach is an aggressive and/or dominant response (attacking another person) and avoidance a self-protective and/or submissive response (fleeing from another person), but that anger is related to avoidance and fear to approach when approach is a self-protective and/or submissive response (begging the other person) and avoidance an aggressive and/or dominant response (stubbornly turning the back). Additionally, we investigated potential differences in approach/avoidance behavior depending on whether one experiences anger or fear oneself or perceives it in another person. If approach/avoidance behaviors are indeed driven by superordinate goals, the source of the emotion should matter. Anger may be related to approach and fear to avoidance when these emotions are experienced by the self but not necessarily when they are perceived in another person.

In a fifth study, we investigated the idea that one of the reasons why previous studies often find that anger is related to approach and fear to avoidance is that approach (i.e., the act of distance reduction) in itself is seen as a more aggressive and/or dominant response than avoidance (i.e., the act of distance increase). Experiments 1 to 4 were set up to investigate the conditions under which the typical pattern of relations (anger associated with approach and fear with avoidance) is found. Experiment 5 was set up to investigate why this pattern often is observed. More specifically, we tested the hypotheses that (a) the mere act of distance reduction (i.e., mere approach) has a more aggressive and/or dominant connotation than the mere act of distance increase (i.e., mere avoidance) and that (b) this connotation can explain why anger typically is related to approach and fear to avoidance.

EXPERIMENTS 1-4

All experiments had the format of a relevant stimulus-response compatibility (SRC) task (De Houwer, 2003; Kornblum & Lee, 1995) consisting of a series of trials in which participants moved a manikin toward or away from an opponent, depending on whether the word that appeared on the manikin or opponent was an anger or a fear word. In one block, the instruction was to approach the opponent in case of anger and to avoid the opponent in case of fear; in the other block the stimulus-response mapping was reversed.

We manipulated two factors across the four experiments. The first factor concerned the implications of approach and avoidance for the superordinate goals to aggress and/or to dominate. In Experiments 1 and 2, approach resulted in an aggressive and/or dominant fight response and avoidance in a self-protective and/or submissive flee response. In Experiments 3 and 4, approach resulted in a self-protective and/or submissive beg response and avoidance in an aggressive and/or dominant response of stubbornly turning one's back.

The second factor concerned the source of the anger. In Experiments 1 and 3, the emotion words referred to (and were located on) the participant manikin. In Experiments 2 and 4, they referred to (and were located on) the opponent.

If the word referred to the participant manikin, we predicted the following SRC effects: If approach resulted in fighting and avoidance in fleeing, we predicted better performance (i.e., faster reaction times and less errors) in the anger-approach/fear-avoidance block than in the anger-avoidance/fear-approach block. Conversely, if approach resulted in begging and avoidance in stubbornly turning one's back, we predicted better performance in the anger-avoidance/fear-approach block than in the anger-approach/fear-avoidance block.

If the word referred to the opponent, we had less clear predictions. Studies have shown that perceiving angry faces can activate approach behavior (Aarts, et al., 2010; Wilkowski & Meier, 2010), avoidance behavior (Marsh, Ambady, & Kleck, 2005; Seidel, Habel, Kirschner, Gur, & Derntl, 2010), or neither (Heuer, Rinck, & Becker, 2007; Roelofs, et al., 2010). A reason for these ambiguous results may be that another persons' anger can elicit very different emotions (both anger and fear) in the perceiver. We therefore predicted that anger and fear of the opponent would lead to a less consistent pattern of results than anger and fear of the participant manikin.

Method

Participants.

A total of 120 students at Ghent University participated in four experiments. Two participants (one in Experiment 3 and one in Experiment 4) were removed because their error rates deviated more than 3 *SDs* from the mean error rate across experiments. This resulted in 29 participants for Experiment 1 ($M_{\text{age}} = 18.5$, 3 men), 28 for Experiment 2 ($M_{\text{age}} = 18.8$, 4 men), 30 for Experiment 3 ($M_{\text{age}} = 18.6$, 12 men), and 31 for Experiment 4 ($M_{\text{age}} = 20.5$, 8 men).

Stimuli and Materials.

Five anger words (rage, angry, mad, quick-tempered, and irritation) and five fear words (afraid, panic, anxious, fear, and terror) were selected from a list of Dutch words pretested for this study. The sets were matched for valence, $t(8) < 1$, $p = .91$, arousal $t(8) < 1$, $p = .62$, number of letters/pixels, $t(8) < 1$, $p = .71/t(8) < 1$, $p = .89$, and frequency, $t(8) < 1$, $p = .58$. The experiments were run in Affect 4.0 (Spruyt, Clarysse, Vansteenwegen, Baeyens, & Hermans, 2010).

Procedure.

Experiment 1.

In the first experiment, the participant manikin and the opponent were fencers (Figure 1). The experiment was framed as a game consisting of 120 trials divided in two blocks of 60 trials. The blocks differed only with respect to response mapping: anger-approach/fear-avoidance or anger-avoidance/fear-approach. Half of the participants started with the anger-approach/fear-avoidance block, the other half with the anger-avoidance/fear-approach block.

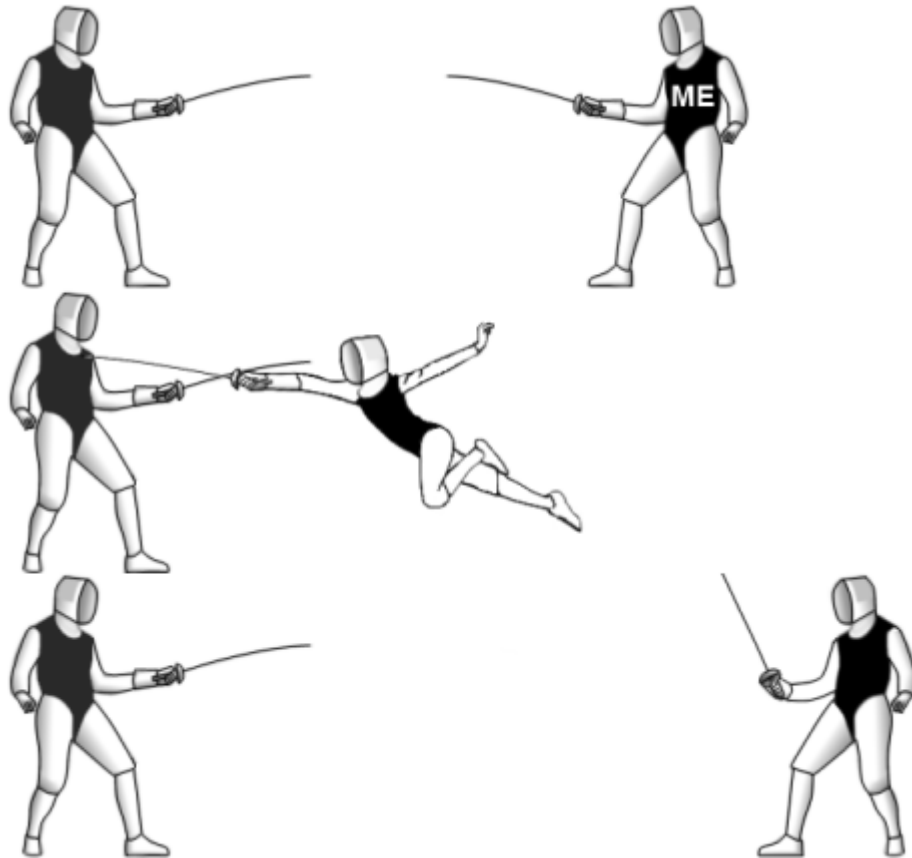


Figure 1. Manikins of Experiment 1 and 2 in start position (top), after a correct fight response (middle), and after a correct flee response (bottom).

Each trial started with the presentation of a fixation cross for 500 ms in the center of the screen. After the fixation cross had disappeared, the participant manikin appeared on the left or right side of the screen, facing the other side and wearing a black shirt depicting the word “ME”. After 500 ms, the opponent, an exact copy of the participant manikin wearing a purple shirt, appeared on the other side, facing the participant manikin. Both manikins held a saber in horizontal position. After 500 ms, the word “ME” was replaced by an anger or a fear word. In the anger-approach/fear-avoidance block, participants were instructed to approach the opponent in case of an anger word and avoid the opponent in case of a fear word; in the anger-avoidance/fear-approach block, participants were instructed to avoid in case of an anger word and approach in case of a fear word.

Participants used their left or right index finger to press the left or right key of a response box (Voss, Leonhart, & Stahl, 2007). The response deadline was 2000 ms. To approach the opponent, participants pressed the button in the direction of the opponent (i.e., the left button if the opponent was on the left side; the right button if the opponent was on the right side); to avoid the opponent, participants pressed the button away from the opponent (i.e., the left button if the opponent was on the right side, the right button if the opponent was on the left side).

After a correct approach response, the participant manikin approached (attacked) the opponent while extending the right arm and touching the opponent with the saber. After a correct avoidance response, the participant manikin avoided (fled from) the opponent by moving backwards while flexing the arm so that the saber protected the participant manikin. A score, displayed in the top center of the screen, was increased by one point after each correct response. If an erroneous or no response was registered before the deadline, the message “!!!ERROR!!!” or “!!!TOO LATE!!!” appeared in the center of the screen for 300 ms before the next trial started (ITI 0 ms).

Experiment 2.

The procedure of Experiment 2 was identical to that of Experiment 1 except that the word “HE” was placed on the opponent and that this word was replaced with the anger or fear word (no words appeared on the participant manikin).

Experiment 3.

The procedure of Experiment 3 was identical to that of Experiment 1 except that different approach and avoidance behaviors were used. In this experiment, the participant manikin and the opponent were said to be two actors whose task was to act like they had an argument. At trial start, both manikins stood up straight with their arms relaxed next to their body (Figure 2). After a correct approach response, the participant manikin approached the opponent in a begging position (on the knees and folding the hands). After a correct avoidance response, the participant manikin avoided the opponent in a stubborn way (turning the back and folding the arms). The beg response involved the same distance

reduction as the fight response of Experiment 1 and turning the back involved the same distance increase as the flee response of Experiment 1.

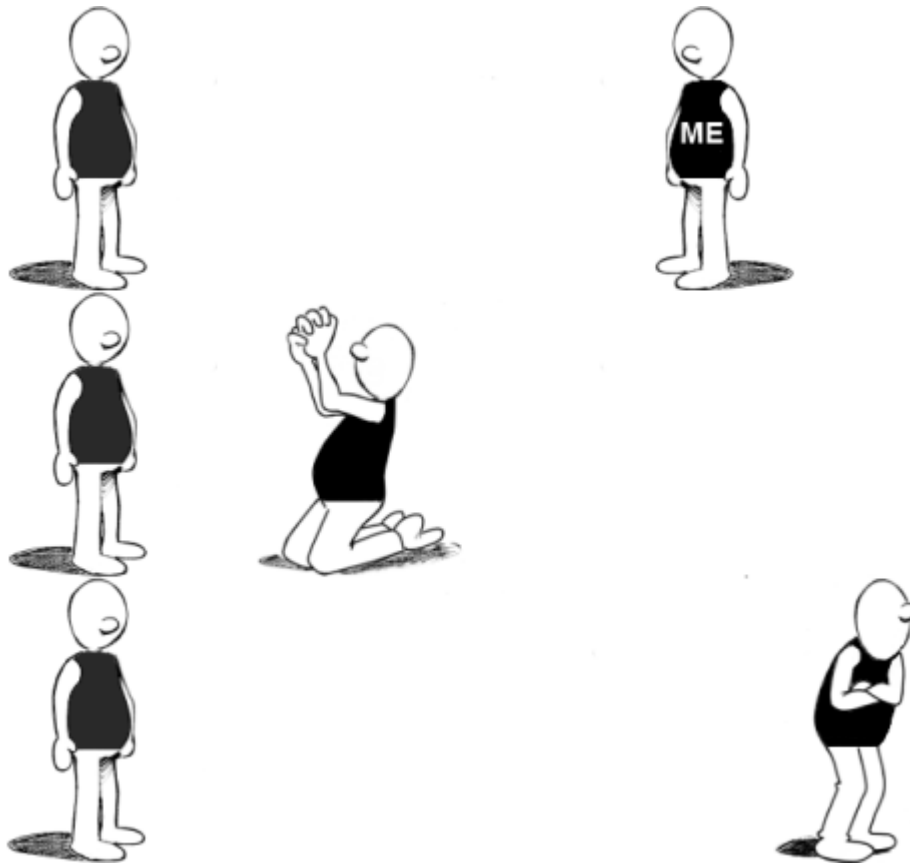


Figure 2. Manikins of Experiment 3 and 4 in start position (top), after a correct a beg response (middle), and after a correct stubbornly turning the back response (bottom).

Experiment 4.

The procedure of Experiment 4 was identical to that of Experiment 3 except that the word "HE" was placed on the opponent and this word was replaced with the anger or fear word.

Results

Before analyzing the data, we removed all trials with reaction times (RTs) below 150 ms (0.08%) or above 2000 ms (0.24%). For the analysis of the RTs, we also removed all trials with errors (7.36%). For each experiment, RTs and errors were analyzed with two repeated measures ANOVAs with the within-subjects factor block (anger-approach/fear-avoidance vs. anger-avoidance/fear-approach).

Experiment 1 (fight/flight, word on the participant manikin).

As predicted, participants responded significantly faster in the anger-approach/fear-avoidance block ($M = 671$ ms, $SD = 89$) than in the anger-avoidance/fear-approach block ($M = 806$ ms, $SD = 124$), $F(1, 28) = 67.31$, $p < .001$, $\eta_p^2 = .71$. They also made less errors in the anger-approach/fear-avoidance block ($M = 5.06\%$, $SD = 5.46$) than in the anger-avoidance/fear-approach block ($M = 8.86\%$, $SD = 6.46$), $F(1, 28) = 26.81$, $p < .001$, $\eta_p^2 = .49$.

Experiment 2 (fight/flight, word on the opponent).

As in Experiment 1, RTs were faster in the anger-approach/fear-avoidance block ($M = 730$ ms, $SD = 146$) than in the anger-avoidance/fear-approach block ($M = 801$ ms, $SD = 169$), $F(1, 27) = 12.09$, $p = .002$, $\eta_p^2 = .31$. Yet, the effect was significantly weaker in Experiment 2, $F(1, 55) = 6.01$, $p = .017$. There was no significant difference in errors between the anger-approach/fear-avoidance block ($M = 6.37\%$, $SD = 6.88$) and the anger-avoidance/fear-approach block ($M = 9.23\%$, $SD = 7.35$) of Experiment 2, $F(1, 27) = 2.82$, $p = .14$.

Experiment 3 (beg/stubborn, word on the participant manikin).

As predicted, the data pattern of Experiment 3 was opposite to that of Experiment 1: RTs were faster in the anger-avoidance/fear-approach block ($M = 748$ ms, $SD = 120$) than in the anger-approach/fear-avoidance block ($M = 782$ ms, $SD = 130$), $F(1, 29) = 4.51$, $p = 0.043$, $\eta_p^2 = .13$. Participants also made less errors in the anger-avoidance/fear-approach block (M

= 7.37%, $SD = 5.64$) than in the anger-approach/fear-avoidance block ($M = 10.86\%$, $SD = 9.02$), $F(1, 29) = 4.52$, $p = .042$, $\eta_p^2 = .14$.

Experiment 4 (beg/stubborn, word on the opponent).

Contrary to Experiment 3, both RTs and error rates did not differ in the anger-approach/fear-avoidance block and the anger-avoidance/fear-approach block, $F_s < 1$.

Overall comparison of the experiments.

To test whether the differences between the experiments were statistically significant, we ran two repeated measures ANOVAs with the within-subjects factor block (anger-approach/fear-avoidance vs. anger-avoidance/fear-approach) and the between-subjects factors Response Outcome (fight/flight vs. beg/stubborn) and Word Location (participant manikin vs. opponent) on the RTs and errors.

We first discuss the RTs. There were no main effects of response outcome and word location, $F_s < 1$. There was a main effect of block, $F(1, 114) = 22.25$, $p < .001$, $\eta_p^2 = .16$, reflecting faster responses in the anger-approach/fear-avoidance block ($M = 726$ ms, $SD = 130$) than in the anger-avoidance/fear-approach block ($M = 770$ ms, $SD = 137$). As predicted, the three-way interaction of Block x Response Outcome x Word Location was also significant, $F(1, 114) = 9.39$, $p = .003$, $\eta_p^2 = .076$. Additionally, we observed a Block x Response Outcome interaction, $F(1, 114) = 34.36$, $p < .001$, $\eta_p^2 = .232$, but no Block x Word Location interaction ($F < 1$).

For the errors there were no main effects of response outcome and word location, $F_s < 1$, nor a main effect of block, $F(1, 114) = 2.26$, $p = .135$, $\eta_p^2 = .019$, nor a three-way interaction of Block x Response Outcome x Word Location, $F(1, 114) = 2.09$, $p = .151$, $\eta_p^2 = .018$. There was a significant interaction of Block x Response Outcome, $F(1, 114) = 17.12$, $p < .001$, $\eta_p^2 = .131$.

Discussion

The three-way interaction of Block x Response Outcome x Word Location for the RTs shows that the relation between anger and approach depends both on the source of the emotion as well as on the superordinate goals that one can fulfill with approach and avoidance behavior. The error data confirmed the pattern of the RTs in three of the four experiments and, despite the lack of a three-way interaction, the impact of superordinate goals on approach/avoidance behavior was substantiated by a two-way interaction of Block x Response Outcome.

The present experiments suggest that anger is associated with approach and fear with avoidance if approach allows one to aggress and/or dominate and avoidance allows one to protect oneself and/or be submissive. On the other hand, anger is associated with avoidance and fear with approach if avoidance allows one to aggress and/or dominate and approach allows one to protect oneself and/or be submissive. Additionally, the location of the emotion word influenced participants' responding. The experiments in which the participant manikin was angry or fearful indicated that anger is relatively more accompanied by a motivation to aggress and/or dominate and fear by a motivation to protect oneself and/or be submissive. For the experiments in which the opponent was angry or fearful, the data pattern was less clear: We obtained a significant effect in the fight/flight experiment (for the RTs but not for the errors) but not in the beg/stubborn experiment. The fact that the results depended on the location of the word is important because it reveals the motivational nature of our effects. One might argue that anger words evoke fight/stubborn responses and that fear words evoke flight/beg responses because of mere semantic associations between these words and those responses. Such a non-motivational account, however, would predict similar effects independent of the position of the word.

EXPERIMENT 5

Experiments 1 to 4 demonstrated that the superordinate goal of approach and avoidance behavior determines whether anger is related to approach and fear to avoidance or the other way around. Yet, earlier studies have shown that anger is related to approach behaviors that do not seem to result in aggression or dominance, but that merely involve a reduction in the distance to the stimulus. For instance, Maayan and Meiran (2011) induced anger, anxiety, or no emotion in their participants and found that the angry ones (both compared to the anxious and neutral ones) were faster at stepping toward a stimulus than at stepping away from a stimulus. The finding that anger relates to mere approach behavior (i.e., the act of mere physical distance reduction) seems at odds with the idea that approach behavior in anger episodes is at the service of the goals to aggress or dominate. We propose, however, that such effects arise because approach behavior is in itself perceived as more aggressive and/or dominant than avoidance behavior, at least in the context of the emotions of anger and fear. This would also explain why the relation between anger and approach and fear and avoidance is such a robust finding.

Experiment 5 was again an SRC task in which participants approached or avoided an opponent, but the responses were not framed in terms of their implications for aggression or dominance. Instead, the responses only caused a physical distance change between the participant manikin and the opponent (Figure 3). We tested our hypothesis in three steps. First, we tried to replicate the finding that anger is relatively more associated with mere approach behavior and fear with mere avoidance behavior. Second, we examined whether the mere act of reducing the distance between the self and an opponent is perceived as relatively more aggressive and/or dominant than the mere act of increasing the distance. We did this by asking participants to rate approach and avoidance behaviors on a number of dimensions. Third, we investigated whether anger is related to mere approach behavior and fear to mere avoidance behavior *because* approach behavior is in itself perceived as relatively more aggressive and/or dominant than avoidance behavior. To this end, we tested whether individual differences in the ratings of approach and avoidance behaviors relate to differences in the SRC effect.

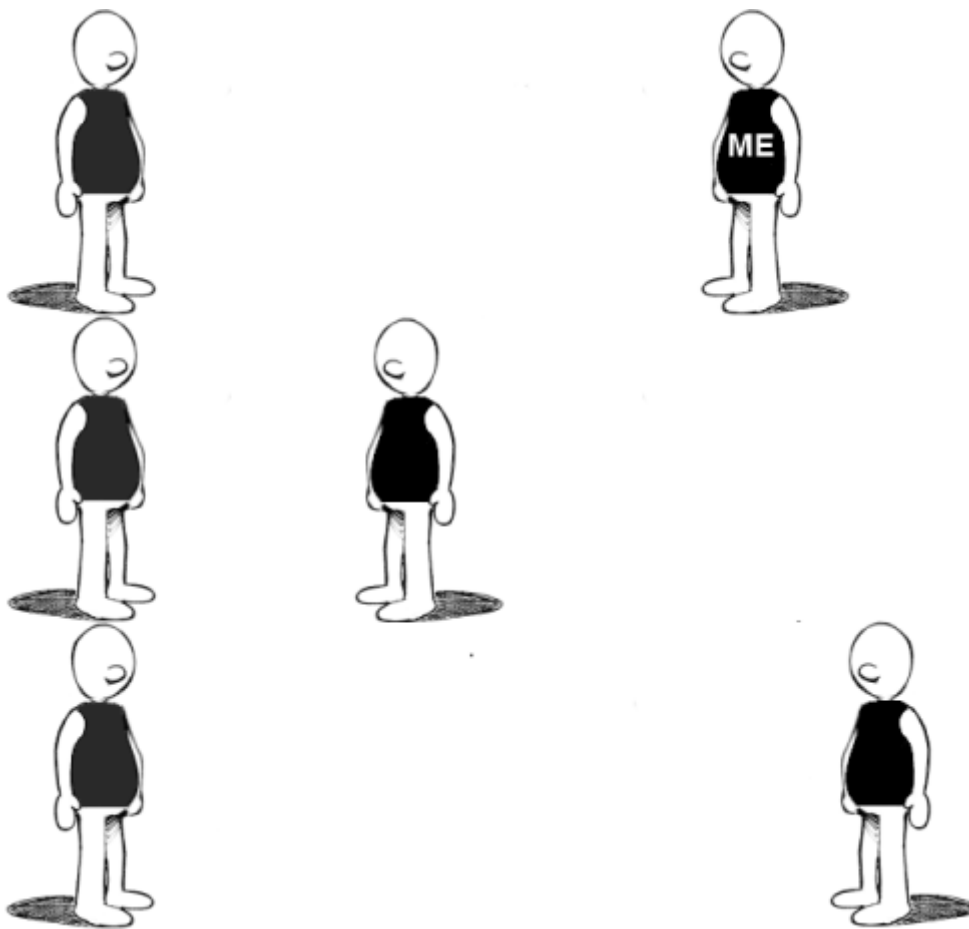


Figure 3. Manikins of Experiment 5 in start position (top), after a correct approach response (middle), and after a correct avoidance response (bottom).

Method

Participants.

A total of 77 students ($M_{age} = 18.9$; 17 men) at Ghent University participated in the study in return for course credits.

Procedure.

The sequence of events in each trial were the same as in Experiments 1 to 4. The experiment consisted of one anger-approach/fear-avoidance block and one anger-avoidance/fear-approach block. Responses were registered via the CTRL keys of the keyboard. After a correct response, the participant manikin approached or avoided the opponent without changing posture. Immediately after the experiment, participants filled in a questionnaire that probed for perceptions of approach and avoidance on five items (all 7-point scales): valence (negative to positive), hostility (friendly to hostile), aggressiveness (sympathetic to aggressive), dominance (submissive to dominant), and power (weak to strong). We assumed that the hostility and aggression items reflected the goal to aggress the opponent and that the dominance and power items reflected the goal to dominate.

Results and Discussion

The data of one participant were discarded because she deviated more than 3 *SDs* from the mean error rate. All trials with RTs below 150 ms (0%) or above 2000 ms (0.83%) were discarded. For the RT analyses, all trials with errors were also removed (6.79%). We discuss the results for each of the three steps described above.

Step 1.

A repeated measures ANOVA for the RTs with the factor block revealed that participants responded significantly faster in the anger-approach/fear-avoidance block ($M = 749$ ms, $SD = 117$) than in the anger-avoidance/fear-approach block ($M = 808$ ms, $SD = 114$), $F(1, 75) = 21.98$, $p < .001$, $\eta_p^2 = .23$. Consistent with the RTs, the same repeated measures ANOVA for the errors revealed that participants made significantly less errors in the anger-approach/fear-avoidance block ($M = 4.76\%$, $SD = 4.55$) than in the anger-avoidance/fear-approach block ($M = 6.56\%$, $SD = 5.89$), $F(1, 75) = 4.96$, $p = .029$, $\eta_p^2 = .062$. These results indicate that anger is, compared to fear, more associated with mere approach than with mere avoidance.

Step 2.

Ratings of approach and avoidance behaviors were analyzed via paired sample t-tests. As predicted, approach was rated as more dominant ($M = .46$, $SD = 1.07$) than avoidance ($M = 3.46$, $SD = 1.23$), $t(75) = 4.94$, $p < .001$, and as stronger ($M = 4.75$, $SD = 0.93$) than avoidance ($M = 3.53$, $SD = 1.06$), $t(75) = 6.10$, $p < .001$. Approach was also perceived as more positive ($M = 4.29$, $SD = 1.22$) than avoidance ($M = 3.43$, $SD = 0.89$), $t(74) = 4.23$, $p < .001$, and as less hostile ($M = 3.86$, $SD = 1.53$) than avoidance ($M = 4.46$, $SD = 0.96$), $t(30) = 1.01$, $p = .012$. There was no significant difference between aggression ratings of approach ($M = 3.88$, $SD = 1.34$) and avoidance ($M = 4.08$, $SD = 0.81$), $t(75) = 0.91$, $p = .37$. Thus, approach in the present experiment seemed to be relatively more than avoidance at the service of the goal to dominate but not at the service of the goal to aggress. This suggests that our SRC effect depends on participants' perception of approach as more powerful and dominant than avoidance, but not as more hostile and aggressive. In Step 3 we investigated this further.

Step 3.

We tested whether participants' perceptions of approach and avoidance behaviors determined the size of their SRC effect. For this analysis, we first collapsed the power and dominance item into a power/dominance scale and the hostility and aggression item in a hostility/aggression scale. We then created different groups of participants according to the position of the participants on these two scales. An aggressive dominant approach group ($n = 28$) rated approach as more hostile/aggressive and more powerful/dominant than avoidance. A non-aggressive non-dominant approach group ($n = 20$) rated approach as equal or lower in hostility/aggression and equal or lower in power/dominance than avoidance. A non-aggressive dominant approach group ($n = 26$) rated approach as equal or lower in aggression/hostility than avoidance, but as higher in power/dominance. An aggressive non-dominant approach group ($n = 2$) rated approach as higher in aggression/hostility than avoidance, but equal or lower in power/dominance. This group was virtually empty. Second, we tested the hypothesis that the power/dominance ratings

separated the participants that did show an SRC effect from those that did not. Directly comparing the dominant approach groups with the non-dominant approach groups would disregard the fact that the dominant approach groups contained more participants that rated approach as more aggressive than avoidance ($n = 28$) than the non-dominant approach group ($n = 2$). Thus, to substantiate that power/dominance was the important dimension, we had to demonstrate that the SRC effect was present in both the non-aggressive dominant approach group and the aggressive dominant approach group but absent in the non-aggressive non-dominant approach group. For the aggressive dominant approach group we found the predicted SRC effect (cf. top right panel in Figure 4): RTs were faster in the anger-approach/fear-avoidance block ($M = 755$ ms, $SD = 122$) than in the anger-avoidance/fear-approach block ($M = 840$ ms, $SD = 131$), $F(1, 27) = 15.99$, $p < 0.001$, $\eta_p^2 = .372$. For the non-aggressive non-dominant approach group, we found the predicted absence of the SRC effect (cf. bottom left panel in Figure 4): no significant difference between the RTs in the anger-approach/fear-avoidance block ($M = 774$ ms, $SD = 129$) than in the anger-avoidance/fear-approach block ($M = 785$ ms, $SD = 90$), $F(1, 19) = 0.18$, $p = .68$, $\eta_p^2 = .009$. Crucially, in the non-aggressive dominant approach group, RTs in the anger-approach/fear-avoidance block ($M = 728$ ms, $SD = 107$) were significantly faster than in the anger-avoidance/fear-approach block ($M = 793$ ms, $SD = 108$), $F(1, 25) = 14.35$, $p = .001$, $\eta_p^2 = .365$ (cf. top right panel in Figure 4). Third, we tested the effect of aggression/hostility by comparing the SRC effect of the non-aggressive dominant approach group with the aggressive dominant approach group. There was no significant difference between these groups, $F(1, 52) = .50$, $p = .49$, $\eta_p^2 = .009$.

To summarize, we found that participants' perceptions of approach and avoidance behavior determined the extent to which anger was associated with approach and fear with avoidance. Only for participants that saw approach as more powerful/dominant than avoidance, anger was associated with approach and fear with avoidance. This experiment provides additional support for the idea that anger relates to the goal to approach and fear to the goal to avoid because approach and avoidance are at the service of other, superordinate goals. More specifically, our data suggest that approach is more than avoidance at the service of the superordinate goal to dominate.

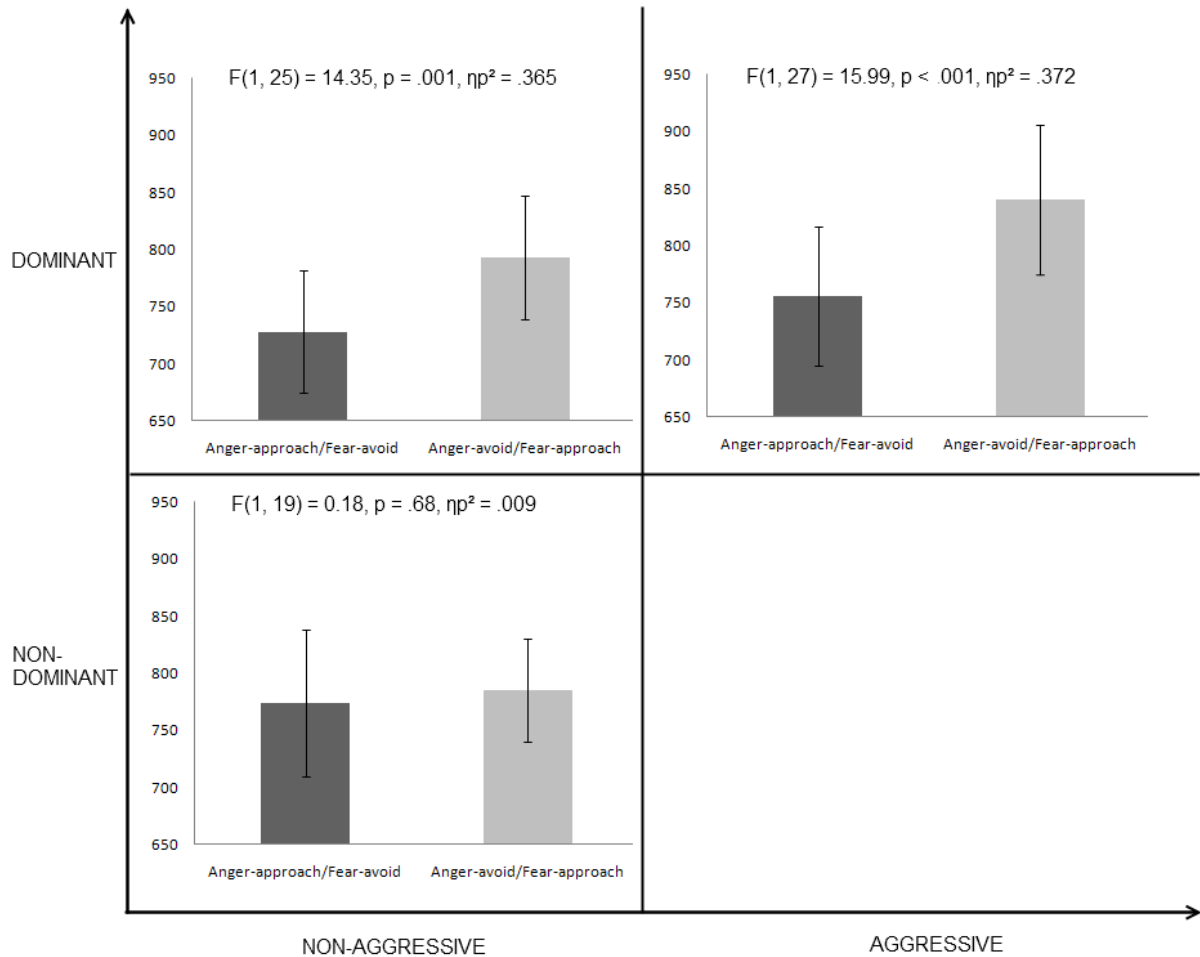


Figure 4. SRC effects for the aggressive dominant approach group (top right panel), the non-aggressive dominant approach group (top left panel), and the non-aggressive non-dominant approach group (bottom left panel). The dark bar represents the mean RT (in ms) in the anger-approach/fear-avoid block, the light bar the mean RT in the anger-avoid/fear-approach block.

GENERAL DISCUSSION

The present series of experiments supports the idea that anger and fear are accompanied by approach and avoidance behaviors because these behaviors are at the service of the superordinate goals associated with these emotions. Experiment 1 showed that anger was related to approach and fear to avoidance when approach was functional to

aggress and/or dominate an opponent and avoidance was functional to protect oneself and/or be submissive. Yet, Experiment 3 showed that anger was related to avoidance and fear to approach when approach was functional to protect oneself and/or be submissive and avoidance was functional to aggress and/or dominate. This suggests that the superordinate goal one can reach by approaching or avoiding plays a crucial role in determining whether anger and fear will go together with approach or avoidance.

To demonstrate that our reasoning explains why anger and fear *usually* go together with respectively approach and avoidance, we sought support for the idea that to reach the superordinate goals associated with anger and fear it is more functional to respectively approach and avoid the stimulus. Experiment 5 showed that the mere act of approaching a stimulus is considered as more dominant/powerful than the mere act of avoiding a stimulus. Additionally, for the subgroup of participants who indicated that approach was equally or less dominant than avoidance, there was no relation between anger and approach and fear and avoidance. These data support the idea that the robust link between anger and approach and fear and avoidance across different studies and research paradigms may originate from the fact that approach behavior is generally seen as more dominant than avoidance behavior.

Notwithstanding the clear pattern of results in the present studies, our conclusions need to be substantiated in future research with other research paradigms. A first limitation of the present experiments is that our effects may not reveal the actual relations between goals and feelings, but participants' knowledge about these relations (either descriptive or normative knowledge). It is in general a challenge to emotion researchers to demonstrate that their studies inform us about actual feelings rather than knowledge about feelings. Our manipulation of the source of the emotion (self vs. other) dismisses the idea that the data reflected mere conceptual overlap between "anger" and "fighting" or "being stubborn" and between "fear" and "fleeing" or "begging". Yet, it may be the case that our data reflect knowledge in a qualified format (e.g., complex beliefs such as "anger is related to being stubborn when it is experienced by the self but not when it is perceived in another person"). Future studies could investigate this issue further, for instance, by measuring approach and avoidance tendencies after inducing actual feelings of anger and fear.

Comparing such conditions to conditions in which participants read a description of the emotion induction procedure and imagine being angry or fearful, may allow one to separate the effects of “cold” knowledge about emotions and “hot” motivations.

A second limitation has to do with the findings of Experiment 5. This experiment suggests that anger and fear are related to respectively approach and avoidance because approach is more functional than avoidance for the goal to dominate and not because approach is more functional than avoidance for the goal to aggress. In future studies this conclusion should be corroborated by studies with experimental manipulations of the implications of approach and avoidance for each of these goals, instead of measuring individual differences in perceptions of approach and avoidance behaviors as in Experiment 5.

A third limitation relates to the relative nature of our effects. It is possible that the obtained effects are produced solely by anger, solely by fear, or by a combination of the two. It is not possible to determine which emotion is driving the effects in our experiments. To solve this problem, future research may use a design that compares a condition in which anger is contrasted with neutral stimuli with a condition in which fear is contrasted with neutral stimuli. The disadvantage of such a design, however, is that participants can recode both the stimuli in the angry vs. neutral condition and fearful vs. neutral condition as negative vs. neutral or arousing vs. non-arousing, which may eradicate any emotion-specific effects. The present experiments both maximized emotion-specific effects and excluded alternative explanations in terms of valence and arousal by carefully matching the categories of angry and fearful stimuli on valence and arousal. Thus, even if our experiments do not allow us to determine whether the effects were driven by anger, fear, or both, they do show there is a difference between anger and fear that cannot be ascribed to differences in valence or arousal.

Our work has some implications for componential views of emotions that emphasize the importance of the motivational component (Arnold, 1960; Frijda, 1986). Previous research inspired by this view has investigated relations between emotions and motivations with self-report measures (e.g., Frijda, Kuipers, & ter schure, 1989; Roseman, et al., 1994) and with behavioral measures that allow for the influence of conscious strategies (e.g.,

Harle & Sanfey, 2010; Lerner & Keltner, 2001). The present series of experiments support this view in a context that restricted participants' opportunity to consciously influence the results of the experiment (i.e., time pressure and fixed response instructions). More in particular, it seems that specific emotions, such as anger and fear, are not invariably related to one particular behavior nor one behavioral direction (towards or away from the stimulus) but to superordinate goals that can produce a wide variety of behavioral output.

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It is an age-old idea that emotion is closely linked to motivation (Frijda & Mesquita, 1998; McDougall, 1908; Moors, 2007; Roseman, 2008; Smith & Lazarus, 1990). Thus far, research on this topic primarily identified the motivations or action tendencies that underlie specific emotions, such as the tendency to attack for anger, the tendency to withdraw for fear, the tendency to repair for regret, and the tendency to become passive for disappointment (Roseman, Wiest, & Swartz, 1994; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998). To date, little is known about the way in which these action tendencies are elicited and differentiated. We investigated this question using the general framework of appraisal theories. In Chapters 2 to 4, we investigated the influence of several appraisal variables (agency, expectancy, proximity and coping potential) on the tendency to repair and on the differentiation of the tendency to repair from the tendency to attack. In addition, we examined the relation between these appraisals and several negative feelings (anger, regret, disappointment, and frustration) and the relation between the tendency to repair/attack and these feelings. Chapter 5 had a different aim and focused exclusively on the relation between action tendencies and feelings. In this chapter we tested the idea that feelings of anger reflect the tendency to attack/dominate and feelings of fear the tendency to self-protect/submit. Additionally, this chapter validated our assumption that action tendencies are flexible goals rather than inflexible action plans. In the next sections, we first review the findings of Chapters 2 to 5 and then turn to suggestions for future research.

OVERVIEW OF THE EMPIRICAL FINDINGS ON THE RELATIONS BETWEEN APPRAISALS, ACTION TENDENCIES, AND FEELINGS

Chapters 2 to 5 generated a diversity of findings with respect to causal and other relations between appraisals, action tendencies, and feelings. In order to integrate these findings, we present them progressively in a figure (see Figure 1). The figure represents a framework with thirteen elements: six appraisal variables/values (i.e., other-agency, self-agency, circumstances-agency, coping potential, expectancy, and proximity), three clusters of action tendencies (i.e., tendency to attack/dominate, repair, and self-protect/submit), and four feelings (i.e., regret, disappointment, anger, and fear). We omitted the feeling of frustration because it was measured in Chapter 4 only and its data pattern was similar to that of anger. It may be noted that our framework does not mention the appraisal of goal congruence. This variable, however, should be considered as operating in the background since all feelings and action tendencies were investigated in response to goal-incongruent events. It may further be noted that none of our empirical chapters had the explicit aim to investigate the influence of coping potential on action tendencies. However, since previous studies demonstrated that coping potential has a facilitative impact on active problem-solving behavior (Galinsky, Gruenfeld, & Magee, 2003; Mikulincer, 1988, 1994; Wortman & Brehm, 1975), we suspected that it would also influence the tendency to repair and we included coping potential as a control variable in all studies of Chapters 2 to 4.

Each of the results obtained in Chapters 2 to 5 can be described in terms of a relation between two or more elements in the framework. We use black lines to depict relations among appraisals and between appraisals and action tendencies. We distinguished relations for which we obtained experimental support (black lines with arrows) and relations for which we obtained correlational support (black lines without arrows). Relations involving feelings (appraisal-feeling or action tendency-feeling) are depicted with red lines. For these relations, we did not distinguish between experimental support or correlational support because the hypothesis that a specific feeling reflects a specific appraisal/action tendency (e.g., the feeling of regret reflects an appraisal of self-agency) may be demonstrated equally well by differences of that feeling in the presence or absence of that appraisal

variable/action tendency (e.g., more vs. less regret in a condition with self-agency vs. no self-agency) or by a correlation between the feeling and that appraisal/action tendency (e.g., regret correlates positively with the appraisal of self-agency). We display only significant results because null-findings are always difficult to interpret.

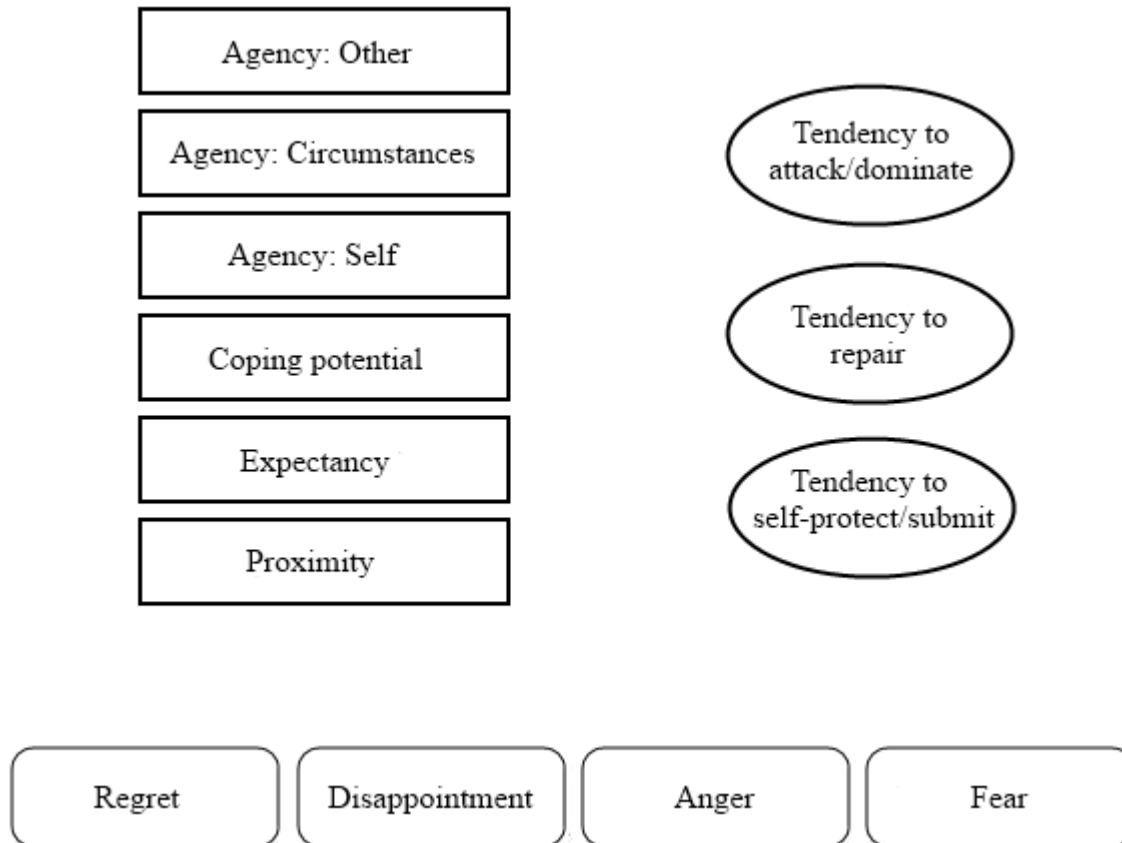


Figure 1. Framework used to present our empirical findings on the relation between appraisals (rectangles), action tendencies (ellipses), and feelings (rectangles with rounded corners).

Chapter 2

Chapter 2 provided support for the hypothesis that the appraisal of agency (self vs. other) influences the activation of the tendency to repair vs. the tendency to attack. More in particular, we found that self-caused goal-incongruent events elicited a relatively stronger tendency to repair and that other-caused goal-incongruent events elicited a

relatively stronger tendency to attack, as measured via response latencies and self-reports (see Figure 2). There was no influence of agency on the occurrence of actual repair or attack behavior. This data pattern provides support for the idea that action tendencies are not always manifested in qualitative behavioral differences (Leeper, 1948; Scherer, 1994) and underscores the importance of using multiple measures for action tendencies. It is important to note that this experiment only allows for relative conclusions: It is unclear whether self-agency increased the tendency to repair or whether other-agency increased the tendency to attack or whether both effects occurred. Feelings of regret, anger, and disappointment were not significantly different on self- and other-agency trials.

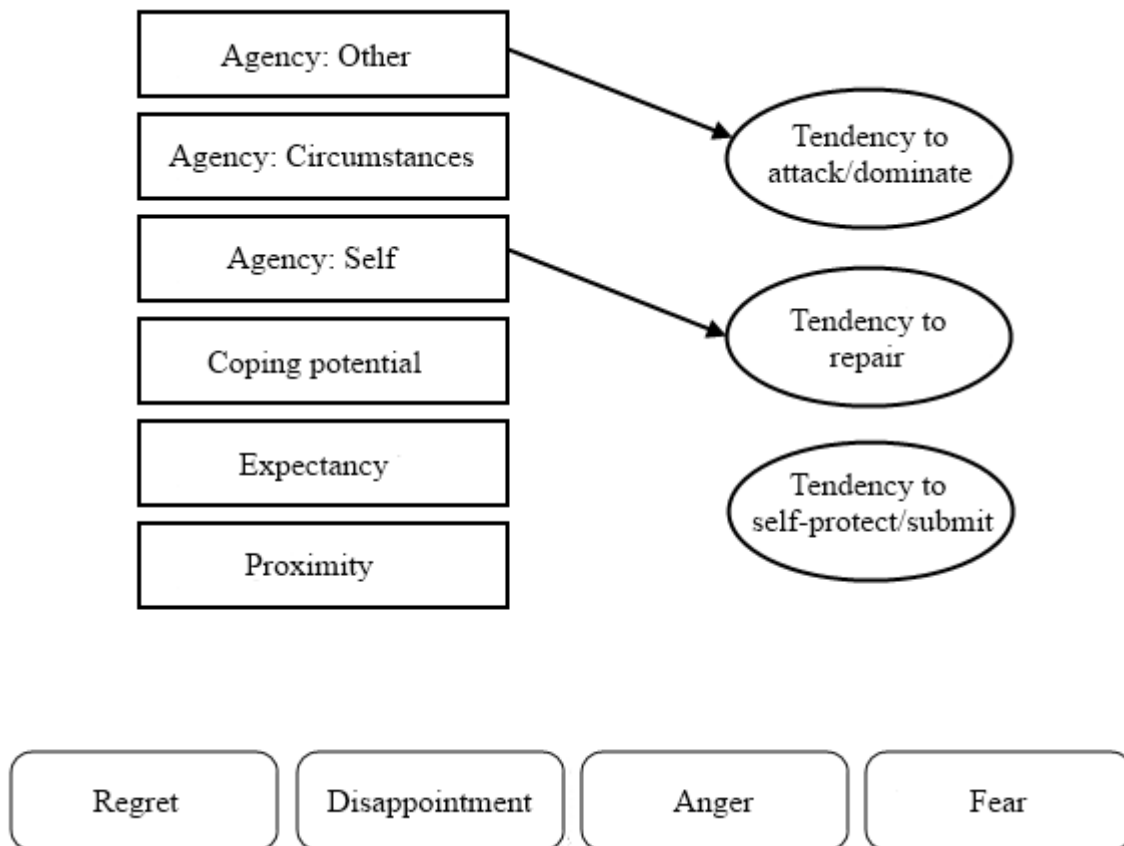


Figure 2. Overview of the findings of Chapter 2.

Chapter 3

In this chapter we further explored the influence of the agency appraisal on the tendency to repair in two studies. In a first study, we contrasted the appraisal of self-agency with the appraisal of circumstances-agency in an experiment. In a second study, we used autobiographical recall to investigate the relation between self-agency and the tendency to repair in daily life. Neither of these studies supported our initial hypothesis that self-agency increases the tendency to repair. Integrating these findings with the findings of Chapter 2, we conclude that the tendency to repair is equally likely in case of an appraisal of self-agency and an appraisal circumstances-agency, but that the tendency to attack is favored in case of an appraisal of other-agency. We thus removed the arrow from self-agency to the tendency to repair in Figure 3.

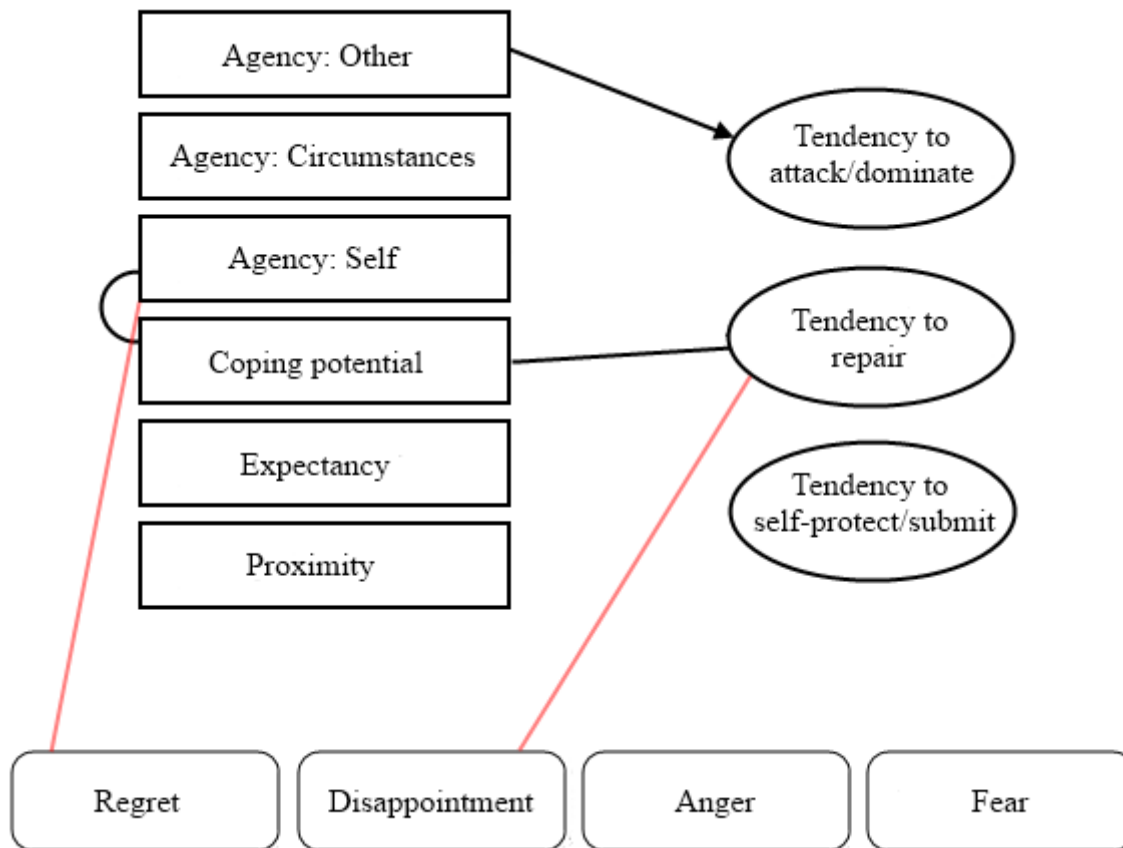


Figure 3. Overview of the findings of Chapters 2 and 3

The autobiographical recall data clarified why it has intuitive appeal that the appraisal of self-agency increases the tendency to repair. In this study, we found that self-agency was positively correlated with coping potential and that coping potential, in turn, was positively correlated with the tendency to repair (see Figure 3). The relation between the appraisal of self-agency and the tendency to repair via coping potential may raise the impression that the appraisal of self-agency increases the tendency to repair.

The studies in Chapter 3 additionally revealed several remarkable findings with respect to feelings. First, both studies in this chapter confirmed that the appraisal of self-agency increased feelings of regret (see also Roseman, Antoniou, & Jose, 1996; Shefrin & Statman, 1985; van Dijk, van der Pligt, & Zeelenberg, 1999; van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998). In Chapter 2, however, feelings of regret did not differ significantly between self-agency and other-agency trials. To investigate this issue further, we inspected the results of Chapters 2 and 3 together (see Table 1). We found that self-agency trials produced about the same intensity of regret in the studies of both chapters. However, whereas circumstances-agency trials produced a significantly lower intensity of regret (Chapter 3) other-agency trials produced about the same intensity of regret as self-agency trials (Chapter 2).

In hindsight, we noticed that the items on feelings in the post-experimental questionnaire of Chapter 2 were potentially confusing. The experiment in Chapter 2 was in the format of a two-player game and the items did not disambiguate whose feelings were probed: Each item depicted a particular experimental situation (e.g., a goal-incongruent other-agency trial) and asked participants to what extent the situation had evoked regret, disappointment, and anger. Thus, the high ratings for regret on other-agency trials might reflect the regret that participants ascribed to the opponent after she caused a negative event. In Chapter 3 the same items were used but the experimental context disambiguated their content (i.e., there was no other person involved in the experiment and a dice is unlikely to feel regret). Thus, it is possible that the failure to replicate the relation between self-agency and regret in Chapter 2 was due to an unfortunate formulation of the items.

A second noteworthy finding with respect to feelings in Chapter 3 was that the tendency to repair was related to feelings of disappointment but not to feelings of regret

(see Figure 3). Previous research, however, suggested that the tendency to repair is characteristic for regret (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998; Zeelenberg, van Dijk, Manstead, & van der Pligt, 2000). We suggested that in previous studies the tendency to repair was measured in a way that confounded the tendency to repair with the appraisal of self-agency. When clearly disentangling the two, we found that disappointment, rather than regret, reflected the tendency to repair.

Table 1.

Means (SDs) of the intensity of regret in Chapters 2 and 3 on self-agency and other/circumstances-agency trials. Different subscript means significantly different ($p < .05$).

	Chapter 2 (self vs. other)	Chapter 3 (self vs. circumstances)
Self	4.17 _a (1.79)	3.85 _a (1.59)
Other/circumstances	3.52 _a (1.81)	2.31 _b (1.59)

Chapter 4

In Chapter 4, we experimentally manipulated the appraisals of expectancy and proximity and measured the tendency to repair and feelings of disappointment, frustration and anger. We did not report on feelings of regret because the experiments in this chapter contained circumstances-agency trials only (a slot machine produced the outcomes) and circumstances-agency generally is associated with low feelings of regret (cf. supra).

We obtained the following results for the appraisal of expectancy: Unexpected goal-incongruent events elicited a stronger tendency to repair and stronger feelings of disappointment, frustration, and anger¹ than expected goal-incongruent events. Additionally, participants rated their coping potential as higher on unexpected than on expected goal-incongruent trials and coping potential mediated some of the effects of expectancy: The influence of expectancy on two of the three self-report measures of the

¹ The influence of expectancy on anger disappeared in a condition in which the number of high-expectancy trials was extremely high (i.e., in a condition in which 72 of the 153 trials were high-expectancy trials).

tendency to repair was fully mediated by coping potential. Coping potential did not mediate the influence of expectancy on the tendency to repair as inferred from behavior nor the influence of expectancy on feelings (see Figure 4).

A different data pattern emerged for the appraisal of proximity. The appraisal of proximity is high vs. low when a desired outcome is just missed vs. missed by far (Kahneman & Varey, 1990). Goal-incongruent events appraised as high in proximity elicited a stronger tendency to repair than goal-incongruent events appraised as low in proximity. There was no influence of proximity on feelings of disappointment, frustration, and anger, nor on the appraisal of coping potential (see Figure 4).

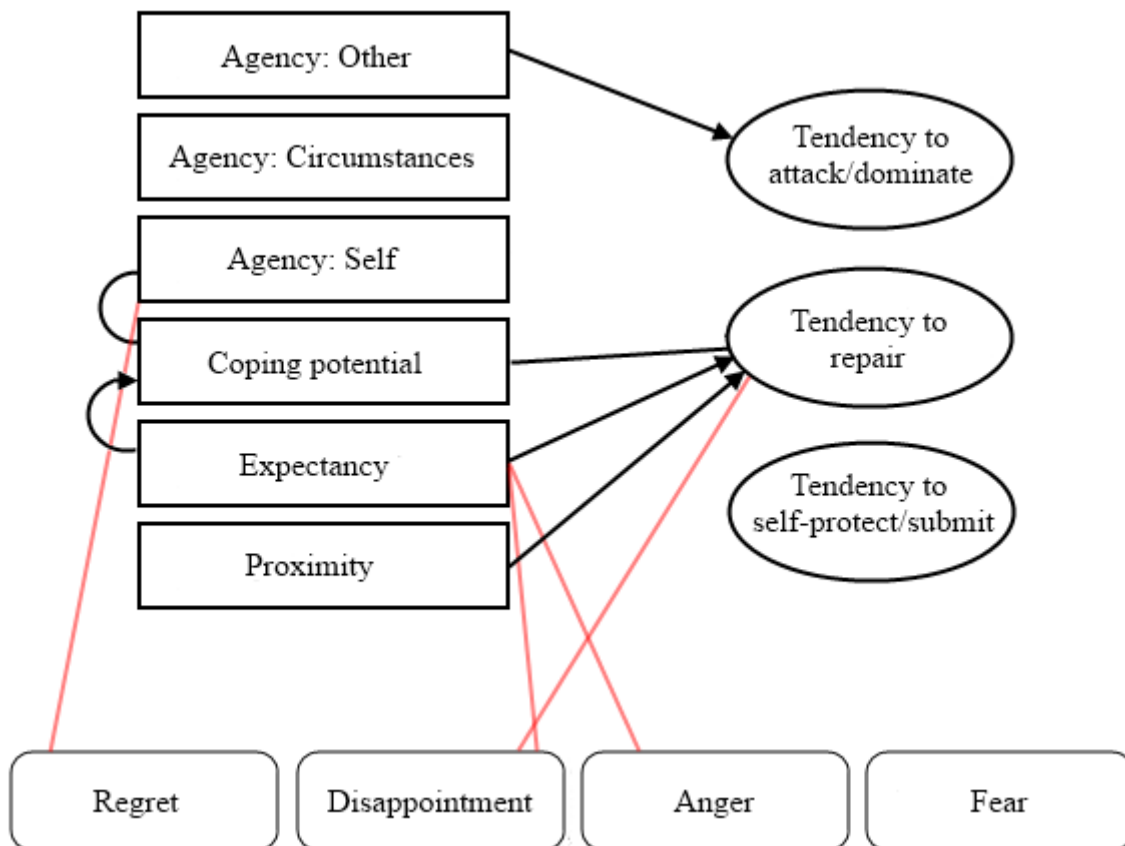


Figure 4. Overview of the findings of Chapters 2 to 4.

Contrary to what we found in Chapter 3, the tendency to repair did not correlate with feelings of disappointment. A possible explanation for this divergence is that the

measurement context for the tendency to repair was substantially different: The number of available repair responses was limited in Chapter 4 but unlimited in Chapter 3. Thus, in Chapter 3, participants could try to repair whenever they wanted and try to keep repairing for as long as they wanted whereas in Chapter 4 participants had to keep track of the number of available repair responses and spend them wisely. Hence, strategic considerations were more likely to play a role in Chapter 4.

Chapter 5

Chapter 5 focused exclusively on the relation between action tendencies and feelings. The contribution of this chapter was twofold: First, we demonstrated that feelings of anger vs. fear are related to the tendency to attack/dominate vs. the tendency to self-protect/submit respectively (see Figure 5). Second, this chapter validated the level of analysis of action tendencies that was employed in Chapters 2 to 4. Following Frijda and Mesquita (1998), we defined action tendencies in terms of goals to establish, change, or maintain a relation between the self and the stimulus. In this view, action tendencies are part of a flexible motivational system rather than an inflexible system with fixed stimulus-response relations (Oatley & Johnson-Laird, 2011; Scherer, 1994; Smith & Lazarus, 1990). Using the terminology of the goal literature (e.g., Carver & Scheier, 1998), our data supported the idea that action tendencies are abstract superordinate goals (e.g., to attack/dominate) that guide the organism toward specific behavior by setting reference values for more concrete subordinate goals (e.g., distance reduction or increase to the stimulus).

Summary of findings

We found support for the idea that the appraisals of high expectancy (high prior expectancy of reaching the goal), high proximity (almost reaching the goal), and high coping potential increased the tendency to repair, and that the appraisal of other-agency decreased the tendency to repair, at least relatively speaking (compared to the tendency to attack). Our data further suggest that feelings of regret reflect an appraisal of self-agency;

feelings of disappointment reflect an appraisal of low expectancy plus the tendency to repair; feelings of anger reflect an appraisal of low expectancy plus the tendency to attack/dominate; and feelings of fear reflect the tendency to self-protect/submit. In the next section, we discuss possible objections and avenues for future research.

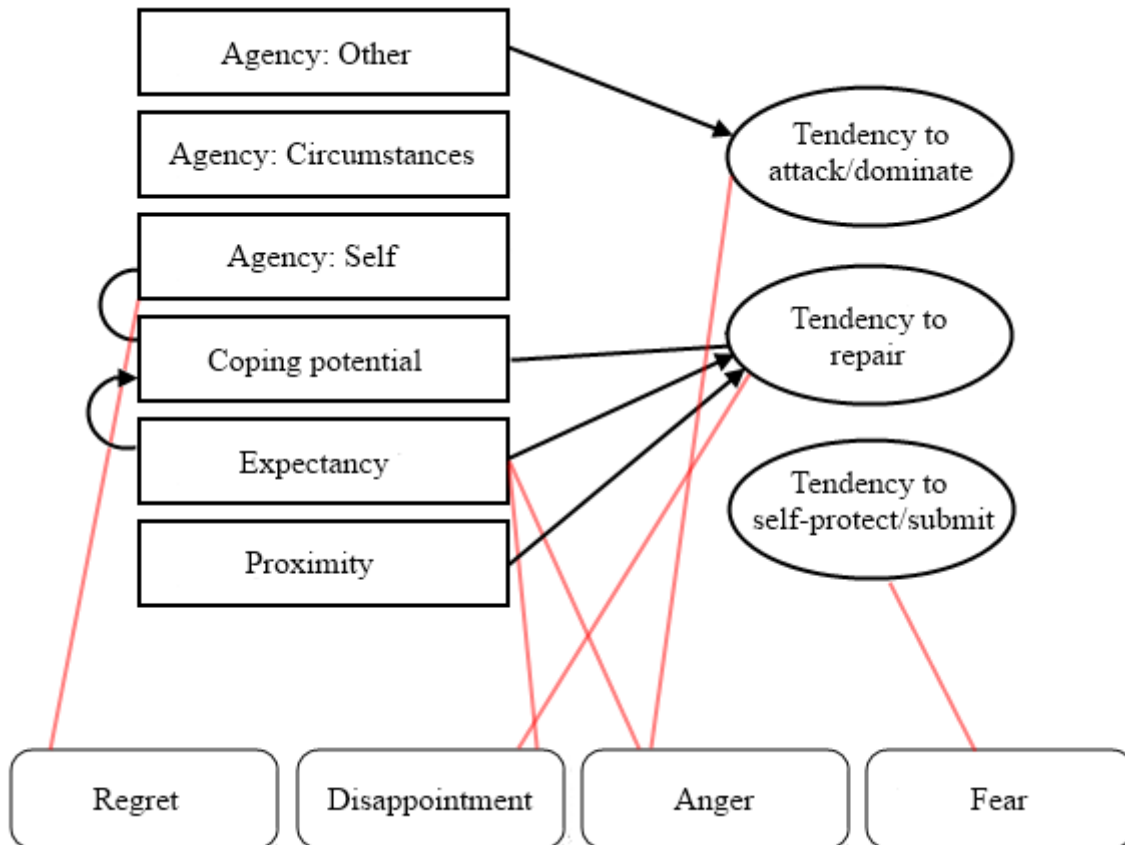


Figure 5. Overview of the findings of Chapters 2 to 5.

REMAINING ISSUES AND AVENUES FOR FUTURE RESEARCH

One objection that could be raised against our studies is that we may have investigated non-emotional rather than emotional action tendencies. Another criticism might be that our studies did not systematically investigate whether the appraisal variables under study had a (specific) differentiating or (general) intensifying influence on action

tendencies. We discuss both criticisms in turn. Afterwards, we turn to avenues for future research.

“Emotional” Action Tendencies?

It is notoriously difficult to decide whether an observed phenomenon is (part of) an emotion or not. As Fehr and Russell (Fehr & Russell, 1984, p. 464) pointed out: “Many have sought but no one has found a commonly acceptable definition for the concept of emotion.” Fehr and Russell therefore suggested to abandon the quest for a definition of emotion in the classical sense (i.e., in terms of individually necessary and jointly sufficient elements) but to turn to a prototype approach in which there are no sharp boundaries between emotions and non-emotional phenomena. In such an approach, the extent to which a given phenomenon can be called emotional depends on the degree of overlap between the phenomenon and a prototype of an emotion. Following this reasoning, we created a prototype of the emotional action tendency, by extracting a number of criteria from existing definitions of emotions. In the next sections, we define the prototype of the emotional action tendency in terms of (a) properties of the action tendency, (b) other components that accompany the action tendency, and (c) the relation between the action tendency and the other components. In addition, for each of the proposed criteria, we clarify how they were implemented in our studies (see also Table 2) or how they could be implemented in future research.

Properties of the action tendency.

Trigger stimulus.

A number of authors have argued that emotions are typically triggered by a stimulus (Scherer, 2005; Tooby & Cosmides, 1990). This can be a real and external or an imagined and internal stimulus (Scherer, 2005). Applying this criterion to action tendencies, one could argue that emotional action tendencies contrast with goals that are active without a trigger, such as chronic goals. Examples of chronic goals are the goal to be a good spouse, parent,

Christian, employee, citizen, or person (Bargh & Barndollar, 1996; Carver & Scheier, 1998). Although the strength of chronic goals may depend on the context (e.g., at work vs. at home), they do not require a stimulus to trigger their activation. Additionally, some authors have argued that emotional action tendencies are typically triggered by a broad rather than a small range of input stimuli (Frijda, 1986; Roseman, 2008; Tomkins, 1962). For instance, the emotional tendency to hurt can be triggered by a range of goal-incongruent stimuli whereas the non-emotional tendency to eat is triggered by food or food-related stimuli only.

Table 2.

Criteria of the prototype of the emotional action tendency (1st column) and an evaluation of whether the criterion was met in our studies (2nd column: ✓ = yes, (✓) = more or less, ✗ = no, ? = not sure, N/A = not applicable)

Criteria	Chapter			
	2	3	4	5
Trigger stimulus	✓	✓	✓	N/A
Broad eliciting conditions	N/A	N/A	N/A	N/A
Rapid onset	✓	?	✓	N/A
Brief duration	(✓)	?	✓	N/A
Difficult to regulate	(✓)	N/A	N/A	N/A
Control precedence	N/A			
Universality	✓	✓	✓	✓
Appraisal of goal-relevance	✓	✓	✓	N/A
Physiological pattern	N/A			
Facial expression	N/A			
Variability in specific behavior	(✓)	(✓)	N/A	✓
Specific feeling	✗	✓	(✓)	✓
Appraisal as cause	✓	✗	✓	N/A
Synchronization	✗	✗	(✓)	N/A

In our studies, we could argue that the tendency to repair (Chapters 2 to 4) per definition is triggered by a goal-incongruent stimulus, because without such a stimulus there would be nothing to repair. On the other hand, the tendency to attack in Chapter 2 may have been chronically active. Future studies with a similar design as in Chapter 2 could investigate the activity pattern of the tendency to attack by allowing participants to attack (i.e., subtract points from the other player) not only following a potential trigger stimulus but also at random times during the game. Finally, our designs did not allow to conclude on the broad vs. narrow nature of the eliciting conditions of the action tendencies under study.

Rapid onset.

It has been proposed that emotions typically follow the eliciting stimulus very quickly (Ekman & Cordaro, 2011; Izard, 2009; Roseman, 2008; Scherer, 1994; Geen 2001). Thus, emotional action tendencies can be contrasted with goals that are also triggered by a stimulus but that become active only after a period of “incubation”. For instance, years after someone passed away from a disease, a relative of that person can activate the goal to raise a fund for people that suffer from the same disease. Such a goal would usually not be considered an emotional action tendency whereas the goal to spend time with that person immediately upon hearing the diagnosis would be.

For those experiments in which we found a significant influence of the manipulated appraisal variable on the action tendency (Chapter 2 and 4), we can investigate the onset time of the action tendency by calculating the time interval from the first presentation of the to-be-appraised stimulus to the execution of the behavior (Moors & De Houwer, 2006). This interval was relatively short in Chapter 4, especially when considering the execution of the first repair response ($M = 1866$ ms, $SD = 257$), but still when considering the execution of the last repair response ($M = 5.2$ s, $SD = 1.6$). In Chapter 2, the repair or attack response also followed relatively quickly on the presentation of the agency information ($M = 6.32$ s, $SD = 0.70$).

Brief duration.

Emotions are sometimes said to be characterized by a brief duration (Ekman & Cordaro, 2011; Izard, 2009; Scherer, 2005). Thus, one could argue that emotional action tendencies contrast with goals that last for longer periods (e.g., multiple months or years), such as the goal to obtain a university degree. The duration of an emotional action tendency varies in function of (a) its intensity (Ekman, Friesen, & Ancoli, 1980), (b) the opportunity to achieve the desired end state (Oatley & Johnson-laird, 1987), and (c) the emergence of new information that is incompatible with the action tendency (Scherer, 2005).

In Chapter 4 the time interval between two subsequent decisions to repair or not to repair was rather short ($M = 9.7$ s, $SD = 0.78$). Hence, we can infer that the action tendencies in these studies had a relatively brief duration (or were quickly updated to new information). In Chapter 2, the interval between two subsequent responses was considerably longer ($M = 44.0$ s, $SD = 3.45$) due to a higher proportion of intervening trials on which the participant did not respond (i.e. goal-congruent trials or trials on which the confederate responded). In Chapter 3 the tendency to repair did not differ across the trials, hence we could not evaluate this criterion.

Difficult to regulate.

Another feature that has been proposed to individuate emotional action tendencies is that they are usually difficult to consciously regulate or control, both in the promoting sense (i.e., activating the action tendency) and in the counteracting sense (i.e., deactivating the action tendency; Moors & De Houwer, 2006). Emotional action tendencies are therefore often accompanied by a particular phenomenological quality: the feeling of passivity or “being moved” by a stimulus (de Rivera, 1977; Frijda, 2008; Tan, 2009). The individual experiences that it is not his/her own deliberate choice to pursue the goal (e.g., “I choose to hurt him”) but that the goal is imposed to him/her by the encountered stimulus (e.g., “He left me no choice but to hurt him”).

In Chapter 2, the discrepancy between participants’ behavioral choices, on the one hand, and their response latencies and their self-reported action tendencies, on the other hand, suggested that participants were successful at preventing the tendency to repair and

the tendency to attack from influencing their behavioral choices. The response latencies, however, revealed that this assumed regulation process was potentially time-consuming, supporting the idea that it was difficult to some degree.

Control precedence.

Several authors have argued that emotional action tendencies typically are prioritized over other goals (M. B. Arnold, 1960; Frijda, 1986; Levenson, 1994; Oatley & Johnson-laird, 1987; Roseman, 2008). Frijda (1986) called this quality “control precedence”. Emotional action tendencies are thus goals that are of high importance and/or high urgency. For instance, the goal to follow a hiking path through the woods can be overruled by the emotional action tendency to run away from a bear.

We did not investigate the degree of control precedence in our studies. Future studies may address this issue in a design that compares the activation of the emotional action tendency with the activation of non-emotional goals. For example, the typical design in ultimatum games (Frank, 1988) allow one to examine whether the tendency to attack or hurt (i.e., to punish another player for an unfair offer) is prioritized over the goal to earn money.

Universality.

According to the idea that emotions are evolutionary adaptations to environmental challenges, several authors have argued that one should find the same emotions and action tendencies across cultures and even across species (Ekman & Cordaro, 2011; Frijda & Parrott, 2011; McDougall, 1908; Plutchik, 1980; 1962). Thus, unlike goals that are specific to humans (e.g., to write a letter, to learn a language, or to listen to music) or goals that are specific to cultures (e.g., to worship a god, to vote for a president, or to submit a scientific paper), emotional action tendencies refer to more “basic” and less culture-specific or species-specific goals (e.g., to obtain safety or to dominate someone).

As can be seen in Table 2, we suggest that all investigated action tendencies (attack/dominate, self-protect/submit, and repair) are universal. It is generally acknowledged that the behavioral repertoire of several other species contains

attack/dominant behavior as well as self-protective/submissive behavior (De Waal; 2003; Plutchik, 1980; Tomkins, 1962). It is less known that a number of other species also show repair behavior. For instance, after an intra-group conflict chimpanzees and dolphins exhibit affiliative and reconciliation behavior that serves the reparation of the relationship damaged by the conflict (K. Arnold & Whiten, 2001; Holobinko & Waring, 2010). This post-conflict repair behavior typically does not occur outside the context of conflict and can be discriminated from submissive and self-protective behavior (e.g., Holobinko & Waring, 2010).

(Ir)rationality.

In daily use, the term emotional has a connotation of irrationality (Parrott, 1995). In line with this idea, researchers have argued that emotional action tendencies and behaviors typically rely on suboptimal information gathering (Frijda, 2010) and on fast heuristic calculations rather than on accurate cost-benefit analyses (Quartz, 2009). At the same time, many emotion researchers propose that emotional action tendencies often are adaptive and rational (Damasio, 1994; Frank, 1988; Frijda, 2010; Lazarus, 1995; Leeper, 1948; Nesse, 1990; Scherer, 1994; Smith & Lazarus, 1990). Still other have argued that emotional action tendencies have both rational and irrational aspects (Haselton & Ketelaar, 2006; Sripada & Stich, 2004). If so, this does not yield a useful criterion to evaluate the emotional nature of the action tendencies in our studies.

Presence and content of other components.

Several researchers define emotions as syndromes consisting of multiple components (Kleinginna & Kleinginna, 1981). An action tendency could thus be considered “emotional” when it is accompanied by changes in the cognitive, physiological, motor, and feeling components. In addition, some authors have argued that these components should have a particular content to count as “emotional” (see also Moors, 2009).

The cognitive component.

Several researchers emphasize that emotions typically (or always, see Lazarus, 1982) involve some kind of cognitive process, called stimulus evaluation or appraisal (Ekman & Cordaro, 2011; Frijda, 1986; Moors, 2009; Oatley & Johnson-laird, 1987; Roseman, 2001; Scherer, 2005; Smith & Lazarus, 1990). According to this criterion, phenomena that lack any cognitive mediation, such as the startle reflex, are excluded from the category of emotions (Ekman, Friesen, & Simons, 1985; Smith & Lazarus, 1990, but see Tomkins, 1962). Some authors additionally suggest that the appraisal process should have a particular output to count as emotional. For instance, some argued that the stimulus must be appraised as relevant to the concerns of the individual (Frijda & Mesquita, 1998; Moors, 2009; Scherer, 2005) or as relevant to the subset of these concerns that are shared by our ancestors and lower life forms (Ekman & Cordaro, 2011; Nesse, 1990; Plutchik, 1980).

We investigated the presence of the appraisal of goal-relevance in Chapters 2 to 4 by measuring how eager participants were to win the rewards offered in these experiments. On a scale from 1 (*not motivated*) to 7 (*very motivated*), participants indicated they were moderately to highly motivated to win the lottery tickets in Chapter 2 ($M = 4.97$, $SD = 1.66$) and in Chapter 3 ($M = 4.77$, $SD = 1.95$) and the money in Chapter 4 ($M = 4.97$, $SD = 1.22$).

The somatic component.

Some authors would call a given action tendency emotional only when it is accompanied by physiological changes (Ekman & Cordaro, 2011; Lazarus, 1982). A number of researchers additionally suggest that specific emotions can be recognized via their specific patterns of physiological changes (e.g., Ekman & Cordaro, 2011; Kreibig, 2010; Stemmler, Aue, & Wacker, 2007). These researchers would be more convinced about the emotional nature of our action tendencies if we had registered accompanying physiological changes. For instance, the tendencies to attack/dominate (related to anger) and self-protect/submit (related to fear) may be accompanied by physiological changes such as faster breathing, increased skin conductance, and increased heart rate (typical for anger and fear; Kreibig, 2010).

The motor component.

Unlike many non-emotional phenomena, emotions are assumed to include distinctive facial expressions (Ekman & Cordaro, 2011; Ekman, et al., 1980; Horstmann, 2003; Roseman, 2008, but see, Ekman, et al., 1985, for an example of a non-emotional phenomenon with a distinctive facial expression). Thus, according to this view, emotional action tendencies are those that are accompanied by a characteristic facial expression. In future studies, we could substantiate the claim that our action tendencies were emotional by showing that the tendency to attack/dominate was accompanied by increased activity in the corrugator supercilli (knits brow) and the tendency to self-protect/submit is accompanied by increased activity in the medial frontalis (raises brow; Moody, McIntosh, Mann, & Weisser, 2007). In addition, researchers often assume that emotional action tendencies are related to a wide variety of gross behaviors rather than one behavior in particular (Smith & Lazarus, 1990).

The experiments in Chapter 5 incorporated the latter idea and suggested that the action tendency related to anger (to attack/dominate) can give rise to an approach behavior (fighting) or an avoidance behavior (stubbornly turning the back) and that the action tendency related to fear (to self-protect/submit) can give rise to an avoidance behavior (fleeing) or an approach behavior (begging). The variation in the behavior that led to the accomplishment of the action tendency was minimal in Chapters 2 and 3 and absent in Chapter 4.

The feeling component.

Older emotion theories seem to suggest that the only criterion to differentiate emotions from other phenomena is the presence of feelings (James, 1884; McDougall, 1908). Although this idea has lost popularity in contemporary theories (e.g., Deonna & Scherer, 2009; Scherer, 2009b), most researchers still agree that emotions include feelings (Kleinginna & Kleinginna, 1981). Some authors refine this claim by proposing that these feelings should involve positive or negative affect (Ortony & Turner, 1990).

The aim of Chapter 5 was to establish the relation between action tendencies and feelings. We found that the feeling of anger was related to the tendency to attack/dominate

and the feeling of fear was related to the tendency to self-protect/submit. Chapter 3 also produced evidence on the relation between action tendencies and feelings: The tendency to repair correlated systematically with the feeling of disappointment. In Chapter 4, we found that unexpected events increased the tendency to repair as well as feelings of disappointment, frustration, and anger, but we did not obtain significant correlations between participants' feelings and their action tendencies. In Chapter 2, we found an influence of agency on action tendencies (the tendency to attack and repair) but not on feelings of regret, anger, and disappointment. However, as argued before, this may have been due to an unfortunate formulation of the items on feelings. Thus, in Chapter 5, the tendencies to attack/dominate and self-protect/submit could be considered emotional according to the criterion that they are related to feelings. The tendency to repair could be considered emotional in Chapter 3 and, to a lesser extent, in Chapter 4 because of its relation with feelings of disappointment.

Relation to the other components.

A number of emotion researchers suggest that a phenomenon can be called emotional when the cognitive, motivational, physiological, motor, and feeling components are related in a particular way. Thus, in order to determine whether a given action tendency is "emotional" one could investigate its relation with the other components. Researchers have proposed different types of relations. Most appraisal theories suggest that the cognitive change (the appraisal) in emotions typically comes first and causes the other components (the changes in action tendencies, physiological responses, expressive behavior, and feelings; Frijda, 1993; Frijda, Kuipers, & ter schure, 1989; Scherer, 2009a). M. B. Arnold (1960) used this criterion to differentiate emotions from drives (such as hunger and thirst). She suggested that in case of a drive the physiological changes come first and elicit the appraisal (e.g., when hungry or thirsty, a piece of bread or a glass of water become goal congruent). Our studies suggest a causal influence of the appraisal of agency (self vs. other) on the tendency to repair/attack (Chapter 2) and a causal influence of the appraisals of expectancy and proximity on the tendency to repair (Chapter 4).

Other researchers propose that feelings cause action tendencies (e.g., de Hooge, Zeelenberg, & Breugelmans, 2007; Frank, 1988; Geen, 2001; Ketelaar & Au, 2003; Nelissen & Zeelenberg, 2009). We believe, however, that there are at least two problems with this proposal: (a) It is incompatible with the idea that feelings reflect the content of the other components and (b) it is difficult to empirically validate because specific feelings such as anger, fear, and sadness are difficult to define independent from underlying appraisals and action tendencies (Frijda & Zeelenberg, 2001).

Another type of relation that is not incompatible with the two relations just discussed is that the different components are orchestrated or synchronized by the action tendency (i.e., all other componential changes are tuned to reach the goal; Scherer, 2005; Tooby & Cosmides, 1990). We could not fully evaluate the criterion of synchronization in our studies because we only measured appraisals, action tendencies, and feelings. We could, however, evaluate the synchronization of these three components, by investigating in which of our studies the action tendencies were both related to appraisals and to feelings. As can be seen in Table 2, this was only to some extent the case for Chapter 4.

Issues of Differentiation

In most of our studies it is difficult to determine whether the appraisal variables under study (a) activate or intensify any action tendency or (b) differentially activate or intensify one specific action tendency (or a subset of action tendencies) and thereby produce qualitative differences. For instance, in Chapter 4, it is both possible that the appraisal of expectancy activates or intensifies any action tendency (among which the tendency to repair) or prioritizes the tendency to repair over other action tendencies. In Chapter 2, we did address the question of differentiation: We investigated whether agency (self vs. other) influenced the relative activation/intensification of the tendency to repair vs. attack. In this paradigm, however, it remains unclear which of the two action tendencies was influenced by the appraisal of agency: the tendency to repair, the tendency to attack, or both. To address this issue, future studies may employ a combined paradigm in which on some trials participants can choose between one of two action tendencies (e.g., to attack or to repair) to assess differentiation or prioritization, and on other trials can implement only one action

tendency (e.g., to repair *or* to attack) to assess the impact of the appraisal variable on the intensity of each action tendency separately.

Future Research

There are ample possibilities for future research. In the next sections, we formulate a framework that could guide future studies on the relation between appraisals and action tendencies and present some final methodological suggestions.

Unexplored relations.

Thus far, we explored 29 possible relations in the framework presented in Figure 5. Twelve relations turned out to be significant; seventeen relations turned out to be non-significant. A quick calculation learns that there are 84 possible relations between appraisals and action tendencies, feelings action and tendencies, appraisals and feelings, and appraisals and appraisals. This means that we left 55 relations of the framework in Figure 5 unexplored. In addition, we could extend the framework with various other appraisal variables (e.g., goal relevance, future expectancy, urgency, novelty), action tendencies (e.g., the tendency to become passive, hide, display the self, seek help), and feelings (e.g., shame, pride, frustration, sadness, joy). Instead of providing a lengthy review of all relations that could be of theoretical interest, we present a modest extension of the framework based on the present findings. This extension can be taken as a starting point for future research. The model exemplifies a way in which our findings (that mainly cover the tendency to repair) could form the basis for a more extensive model (see Figure 6). In the new model, we included the tendency to become passive because of its relation with sadness (Lazarus, 1991; Oatley & Johnson-laird, 1987), an emotion that is present in virtually all emotion theories. The tendency to become passive may be elicited in situations in which it is not adaptive to repair, attack, or protect the self because these behaviors would spoil valuable resources.

The new hypotheses we added to the model were inferred from appraisal theories and empirical papers. We took the liberty to generalize existing hypotheses about feelings

(anger, fear, sadness, and disappointment) to their associated action tendencies (the tendency to attack/dominate, self-protect/submit, become passive, and repair). We discriminate between appraisal variables that have (a) a similar (intensifying or decreasing) impact on all action tendencies or (b) a differentiating impact, meaning that they prioritize some action tendencies over others by intensifying/decreasing one action tendency (or a subset of action tendencies) and not others. As can be seen in Figure 6, we consider the appraisals of goal relevance and expectancy as members of the first category (see also Scherer, 2009a): the strength of all action tendencies increases when the stimulus is appraised as more goal relevant and less expected. Examples of members of the second category are the appraisal of other-agency (increasing the tendency to attack/dominate, Lazarus, 1991; Roseman, 2011; Scherer, 1988; Weiner, 1985; Chapter 2), the appraisal of proximity (increasing the tendency to repair; Chapter 4), the appraisal of uncertainty (increasing the tendency to self-protect/submit, Roseman, 2011), the appraisal of urgency (decreasing the tendency to become passive; Frijda, 1986; Scherer, 1988), the appraisal of coping potential (decreasing the tendency to become passive and the tendency to self-protect/submit, Lazarus, 1991; Roseman, 2011; Scherer, 1988; Solomon, 1977, and increasing the tendency to repair, Mikulincer, 1988; Wortman & Brehm, 1975; Chapter 3). In other words, according to our model the tendency to become passive is evoked by a pattern of the appraisal values goal relevant, goal incongruent, unexpected, low urgency, and low coping potential, (e.g., the decease of a loved one); the tendency to attack is evoked by a pattern of the appraisal values goal relevant, goal incongruent, unexpected, and other-agency (e.g., an insult); the tendency to repair is evoked by a pattern of the appraisal values goal relevant, goal incongruent, unexpected, high proximity, and high coping potential (e.g., a missed opportunity to get a job); the tendency to self-protect/submit is evoked by a pattern of the appraisal values goal relevant, goal incongruent, unexpected, uncertainty, and low coping potential (e.g., a strange dog that jumps at you).

Our model could be contrasted with other ideas in the literature, such as (a) that urgency has the same, generally intensifying, influence as goal relevance (Moors, in press), (b) that uncertainty increases any action tendency aimed at change whereas certainty

activates the tendency to become passive (Frijda, 1986), and (c) that coping potential increases the feeling of anger and the tendency to attack/dominate (Roseman, 2011; Scherer, 1988). With respect to the latter hypothesis, several studies have disconfirmed the

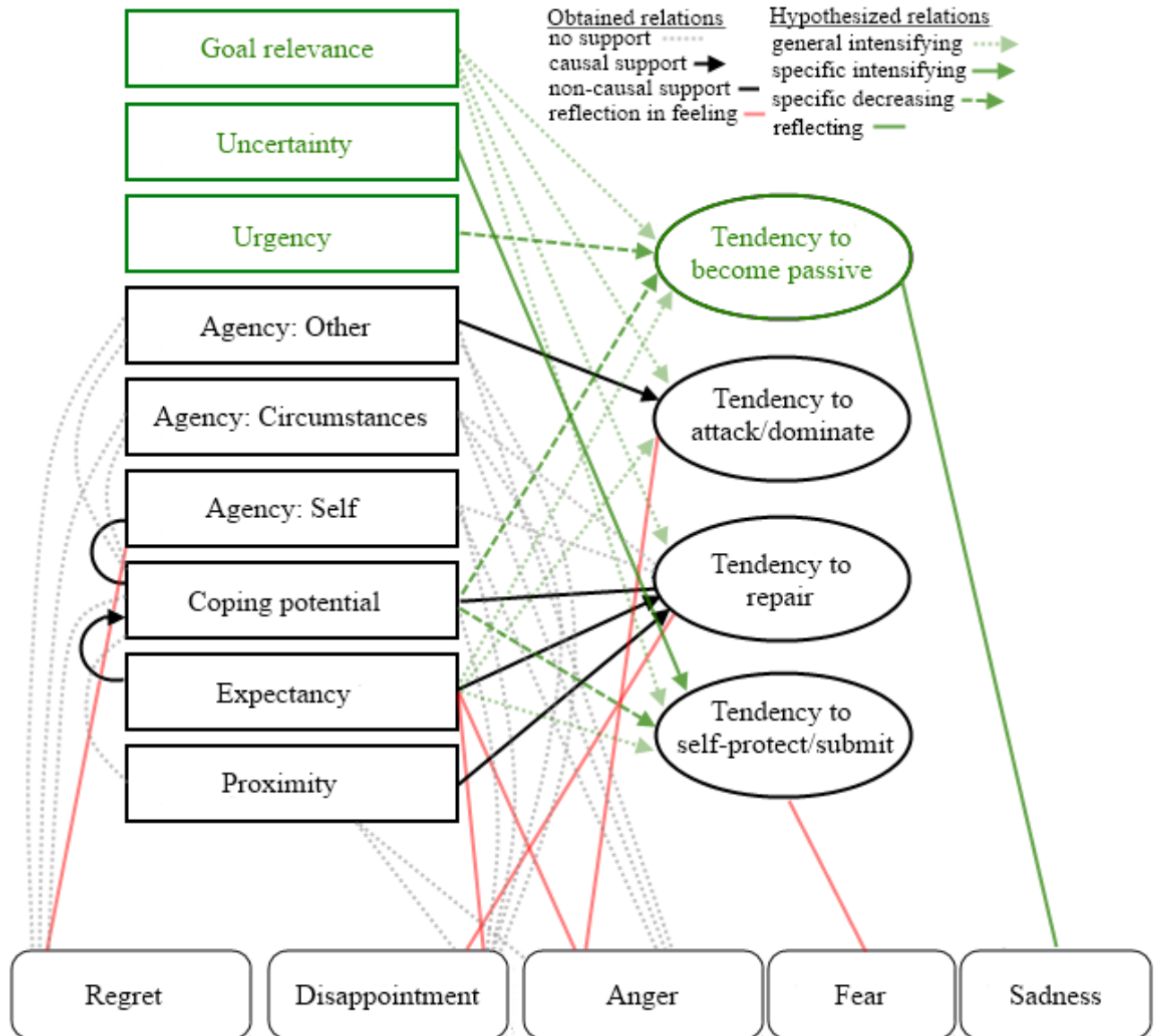


Figure 6. Model depicting newly hypothesized relations (green) embedded in a framework of obtained significant (black and red) and non-significant relations (grey).

idea that an appraisal of high coping potential gives rise to anger (Ellsworth & Tong, 2006; Kuppens, Van Mechelen, Smits, & De Boeck, 2003; Roseman, et al., 1996; Tong, et al., 2007;

van Dijk & Zeelenberg, 2002), but the relation between coping potential and the tendency to attack/hurt has not been investigated yet.

Final methodological suggestions.

In Chapters 1 and 2, we presented a number of methodological suggestions for studying the relations between appraisals and action tendencies. We conclude with some final methodological suggestions based on the experiments and findings in Chapters 2 to 5.

Self-reported action tendencies.

The experiments of Chapters 2 to 4 revealed that participants can self-report on their action tendencies. More in particular, we found that the self-report measures systematically confirmed the results of the behavioral measures. It may be noted that participants reported on their action tendencies immediately after they gained abundant experience with the experimental situations (following up to 120 to 160 experimental trials) using a questionnaire that carefully simulated the experimental situations via pictures. It has been suggested that online questions that quickly follow the experience are more reliable than retrospective questions (Robinson & Clore, 2002).

Symbolic vs. real stimuli.

In Chapters 2 to 4 we used actual goal-relevant stimuli and real opponents to study the relation between appraisals and action tendencies. To investigate action tendencies that are more difficult to elicit in the lab, future studies may turn to paradigms that use symbolic stimuli (cf. Chapter 5). For instance, using the fencing game of Chapter 5, we could investigate the hypothesis that low coping potential increases the tendency to self-protect/submit. Coping potential could be manipulated by presenting words referring to high vs. low coping potential (instead of words referring to anger vs. fear) on the participant's fencer or on the opponent. Alternatively, we could manipulate coping potential more directly by making one opponent stronger than the participant's fencer (e.g.,

the blue opponent wins on 80% of the trials) and another opponent weaker than the participant's fencer (e.g., the yellow opponent loses on 80% of the trials).

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INLEIDING

Meer dan eeuw geleden werd geponeerd dat emoties bijproducten zijn van een motivationeel systeem (James, 1884; McDougall, 1908). Meer specifiek werden emoties gelijkgesteld aan de gevoelens die samengaan met bepaalde sequensen van perceptie en actie (McDougall, 1908): angst is het gevoel bij het vluchten van gevaar, woede is het gevoel bij het verwijderen van een obstakel en walging is het gevoel bij het verwijderen van een giftig of schadelijk object.

In moderne emotietheorieën worden emoties niet meer gelijkgesteld aan gevoelens maar gedefinieerd in termen van een aantal componenten (Moors, 2009; Scherer, 2005). Eén van deze componenten is de motivationele component, bestaande uit de activering van een actietens (Frijda, 1988). De andere componenten zijn: (a) een cognitieve component bestaande uit de evaluatie of inschatting van de stimulus (Arnold, 1960; Frijda, 1986; Lazarus, 1991; Scherer, 1988), (b) een neurofysiologische component die de voorbereiding tot actie ondersteunt (Bull, 1951; Frijda, 1988; Lazarus, 1982; Levenson, 1994), (c) een motorische component bestaande uit gezichtsexpressies, vocale expressies en gedrag (Mortillaro & Scherer, 2009) en (d) een gevoelscomponent of ervaringscomponent, die een reflectie is van de cognitieve, motivationele, neurofysiologische, en motorische component in het bewustzijn (Bull, 1951; Frijda & Mesquita, 1998; Grandjean, Sander, & Scherer, 2008; Moors, 2009; Scherer, 2004).

Ondanks deze theoretische evolutie is wetenschappelijk onderzoek naar emoties nog steeds sterk gefocust op de gevoelscomponent. Er bestaan bijvoorbeeld talrijke studies omtrent de relatie tussen specifieke types van stimulusinschatting en specifieke gevoelens (bv. de inschatting dat een doelincongruente stimulus werd veroorzaakt door een andere persoon geeft aanleiding tot het gevoel van woede; Kuppens, Van Mechelen, & Rijmen, 2008; Roseman, Antoniou, & Jose, 1996; Tong, et al., 2005). Talloze andere studies beschrijven hoe specifieke types van motivaties of actietendensen gereflecteerd worden in specifieke gevoelens (bv. woede reflecteert een tendens tot aanvallen; Fischer & Roseman, 2007; Roseman, Wiest, & Swartz, 1994). Hoewel deze studies belangrijke kennis hebben opgeleverd omtrent de inhoud van de gevoelscomponent, hebben verschillende

emotieonderzoekers herhaaldelijk benadrukt dat deze studies slechts in beperkte mate kennis opleveren over de uitlokkende processen van emoties (Frijda & Zeelenberg, 2001). Deze onderzoekers stellen verder dat begrip krijgen over de oorzaken van specifieke emoties inzicht vergt in de manier waarop verschillende stimulusinschattingen aanleiding geven tot verschillende actietendensen (Frijda, 1993; Frijda, Kuipers, & ter schure, 1989; Scherer, 2009; Scherer & Ellsworth, 2009). Systematisch onderzoek naar deze vraag ontbreekt voorlopig echter. Het doel van dit doctoraat is om deze leemte in het huidige emotieonderzoek aan te pakken en studies op te zetten omtrent de relatie tussen specifieke stimulusinschattingen en specifieke actietendensen. Hiervoor werd het kader van appraisaltheorieën van emotie gebruikt. We leggen eerst kort uit wat appraisaltheorieën zijn alvorens in te gaan op de bevindingen van onze studies.

Appraisaltheorieën van emotie

Appraisaltheorieën stellen dat de perceptie van een stimulus, gebeurtenis of situatie niet volstaat om een emotie uit te lokken bij een persoon; een stimulus kan pas aanleiding geven tot een emotie als de persoon heeft beoordeeld wat de stimulus betekent voor zijn welbevinden (Arnold, 1960; Frijda, 1986; Lazarus, 1991; Scherer, 1988). De evaluatie of inschatting van de betekenis van de stimulus voor de persoon wordt de “appraisal” van de stimulus genoemd (Arnold, 1960). In de volgende paragrafen leggen we uit wat appraisaltheorieën bedoelen met de term appraisal. Daarna gaan we dieper in op de term actietendens en de relatie tussen appraisal en actietendens.

Appraisal

De appraisal van een gebeurtenis omvat de evaluatie van een aantal appraisalvariabelen die elk overeenkomen met een ander aspect van de gebeurtenis. De combinatie van waarden op appraisalvariabelen bepaalt het type emotie dat de persoon zal ervaren. Volgens appraisaltheorieën bepaalt de appraisal van de gebeurtenis dus niet enkel of een emotie zal optreden, maar ook welke soort emotie zal optreden (Smith & Lazarus, 1990). Elke individuele appraisaltheorie stelt een eigen set van appraisalvariabelen voor (zie Scherer, 1988, voor een overzicht). We bespreken eerst een aantal variabelen die in de meest bekende theorieën opgenomen zijn en eindigen met een aantal minder bekende variabelen.

Doelrelevantie. De meeste appraisaltheoretici stellen dat een gebeurtenis beoordeeld wordt op haar relevantie voor de doelen of belangen van de persoon. Een emotie zou enkel optreden wanneer de gebeurtenis wordt beschouwd als doelrelevant (Lazarus, 1991). Deze appraisalvariabele bepaalt ook de intensiteit van de emotie: hoe relevanter de gebeurtenis, hoe sterker de emotie (Lazarus, 1991; Scherer, 1988).

Doelcongruentie. Mensen zouden ook evalueren of een gebeurtenis congruent of incongruent is met hun doelen. De appraisal van doelcongruentie komt in vrijwel elke appraisaltheorie voor, maar telkens onder een andere naam: appraisal van “goal conduciveness” (Scherer, 1988), motivationele congruentie (Lazarus, 1991), of motivationele valentie (Moors & De Houwer, 2001). Als de persoon oordeelt dat de huidige en de gewenste situatie overeenkomen, dan volgt een positieve emotie; als de persoon oordeelt dat ze niet overeenkomen, dan volgt een negatieve emotie (Frijda, 1986).

Oorzaak. Bij deze appraisalvariabele van oorzaak gaat iemand na wie of wat een gebeurtenis veroorzaakt heeft: het zelf, de andere(n), of situationele omstandigheden. De uitkomst van deze evaluatie bepaalt op wie (of wat) de eventuele emotionele reactie gericht wordt (Frijda, 1986; Scherer 1988; Smith & Lazarus, 1990). Bij een negatieve gebeurtenis onderscheidt deze appraisalvariabele de emotie woede (oorzaak: ander) van emoties van schuld, schaamte en spijt (oorzaak: zelf) en van de emotie teleurstelling (oorzaak: omstandigheden; Frijda, 1986; Ortony, Clore, & Collins, 1988; Roseman, 2001; Roseman, et al., 1996; Smith & Lazarus, 1993; van Dijk & Zeelenberg, 2002). Bij een positieve gebeurtenis onderscheidt deze variabele de emotie trots (oorzaak: zelf) van de emotie dankbaarheid (oorzaak: ander; Lazarus, 1991; Ortony, et al., 1988; Roseman, 2001; Scherer, 1988).

Coping potential. Bij de appraisalvariabele van coping potential gaan mensen na of ze iets kunnen doen om een negatieve situatie om te zetten in een positieve of neutrale situatie of om een positieve situatie te behouden (Scherer, 1988; Smith & Lazarus, 1993). Dit wordt ook de appraisal van macht (Roseman, 2001; Scherer, 1988), beheersbaarheid (Frijda, 1986) of probleemgerichte coping potential (Lazarus, 1991; Smith, Haynes, Lazarus, & Pope, 1993) genoemd. Verschillende appraisaltheoriën stellen dat gevoelens van verdriet volgen uit een appraisal van lage coping potential terwijl andere negatieve gevoelens, zoals woede, volgen uit een appraisal van hoge coping potential (Lazarus, 1991; Roseman, 2001; Scherer, 1988).

Overige appraisalvariabelen. Appraisalvariabelen die minder frequent voorkomen in appraisaltheorieën zijn familiariteit, voorspelbaarheid, waarschijnlijkheid, urgentie, overeenkomst met interne normen, overeenkomst met externe normen (Scherer, 1988), onzekerheid, verwachting (Roseman, 2001), “type of ego-involvement”, toekomstverwachting (Lazarus, 1991), gevolgen voor de ander, relevantie voor de toekomst (Orthony et al., 1988) en aan- of afwezigheid van de stimulus (Arnold, 1960; Frijda, 1986).

Actietendens

Een actietendens is een doel om een relatie tussen het zelf en de stimulus te vestigen, te veranderen, of te behouden (Frijda, 2010; Frijda & Mesquita, 1998). De actietendens wordt verondersteld prioriteit te krijgen over andere doelen en alle energie van het organisme te focussen op het bereiken van het gewenste einddoel, een eigenschap die Frijda (1986) benoemde met de term “stuurvoorrang” (zie ook Arnold, 1960; Levenson, 1994; Oatley & Johnson-laird, 1987; Roseman, 2008). De actietendens kan zich vertalen in gedrag maar blijft ook regelmatig zonder gevolg (Coombes, et al., 2009; Frijda, 2010). Voorbeelden van actietendensen zijn: de tendens tot kwetsen, aanvallen, of vernietigen (gerelateerd aan woede), de tendens tot vluchten of opzoeken van veiligheid (gerelateerd aan angst), de tendens tot verwijderen of uitspuwen (gerelateerd aan walging), de tendens tot herstellen (gerelateerd aan spijt), de tendens tot verbergen (gerelateerd aan schaamte), de tendens om zichzelf te etaleren (gerelateerd aan trots), en de tendens tot passiviteit (gerelateerd aan verdriet en teleurstelling; Berkowitz, 1989; Bull, 1951; de Rivera, 1977; Frijda, 1986; Lazarus, 1991; Levenson; McDougall, 1908; Panksepp, 1982; Plutchik, 1980; Roseman, 2011; Solomon, 1977; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998).

De relatie tussen appraisal en actietendens

De meeste appraisaltheorieën bevatten geen rechtstreekse hypothesen over de relatie tussen appraisals en actietendensen, maar wel over de relaties tussen appraisals en gevoelens enerzijds en tussen gevoelens en actietendensen anderzijds (Lazarus, 1991; Scherer, 1988). Bijgevolg kan men vanuit de meeste appraisaltheorieën zelf hypothesen over de relatie tussen appraisals en actietendensen afleiden. De appraisaltheorie van Roseman (2001, 2008, 2011) en een recente versie van de theorie van Scherer (Moors & Scherer, in press) bevatten wel rechtstreekse hypothesen. Een voorbeeld uit de theorie van Roseman (2011) is dat de tendens tot kwetsen (geassocieerd met woede), uitgelokt wordt door

stimuli die worden ingeschat als incongruent met een toenaderingsdoel, veroorzaakt door anderen, en hoog qua coping potential. De tendens tot het opzoeken van veiligheid (geassocieerd met angst) daarentegen zou worden uitgelokt door stimuli die worden ingeschat als incongruent met een toenaderings- of vermijdingsdoel, veroorzaakt door omstandigheden, onzeker en laag qua coping potential.

STUDIES NAAR DE RELATIE TUSSEN APPRAISALS, ACTIETENDENSEN EN GEVOELENS

Het doel van dit doctoraat was om inzicht te krijgen in de appraisals die aanleiding geven tot verschillende actietendensen. Verder gingen we ook telkens na of we de bevindingen van voorgaand onderzoek omtrent de relatie tussen appraisals en gevoelens en actietendensen en gevoelens konden repliceren. In de volgende paragrafen geven we een overzicht van onze bevindingen per hoofdstuk.

Hoofdstuk 2: De appraisal van oorzaak (zelf vs. ander) en de tendens tot herstellen vs. aanvallen

Via een experimentele studie werd de invloed onderzocht van de appraisal van de oorzaak van een doelincongruente gebeurtenis (zelf vs. ander) op de tendens tot herstellen of aanvallen. Voorgaand onderzoek gaf aan dat doelincongruente zelfveroorzaakte gebeurtenissen aanleiding geven tot gevoelens van spijt (Roseman, et al., 1996; van Dijk & Zeelenberg, 2002; Zeelenberg, van Dijk, & Manstead, 1998) en dat gevoelens van spijt samengaan met de tendens tot herstellen (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998). Andere studies toonden aan dat doelincongruente gebeurtenissen veroorzaakt door andere personen aanleiding geven tot gevoelens van woede (Kuppens, et al., 2008; Roseman, et al., 1996; Tong, et al., 2005) en dat gevoelens van woede samengaan met de tendens tot aanvallen (Frijda, et al., 1989; Roseman, et al., 1994). Enkele onderzoekers onderzochten ook reeds of gebeurtenissen veroorzaakt door anderen vaker aanleiding geven tot de tendens tot aanvallen (Geen, 1968; Krieglmeier, Wittstadt, & Strack, 2009; Kulik & Brown, 1979). De resultaten van deze studies waren echter inconsistent, allicht door onzuiverheden in de manipulatie van de appraisal van oorzaak. Anderen hebben onderzocht of de mate waarin een gebeurtenis is veroorzaakt door het zelf een invloed heeft op de tendens tot herstellen (Carlsmit & Gross, 1969; de Hooge, Nelissen,

Breugelmans, & Zeelenberg, 2011; Konecni, 1972; Parkinson & Illingworth, 2009; Struthers, Eaton, Shirvani, Georghiou, & Edell, 2008). Ook deze studies bekwamen wisselende resultaten, mogelijk omwille van het gebruik van een context waarin deelnemers doelincongruente situaties veroorzaakten voor anderen in plaats van zichzelf. Konecni (1972) argumenteerde dat het veroorzaken van een doelincongruente situatie voor een andere persoon niet alleen de tendens tot herstellen uitlokt, maar ook alternatieve actietendensen zoals de tendens tot verbergen (gerelateerd aan schaamte) of vluchten (gerelateerd aan angst). Dit is mogelijk niet het geval wanneer de doelincongruente situatie alleen consequenties heeft voor de persoon zelf.

In hoofdstuk 2 werd de oorzaak (zelf vs. ander) van doelincongruente gebeurtenissen gemanipuleerd en werd de tendens tot herstellen vs. aanvallen gemeten. De deelnemers speelden een keuzespel tegen een handlanger van de experimentleider met als doel om zoveel mogelijk punten te winnen (de speler met het hoogste aantal punten won een krasbiljet). Op de helft van de spelbeurten mocht de deelnemer zelf een keuze maken (oorzaak: zelf); op de andere helft van de beurten blokkeerde de handlanger één van de keuzemogelijkheden (oorzaak: ander). De uitkomst van de spelbeurt kon positief en doelcongruent zijn (de deelnemer verdiende 10 punten) of negatief en doelincongruent zijn (de deelnemer verdiende 0 punten). Op doelincongruente beurten konden de deelnemers kiezen tussen herstellen (het alsnog winnen van 4 of 6 punten) of aanvallen (het aftrekken van 4 of 6 punten van de score van de handlanger). At random bepaalde het computer of herstellen een puntenvoordeel opleverde van 4 punten en aanvallen een puntenvoordeel van 6 punten, of omgekeerd. Zowel de keuze (aanval vs. herstel) als de latentietijd van de keuzes van de deelnemers werden gemeten. Op het einde van het experiment gaven de deelnemers ook aan in welke mate ze de neiging hadden om te herstellen of aan te vallen op elk type van spelbeurten (oorzaak zelf vs. oorzaak ander).

Zowel de zelfrapportage als de latentietijden gaven aan dat deelnemers eerder de neiging hadden om te herstellen op doelincongruente beurten die ze zelf hadden veroorzaakt en aan te vallen op doelincongruente beurten die de ander had veroorzaakt. We vonden geen invloed van de appraisal van oorzaak op de keuzefrequenties voor herstel of aanval. Een mogelijke verklaring voor dit datapatroon is dat deelnemers strategieën ontwikkelden om zo vaak mogelijk het puntenverschil van 6 punten te verkrijgen en dat het onderdrukken van hun initiële actietendensen tijd kostte. We concluderen dat de appraisal van oorzaak (zelf vs. ander) een invloed had op de tendens tot herstellen of aanvallen.

Hoofdstuk 3: De appraisal van oorzaak (zelf vs. omstandigheden), de tendens tot herstellen en gevoelens van spijt

De resultaten van de studie die werden beschreven in Hoofdstuk 2 doen vermoeden dat het zelf veroorzaken van een negatieve gebeurtenis aanleiding geeft tot het herstellen van die negatieve gebeurtenis. Het design van deze studie laat echter enkel toe om relatieve uitspraken te doen over de mate waarin de actietendensen herstellen en aanvallen werden geactiveerd. Het is dus onduidelijk of de appraisal van veroorzaking door het zelf aanleiding gaf tot een verhoogde tendens tot herstellen, of de appraisal van veroorzaking door de ander de tendens to aanvallen verhoogde, of dat beide effecten plaatsvonden. Om die reden gingen we in de twee studies van Hoofdstuk 3 dieper in op de relatie tussen het zelf veroorzaken van een negatieve gebeurtenis en de tendens tot herstellen.

In Studie 1 van Hoofdstuk 3 onderzochten we of de tendens tot herstellen sterker is na de appraisal dat een gebeurtenis veroorzaakt werd door het zelf dan na de appraisal dat een gebeurtenis veroorzaakt wordt door omstandigheden. De deelnemers speelden opnieuw een keuzespel voor punten. Op de helft van de spelbeurten mocht de deelnemer zelf een keuze maken (oorzaak: zelf); op de andere helft van de beurten werd een dobbelsteen gerold die bepaalde welke keuze de deelnemer moest maken (oorzaak: omstandigheden). De uitkomst van de spelbeurt kon opnieuw positief en doelcongruent zijn (de deelnemer verdiende 10 punten) of negatief en doelincongruent zijn (de deelnemer verdiende 0 punten). Op doelincongruente beurten kreeg de deelnemer de kans om de situatie te herstellen en de 10 punten alsnog te verdienen. We registreerden hoeveel moeite de deelnemers deden om de 10 punten terug te verdienen aan de hand van het aantal herstelresponsen ze stelden. Op het einde van het experiment werden zowel de tendens tot herstellen als gevoelens van spijt en teleurstelling in kaart gebracht door middel van zelfrapportage.

Het experiment gaf aan dat deelnemers een even sterke tendens tot herstellen hadden bij de doelincongruente uitkomsten veroorzaakt door henzelf als bij doelincongruente uitkomsten veroorzaakt die werden veroorzaakt door omstandigheden. De deelnemers gaven wel aan meer spijt en meer teleurstelling te voelen wanneer ze zelf de doelincongruentie veroorzaakt hadden dan wanneer de doelincongruentie veroorzaakt werd door een dobbelsteen. In tegenspraak met de literatuur vonden we bovendien dat gevoelens van spijt niet correleerden met de tendens tot herstellen. Gevoelens van

teleurstelling daarentegen correleerden met de tendens tot herstellen . Deze bevindingen werden verder onderzocht in Studie 2.

Studie 2 was een herinneringsstudie. In herinneringsstudies wordt aan deelnemers gevraagd zich een gebeurtenis te herinneren die een bepaalde emotie uitlokte, waarna ze de gebeurtenis beoordelen op verschillende appraisalvariabelen en/of actietendensen (Roseman, et al., 1996). Beide studies die voordien een relatie vonden tussen de emotie spijt en de tendens tot herstellen waren herinneringsstudies (Roseman, et al., 1994; Zeelenberg, van Dijk, Manstead, et al., 1998). In een online vragenlijststudie lieten we deelnemers herinneringen oproepen aan een situatie waarin ze spijt of teleurstelling voelden. We peilden zowel naar appraisalvariabelen, actietendensen en de intensiteit van de opgeroepen emotie en mogelijke andere emoties. Studie 2 suggereerde dat de relatie tussen spijt en de tendens tot herstellen in voorgaand onderzoek waarschijnlijk werd gevonden omdat de items die peilden naar de tendens tot herstellen niet conceptueel zuiver waren (i.e., de items in voorgaand onderzoek peilden niet enkel naar de tendens tot herstellen, maar ook naar de appraisal van veroorzaking door het zelf). Verder repliceerden we ook enkele bevindingen van Studie 1: (a) De appraisal van veroorzaking door het zelf was niet gerelateerd aan de tendens tot herstellen, (b) de intensiteit van teleurstelling was significant gerelateerd aan de tendens tot herstellen, (c) de intensiteit van spijt was niet significant gerelateerd aan de tendens tot herstellen, en (d) de appraisal van veroorzaking door het zelf was positief gerelateerd aan de intensiteit van spijt. De positieve relatie tussen de appraisal van veroorzaking door het zelf en de intensiteit van teleurstelling werd evenwel niet gerepliceerd. Hoewel het zelf veroorzaken van een situatie dus aanleiding geeft tot het gebruik van het label “spijt”, vonden we geen steun voor de idee dat het aanleiding geeft tot het herstellen van de situatie

Hoofdstuk 4: De appraisal van verwachting en nabijheid op de tendens tot herstellen

Onderzoek geeft aan dat onverwachte doelincongruente gebeurtenissen sterkere negatieve gevoelens uitlokken dan verwachte doelincongruente gebeurtenissen (McGraw, Mellers, & Ritov, 2004; Mellers, Schwartz, Ho, & Ritov, 1997; Shepperd & McNulty, 2002; Siemer, Mauss, & Gross, 2007; van Dijk & van der Pligt, 1997). Verder geeft onderzoek ook aan dat doelincongruente gebeurtenissen aanleiding geven tot een sterkere negatieve gevoelens wanneer de doelcongruente gebeurtenis net gemist werd (i.e., een appraisal van

hoge nabijheid, bv. een perfect rijexamen afleggen, maar falen in de laatste minuut) dan wanneer de doelcongruente gebeurtenis compleet gemist werd (i.e., een appraisal van lage nabijheid, bv. een grote fout maken in de eerste minuut van je rijexamen; Clark, Crooks, Clarke, Aitken, & Dunn, 2012; Clark, Lawrence, Astley-Jones, & Gray, 2009; Markman, McMullen, & Elizaga, 2008; Qi, Ding, Song, & Yang, 2011). Wij onderzochten de vraag of de tendens tot het herstellen van een doelincongruente gebeurtenis afhankelijk is van de appraisal van verwachting en nabijheid. Onze hypotheses hieromtrent waren de volgende: (a) Onverwachte doelincongruente gebeurtenissen geven aanleiding tot een sterkere tendens tot herstellen dan verwachte doelincongruente gebeurtenissen, en (b) doelincongruente gebeurtenissen geven aanleiding tot een sterkere tendens tot herstellen wanneer de doelcongruente gebeurtenis net gemist werd dan wanneer de doelcongruente gebeurtenis compleet gemist werd.

Het experiment werd aangeboden in de vorm van een slotmachinespel, waarin op elke spelbeurt drie symbolen sequentieel werd getoond. Indien drie keer hetzelfde symbool verscheen (i.e., AAA) dan kreeg de deelnemer tien cent. De deelnemers werden blootgesteld aan doelincongruente gebeurtenissen met een hoge verwachting en hoge nabijheid (i.e., AAB), doelincongruente gebeurtenissen met een lage verwachting en hoge nabijheid (i.e., ABA of ABB) en doelincongruente gebeurtenissen met een lage verwachting en lage nabijheid (i.e., ABC). De tendens tot herstellen werd net als in Hoofdstuk 3 gemeten aan de hand van het aantal herstelresponsen op doelincongruente beurt en via zelfrapportage.. Onze hypotheses werden bevestigd: Zowel verwachting als nabijheid hadden een positieve invloed op de tendens tot herstellen van de doelincongruente gebeurtenis (zowel op de zelfrapportage als op de gedragsmaten van de tendens tot herstellen). Bovendien vonden we ook dat verwachting, maar niet nabijheid, een invloed had op gerapporteerde gevoelens van teleurstelling, frustratie, en woede: Bij onverwachte doelincongruente gebeurtenissen waren deze gevoelens sterker dan bij verwachte doelincongruente gebeurtenissen.

Hoofdstuk 5: De doelafhankelijkheid van de tendens tot toenaderen en vermijden bij angst en woede.

In Hoofdstuk 5 werd de precieze aard van de relatie tussen actietendensen en gevoelens in kaart gebracht. Meer specifiek werd nagegaan of actietendensen inderdaad het

best geconceptualiseerd kunnen worden in termen van doelen of gewenste eindtoestanden (bv. iemand kwetsen), eerder dan in termen van (a) specifiek gedrag (bv. iemand slaan), (b) specifieke patronen van spieractiviteit (het buigen en strekken van spieren in de armen, handen en de rest van het lichaam) of (c) specifieke kinematische aspecten van het gedrag (het opheffen van de arm, het oriënteren van de hand, en het reduceren van de afstand tot de stimulus). Een aantal onderzoekers hebben voorgesteld om onderzoek naar emotionele tendensen en gedrag te focussen op één kinematisch aspect van het gedrag: de toename of reductie van de afstand tussen het zelf en de stimulus (Davidson, 2009). Verschillende onderzoekers hebben dan ook pogingen gedaan om specifieke gevoelens of emoties te relateren aan de tendens tot toenaderen of vermijden. Bijvoorbeeld, na lang wetenschappelijk debat werd aangetoond dat woede eerder gerelateerd is aan het toenaderen dan vermijden van de stimulus (Carver & Harmon-Jones, 2009; Harmon-Jones, 2003; Harmon-Jones & Allen, 1998; Harmon-Jones & Sigelman, 2001; Maayan & Meiran, 2011; Yan & Dillard, 2010). Wij stellen voor dat deze relatie gevonden werd omdat het toenaderen van de stimulus vaak nodig is om het doel gerelateerd aan woede te bereiken: het aanvallen en/of domineren van een andere persoon. Verder stellen we ook voor dat andere negatieve gevoelens, zoals angst en walging, vaak gerelateerd zijn aan vermijding omdat het vermijden van de stimulus doorgaans nodig is om de doelen geassocieerd met deze gevoelens te bereiken: veiligheid en hygiëne. In Hoofdstuk 5 werden deze ideeën getoetst voor woede en angst via vijf experimenten die elk de vorm aannamen van (relevante) stimulus-respons compatibiliteitstaken.

Experiment 1 was in de vorm van een spel met twee schermers. Het bestond uit een reeks van 120 beurten met het volgende verloop: Op elke beurt verscheen eerst de schermer van de deelnemer (aangeduid met het woordje "ik") links of rechts op het scherm. Kort erna (SOA 500 ms) verscheen een tweede schermer rechts of links van schermer van de deelnemer. Opnieuw 500 ms later verscheen een emotiewoord op het scherm van de deelnemer dat ofwel gerelateerd was aan woede (kwaad, boos, driftig, irritatie, of woede) ofwel aan angst (angstig, bang, paniek, schrik, of vrees). De deelnemers kregen de opdracht om afhankelijk van de emotie van de eigen schermer (uitgedrukt door het woord dat op de schermer verscheen) een actie te stellen: aanvallen/toenaderen (door een knop in te drukken naar de tegenstander toe) of vluchten/vermijden (door een knop in te drukken van de tegenstander weg). Elke deelnemer kreeg één compatibel blok (60 beurten) en één incompatibel blok (60 beurten). In het compatibele blok moest de deelnemer toenaderen

(aanvallen) als een kwaad woord op zijn/haar schermer verscheen en vermijden (vluchten) als een bang woord op zijn/haar schermer verscheen. In het incompatibel blok was de responstoewijzing omgekeerd: De deelnemer moest toenaderen (aanvallen) bij een bang woord en vermijden (vluchten) bij een kwaad woord. De volgorde van het compatibel en incompatibel blok werd gecontrabalanceerd over deelnemers. Experiment 2 had hetzelfde design als Experiment 1, maar het emotiewoord verscheen op de andere schermer in plaats van op de eigen schermer. In Experiment 3 gebruikten we andere personages en toenaderen vermijdingresponsen. In dit experiment werden de schermers vervangen door twee acteurs. De deelnemers kregen de opdracht om op basis van het emotiewoord dat op het eigen personage verscheen een actie te stellen: toenaderen/smeken of vermijden/koppig de rug toe draaien. Elke deelnemer kreeg opnieuw één compatibel (60 beurten) en één incompatibel blok (60 beurten). In het compatibel blok moest de deelnemer toenaderen (smeken) als een bang woord op zijn/haar personage verscheen en vermijden (koppig de rug toe draaien) als een kwaad woord op zijn/haar personage verscheen. In het incompatibel blok was de responsmapping omgekeerd: De deelnemer moest vermijden (koppig de rug toe draaien) bij een bang woord en toenaderen (smeken) bij een kwaad woord. Experiment 4 had een gelijkaardig design aan Experiment 3, maar het emotiewoord verscheen op de tegenstander.

De eerste vier experimenten werden gezamenlijk geanalyseerd. We vonden dat wanneer het emotiewoord op het eigen personage verscheen (Experiment 1 en 3) de relaties tussen woede en angst en toenaderen en vermijden afhankelijk waren van de eindtoestand deze gedragingen. Concreet was woede gerelateerd aan toenadering en angst aan vermijding wanneer toenadering agressief/dominant was (aanvallen) en vermijding zelfbeschermend/onderdanig (vluchten), maar was woede gerelateerd aan vermijding en angst aan toenadering wanneer vermijding agressief/dominant was (koppig de rug toe keren) en toenadering zelfbeschermend/onderdanig (smeken). Het patroon van resultaten was significant verschillend wanneer het emotiewoord op het andere personage verscheen (Experiment 2 en 4). Zoals voorspeld, waren woede en angst in deze experimenten niet systematisch gerelateerd aan agressie/dominantie of zelfbescherming/onderdanigheid. Dit komt waarschijnlijk omdat de emotie van een andere persoon (bv. kwaadheid van een andere persoon) verschillende emoties kan uitlokken (bv. zowel kwaadheid als angst). De effecten van de locatie van het emotiewoord geven aan dat de effecten in onze studies niet puur een gevolg waren van een semantische relatie tussen de emotiewoorden gerelateerd

aan woede en de actiewoorden “vechten” en “koppig” of de emotiewoorden gerelateerd aan angst en de actiewoorden “vluchten” en “smeken”.

In Experiment 5 werd verder nagegaan waarom sommige studies aangeven dat woede kan samengaan met pure reductie van de afstand tussen het zelf en de stimulus zonder duidelijke sporen van agressiviteit en/of dominantie (Maayan & Meiran, 2011). Experiment 5 suggereerde dat de simpele act van het reduceren van de afstand als meer dominant gezien wordt dan de simpele act van het doen toenemen van de afstand. Dit is een mogelijke verklaring waarom de relatie tussen woede en de tendens tot toenaderen zo robuust is.

SAMENVATTING VAN DE ONDERZOEKSRISULTATEN EN SUGGESTIES VOOR VERDER ONDERZOEK

We vonden steun voor de invloed van verschillende appraisalvariabelen op de tendens tot herstellen: De tendens tot herstellen werd verhoogd door de appraisal van hoge verwachting op en hoge nabijheid van de doelcongruente uitkomst. Anderzijds werd de tendens tot herstellen verlaagd relatief gezien (vergeleken met de tendens tot aanvallen) door de appraisal van veroorzaking door de ander. We vonden geen steun voor de hypothese dat de appraisal van veroorzaking door het zelf de tendens tot herstellen activeert of versterkt. Verder genereerden onze studies ook bevindingen met betrekking tot de inhoud van gevoelens. Onze studies suggereerden dat gevoelens van spijt een reflectie zijn van de appraisal van veroorzaking door het zelf; gevoelens van teleurstelling een reflectie zijn van de appraisal van onverwacht plus de tendens tot herstellen; gevoelens van woede een reflectie zijn van de appraisal van onverwacht plus de tendens tot aanvallen/domineren; en gevoelens van angst een reflectie zijn van de tendens tot zelfbescherming/onderdanigheid.

Toekomstig onderzoek

De vraag van differentiatie

In de meeste van onze studies kunnen we niet bepalen of de appraisal variabele (a) één specifieke actietendens activeerde (of een subset van actietendensen) en daarbij

kwalitatieve verschillen veroorzaakte of (b) dezelfde activerende of intensifiërende invloed heeft op de meeste of alle actietendensen. Bijvoorbeeld, het experiment in Hoofdstuk 4 laat zowel de mogelijkheid open dat de appraisal van verwachting enkel de tendens tot herstellen veroorzaakt of versterkt of dat deze variabele elke mogelijke actietendens versterkt (waaronder de tendens tot herstellen). In Hoofdstuk 2 werd de vraag naar differentiatie wel onderzocht: We manipuleerden de appraisal van oorzaak en maten de relatieve intensiteit van de tendens tot herstellen en de tendens tot aanvallen. Het nadeel van het paradigma van Hoofdstuk 2 is dat het onduidelijk was of de appraisal van oorzaak beide actietendensen beïnvloedde, of enkel de tendens tot herstellen of aanvallen. In toekomstige studies kunnen we deze problemen oplossen door een paradigma te gebruiken waarin deelnemers op sommige beurten één van twee actietendensen kunnen implementeren (bv. aanvallen of herstellen) om na te gaan of de appraisalvariabele differentieert tussen die twee actietendensen, en op andere beurten slechts één van de twee actietendensen kunnen implementeren (bv. herstellen) om na te gaan of de appraisalvariabele een invloed heeft op de intensiteit van die specifieke actietendens.

Andere relaties tussen appraisals, actietendensen, en gevoelens

Appraisaltheorieën bevatten een veelheid aan hypothesen omtrent de relaties tussen appraisals, actietendensen en gevoelens. Toekomstig onderzoek naar de relaties tussen appraisals en actietendensen kan voortbouwen op de huidige studies en/of op voorgaand onderzoek omtrent de relaties tussen appraisals en gevoelens enerzijds en gevoelens en actietendensen anderzijds. We geven enkele concrete voorbeelden van hypothesen die in toekomstig onderzoek geëxploreerd kunnen worden.

Verder onderzoek zou kunnen ingaan op de appraisalvariabelen die een rol spelen in de uitlokking van de tendens tot zelfbescherming/onderdanigheid en de manier waarop deze actietendens gedifferentieerd wordt van de tendens tot aanvallen/domineren. Mogelijk moet ons repertoire van appraisalvariabelen hiertoe verder uitgebreid worden met de variabelen van onzekerheid en coping potential. Verschillende onderzoekers suggereren dat gevoelens van woede en angst gedifferentieerd worden door respectievelijk hoge en lage coping potential (Roseman, 2011; Scherer, 1988). Vooralsnog werd deze mogelijkheid evenwel nog niet getoetst met betrekking tot de tendens tot aanvallen/domineren en de tendens tot zelfbescherming/onderdanigheid. Verder wordt angst, maar niet woede

geassocieerd met een hoge appraisal van onzekerheid (Lazarus, 1991; Roseman, 2011). Een andere piste voor verder onderzoek betreft de differentiatie van de tendens tot zelfbescherming/onderdanigheid en de tendens tot herstellen. Mogelijk spelen dezelfde variabelen hier een rol: lage coping potential en onzekerheid. Onze studies gaven reeds aan dat de appraisal van veroorzaking door een ander de tendens tot aanvallen/domineren differentieert van de tendens tot herstellen. Toekomstig onderzoek kan ook de uitlokkende appraisals van een van de vele andere niet onderzochte actietendensen onderzoeken, zoals de tendens tot passief worden (verdriet), zichzelf te verbergen (schaamte), of zichzelf te etaleren (trots).

ALGEMEEN BESLUIT

Het onderzoek naar de motivationele component van emoties staat momenteel nog in zijn kinderschoenen. Nochtans wordt in verschillende emotietheorieën gekapitaliseerd op de centrale rol van motivatie in het verklaren van emoties. Onze studies suggereren dat het begrip van de emoties van teleurstelling, woede en angst niet los staat van het inzicht in de tendens tot herstellen, de tendens tot aanvallen/domineren en de tendens tot zelfbescherming/onderdanigheid. We hopen dat onze studies een eerste stap kunnen zijn naar een meer systematische studie naar de rol van appraisal in het uitlokken van actietendensen.

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