Individual differences in patterns of appraisal and anger experience

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The aim of the present study was to identify and account for individual differences in the contextual experience of anger and its appraisals and in the associations between both. Participants ($N =832$) engaged in a directed imagery task of descriptions of unpleasant situations and reported on their appraisal and anger experience. Additionally, they filled out several dispositional questionnaires. The results demonstrated that at the basis of the experience of anger lies an externally induced disadvantage, which for many people elicits frustration. For some individuals, the latter is sufficient for becoming angered. Yet, for others, the thwarting has to be characterised by norm violation and has to be appraised as unfair and deliberate in order for them to experience anger. Individuals also differed as to whether threat to self-esteem was experienced along with frustration in situations that involved negative evaluative self-relevant information. Combined, the findings demonstrated that anger can occur in combination with different patterns of appraisals, varying as a function of situation and person characteristics.

INTRODUCTION

Appraisal theories of emotions have gained widespread acceptance in the field of emotion research (for a recent overview, see, e.g., Scherer, Schorr, & Johnstone, 2001). In these theories, it is assumed that a situation may elicit in an individual a set of appraisals, and that distinct patterns of such appraisals are associated with the experience of specific emotions (Frijda, Kuipers, & ter Schure, 1989; Ortony, Clore, & Collins, 1988; Roseman, Spindel, & Jose,

1990; Scherer, 1999; Smith & Ellsworth, 1985; Smith & Lazarus, 1993). For instance, if someone appraises a situation as goal-blocking and holds someone else accountable for it, this person may experience anger.

Up till now, the bulk of appraisal research on emotions has predominantly focused on determining which appraisals are in general associated with the experience of different emotions. An aspect that has received far less attention is that of individual differences. Yet, one of the original motivations for the construction of appraisal theories was the desire to account systematically for individual differences in emotional experience (Griner & Smith, 2000; Roseman & Smith, 2001). Although the existence of individual differences in emotions and their associated appraisals is widely acknowledged (e.g., Lazarus, 1994; Scherer, 1999; Smith & Pope, 1992), little research has addressed this issue to date.

With the present study we wished to contribute to filling this gap. Our primary aim was to examine individual differences in the contextual experience of appraisals and emotional experience and in the interrelations between the two. Subsequently, we aim to account for such individual differences by relating them to potentially relevant dispositional variables. In pursuit of this aim, we focused on the emotion of anger and on appraisals that are considered as central to this emotion. In the following sections, we will first briefly review the anger appraisals that we included in our study. Second, we will address the issue of individual differences. Third, we will discuss our research questions in more detail and we will present an outline of our study.

Central appraisals of anger

Previous research on anger was reviewed and four appraisals that have been systematically related to anger were selected. The latter include goal obstacle, other accountability, unfairness, and threat to self-esteem.[1]

Goal-obstacle. The appraisal of goal-obstacle or goal-blocking is generally accepted as an important determinant of anger as well as aggression. Besides its key role in the influential frustration–aggression hypothesis (Dollard, Doob, Miller, Mowrer, & Sears; 1939), it has also been adopted under various forms by numerous more recent appraisal theorists as a major

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[1] Some appraisal theories also hypothesise that the appraisal of power or control is an important determinant of anger (e.g., Roseman et al., 1990; Scherer, 1993). This appraisal was not included in the present study because empirical evidence so far has failed to show a consistent association between this appraisal and anger (see, e.g., Kuppens, Van Mechelen, Smits, & De Boeck, 2003) and in the present study we wanted to include only those appraisals that have been proven to be predictive for anger.

component of anger and anger-like emotions; the latter include frustration (Averill, 1982), perceived goal-obstacle (Ellsworth & Smith, 1988; Smith & Ellsworth, 1985), motivational incongruence (Smith & Lazarus, 1993), motive inconsistency (Roseman et al., 1990), undesirable event (Ortony et al., 1988), goal obstructiveness (Scherer, 1993), and goal blocking (Izard, 1977).

Other accountability.   The appraisal of other accountability refers to somebody else being considered as the cause of what happened. This appraisal, which can be found in many recent appraisal theories, is considered a (and often *the*) core component of anger (e.g., Ellsworth, 1994; Ellsworth & Smith, 1988; Fischer, 1991; Frijda, 1986; Ortony et al., 1988; Smith & Lazarus, 1993; Wierzbicka, 1992).

Unfairness.   The relation between anger and the appraisal of unfairness has been documented in various studies (e.g., Ellsworth & Smith, 1988; Frijda et al., 1989; Mikula, Scherer, & Athenstaedt, 1998; Miller, 2001; Wallbott & Scherer, 1986). Perceived unfairness is further closely related to the appraisal of illegitimacy, which is also considered a determinant of anger (Averill, 1982; Fitness & Fletcher, 1993; Roseman et al., 1990).

Threat to self-esteem.   The experience of anger and the display of aggressive behaviour have been related to the appraisal of threatened self-esteem, where the expression of anger is then seen as an effort to maintain one's self-esteem (e.g., Baumeister, Smart, & Boden, 1996; Kernis, Grannemann, & Barclay, 1989; Smith & Lazarus, 1993). More precisely, threatened low self-esteem is traditionally seen as a source of anger and violence. However, the opposite has also been suggested, namely that an inflated but unstable self-esteem leads to anger and aggression when disputed by others (for an overview, see Baumeister et al., 1996).
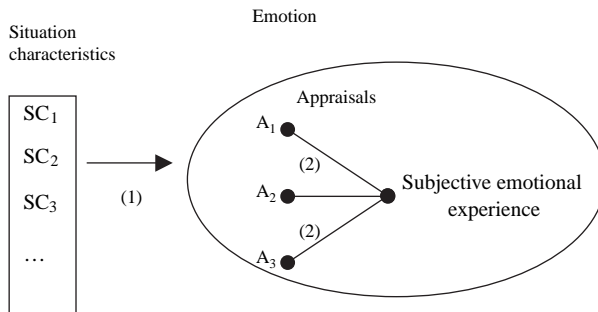
Individual differences in appraisal and emotion

Componential theories of emotions such as appraisal theories assume that an emotion consists of different emotion components including appraisals and the subjective experience of the emotion itself, all occurring within a given situational context (e.g., Gross, 1999; Russell, 2003). Obviously, the occurrence of such emotion components can vary across different situations. An appraisal is usually defined as an organism's evaluation of a situation in relation to the organism's own goals, needs, etc. (e.g., Smith & Lazarus, 1993) and therefore may be strongly situation dependent. Surprisingly, however, the search for situational characteristics that play a role in shaping appraisals has largely been neglected thus far (Funder, 2001). Also, the

subjective experience of specific emotions is said to be linked to specific types of situations (Zurbriggen & Sturman, 2002). Situational variability of emotions is also in line with the recognised low cross-situational stability of personality (e.g., Mischel, 1968).

Without making any temporal or causal claims, the occurrence of an emotion can be represented as in Figure 1. As indicated in this figure, individual differences then can be hypothesised to arise at two points: (1) in the link between situation characteristics and emotion components, and (2) in the mutual links between emotion components themselves.

(1) Regarding the link between situation characteristics and the occurrence of emotion components, attention has primarily been focused on individual differences in the link between situations and appraisals because the occurrence of the latter components is oftentimes assumed to be the antecedent of emotional experience (e.g., Griner & Smith, 2000; Gross, 1999; Smith & Pope, 1992; but see, Frijda, 1993; Russell, 2003). As a consequence, this link has been argued to constitute the key to understanding individual differences in emotion; yet, research efforts that have directly examined this issue are far from abundant (e.g., Smith & Pope, 1992; van Reekum & Scherer, 1997; for an exception, see Kuppens & Van Mechelen, 2007). A relevant concept in this regard is that of appraisal tendencies. Such tendencies may be considered systematic distortions or sensitivities in the appraisal process, causing the facilitation of the occurrence of certain appraisals for an individual within a given situation (Matthews, Derryberry, & Siegle, 2000; Scherer, 1999; van Reekum & Scherer, 1997). Appraisal tendencies, however, have received only scant attention in empirical research until now (for some exceptions, see Dodge, 1993; Hazebroek, Howells, & Day, 2001; Hemenover & Dienstbier, 1996).

Figure 1. Schematic representation of the occurrence of emotion components as a function of situation characteristics. Individual differences can occur at (1), the link between situation characteristics and emotion components, and (2), in the interrelations between emotion components, i.e., appraisals and subjective emotional experience.

(2) Regarding individual differences in the mutual links between emotion components, we limit ourselves here to the relation between appraisals and emotional experience. From a theoretical point of view, some authors have hypothesised that there may be variations in the component patterns that are associated with the same emotion. For instance, Scherer (2001) recently argued that, "appraisal theorists do not assume that the typical appraisal profile is always required to produce the emotion" (p. 373). Along similar lines, other authors have questioned that the commonly accepted set of components of a specific emotion always needs to occur in order for the emotion to be experienced (Frijda & Zeelenberg, 2001; Parkinson, 2001; Russell, 2003; Schweder, 1993). From an empirical point of view, there are several findings that suggest that the relationship between emotional experience and its appraisal components may be less consistent then is generally assumed. For instance, Kuppens, Van Mechelen, Smits, and De Boeck (2003) showed that the anger appraisals of frustration, other accountability, and unfairness do not necessarily accompany the experience of anger and vice versa. Also, findings from other studies suggest that emotions are not always characterised by the same pattern of appraisals (Parkinson, 1999; Reisenzein, 2000).

However, not all theoretical proposals would agree with this view. For instance, contrary to Scherer (2001), Roseman and Smith (2001) state that, "appraisal theories maintain that a common pattern of appraisals is found in all the situations that evoke the same emotion" and "that there should be strong and invariant one-to-one relationships between particular appraisal combinations and particular emotions" (p. 7; see also Smith & Pope, 1992). Regarding anger specifically, for instance, Smith and Kirby (2004) stated that the combination of motivational relevance, incongruence, and other accountability is a necessary and sufficient condition for anger. Such statements imply that a fixed set of components should always accompany the experience of an emotion. Consequently, according to this viewpoint, no individual differences in the relationships between appraisals and emotional experiences are assumed to exist.

Taken together, it seems that there is no consensus as to whether an emotion can occur in combination with different patterns of components. If that should be the case, however, a possible explanation for such a finding may be that individual differences characterise the relationships between subjective emotional experience and the occurrence of appraisal components. This would mean that the sets of components that can be associated with an emotional experience may vary across individuals, such that, for instance, a certain component (e.g., the appraisal of unfairness) may be necessary for the experience of the emotion (e.g., anger) for one person, whereas another person can also experience the emotion in question in

absence of that component. No research has yet explored such a possibility, however.

Aims and outline of the study

The aim of the present study was to closely examine the issue of individual differences in emotion components. More specifically, we wished to identify individual differences that may exist in the two types of links that were outlined above: (1) in the link between relevant situation characteristics and the occurrence of emotion appraisals and experience, and (2) in the link between appraisals and the subjective experience of an emotion.

A large-scale directed imagery study was designed to address these research questions, focusing on anger. In this study, a set of situation descriptions was presented to a large and diverse group of participants. For each description, the participants were asked to imagine as vividly as possible how they would react to the situation and describe their reactions in terms of the aforementioned anger components. The resulting data were subjected to a data-classification technique with the specific aim of identifying individual differences from the data in terms of a typology of persons, with each person type being characterised by a distinct set of situation–emotion component profiles (note that it is crucial that each participant is given the same set of situations and responses in order to construct such a typology). From these results, it was possible to examine how the person types differed from one another with respect to the two types of links mentioned above (see below).

Additionally, we examined how the found person types differed from one another with regard to a number of potentially relevant dispositional variables. Each dispositional measure that was included corresponded to one of the anger components. For the appraisals of goal-blocking, other accountability, and unfairness, corresponding dispositional appraisal tendency measures were included (e.g., measures reflecting the general tendency to experience goal-blocking, other accountability, and unfairness). For threat to self-esteem and anger, dispositional measures of self-esteem and trait anger were included. We expected that differences in such dispositional tendencies may underlie differences in situation–anger component profiles. As such, their inclusion may yield a better understanding of the found typology as well as providing insight in possible processes that may underlie the individual differences structure.

METHOD

Participants

Participants were 832 high-school students from 8 different high schools in the Dutch speaking part of Belgium; 546 of the participants were girls, 286 boys. Their mean age was 17.1 years. The use of a heterogeneous sample of high-school students limits the generalisability problems that one encounters when using a specific sample of participants (e.g., psychology students) and implies a guarantee to capture a large range of the natural variation that occurs with respect to the domain under study.

Materials

A directed imagery task as well as several dispositional questionnaires were constructed. Two pilot studies were performed to select reliable and valid items to be used in the imagery task and the dispositional questionnaires. In order not to overload the reader, we will present here only a summary of these pilot studies.

Directed imagery task

In the directed imagery task, participants had to report on their responses to a list of situation descriptions in terms of the different anger components. What follows is a description of how the situation descriptions and the anger component items were constructed.

Situation-descriptions.   In a study by Kuppens et al. (2003), a total of 443 situation descriptions was collected from 161 high-school students. Each participant had to describe three unpleasant situations that they had recently experienced, one from the domain of work or school, one from the domain of interaction with close personal friends or family, and one from the domain of leisure time. Furthermore, each situation had to be characterised by either the presence or absence of one of the following six features: frustration, other accountability, arrogant entitlement, antagonistic action tendency, anger, or irritation. Thus, in the study by Kuppens et al. (2003), there were 12 different instruction types (present/absent ×6 features), and each participant was randomly assigned one of them. From the resulting total pool of situation descriptions, 24 descriptions were selected for use in the present study. This selection was based on the following criteria: (a) sample of two situations from each of the 12 instruction types under which the situations were generated; (b) equal representation of the three domains of life in the final list of situations; (c) equal representation of the sex of the

participants who generated the situations; (d) absence of too idiosyncratic elements; and (e) clarity of the situation descriptions. The selection resulted in a list of 24 situation descriptions, varying with respect to the aforementioned features pertaining to anger, and relevant for the participants from the current study who were also high-school students. Summary descriptions of the situations can be found in Table 1.

Anger components.   Regarding the experience of anger, participants were asked to rate on a 4-point scale (ranging from 0 =*not at all*, to 3 =*very strongly*) to what degree they would feel angry in the presented situations.

Regarding the appraisal items, previous research has pointed at the importance of carefully selecting the formulation of appraisals in order to improve the quality of the prediction of emotion variables (Kuppens et al., 2003). To this end, a pilot study was set up, aimed at selecting reliable and valid item formulations that reflect the four studied appraisal contents (appraisal of goal obstacle, other accountability, unfair treatment, and threat of self-esteem). In this pilot study, a set of three different items was formulated for each of the appraisals. Two samples of participants (N_1 =80, 54 women and 26 men, mean age =17 years; N_2 =85, 54 women, 31 men, Mean Age =17.1 years) rated the 24 selected situation descriptions with respect to the experience of anger and the total of 12 appraisal items (4 appraisals $\times$ 3 items =12 items), one group with respect to how *they* would react to the situation, the other group with respect to how *an average member of their age-group* would react (ranging from 0 =*not at all*, to 3 =*very strongly*). Both datasets were separately averaged across situations and across participants, yielding four different datasets in total. From each appraisal item set, that item was chosen that performed best across the four datasets in terms of (a) high item–total set correlation, reflecting the degree to which the item is related to the underlying construct (internal criterion), and (b) high correlation with anger, reflecting the predictive quality for anger (external criterion). The formulations that were retained on the basis of these criteria were: To what extent "are you frustrated in this situation?" (pertaining to goal-obstacle); "Do you feel that someone else is deliberately accountable for what has happened?" (other accountability); "Do you feel treated in an unfair way?" (unfair treatment); and "Do you feel threatened in your self-esteem?" (threat to self-esteem).

Based on the selected situations and items, the imagery task was constructed. In fact, four parallel versions of this task were used, in order to eliminate possible order effects (Schwarz, 1999; Steinberg & Thissen, 1996): a sequential–component/anger version, a sequential–anger/component, a parallel–component/anger, and a parallel–anger/component version (following Yen, 1993). In the two parallel versions, all items were presented at once together with each situation (either first the anger, and then the other

TABLE 1
Summary of situation descriptions used in the imagery task, grouped according to the Tucker3-HICLAS classification

Situation class	Cluster 1	Cluster 2	Cluster 3
Situation class 0 (rest-class)			
The waiter doesn't show up when you're sitting in a cafe	0	0	0
Your sports team loses to a much higher ranked team	0	0	0
Your sibling wakes up with a high fever in the morning	0	0	0
You're alone at home and you're bored	0	0	0
No one lets an old man sit down on a crowded bus	0	0	0
You fail on a test, on which the average score is 3/10	0	0	0
A swimming appointment is cancelled because one of your friend falls ill	0	0	0
You rip your pants during sports	0	0	0
Situation class 1			
A floppy disk holding an important school assignment is destroyed by your computer	0	1	0
Your sibling is nearly run over by a car when he/she runs into the street	0	1	0
It's hard to study when the neighbours make a lot of noise and it's a hot day	0	1	0
Your friend is in a coma after an accident	0	1	0
Situation class 2			
You're in love with someone but he/she is not interested in you	0	0	1
You drop a plate of glasses at a party and everyone is looking at you	0	0	1
You and a friend are both in love with the same person	0	0	1
Situation class 3			
A fellow student loses your notes, causing you to fail the exam	1	1	0
Your sibling sneaks out when you both have to clean up the house	1	1	0
A fellow student fails to return your notes the day before an exam	1	1	0
You're at a party, and someone tells you that a friend outside has smashed your bike	1	1	0
Situation class 4			
After working hard on an assignment, your teacher says it's still not better than your previous work	0	1	1
Situation class 5			
You are blamed for someone else's failures after a sports match	1	1	1
Being a jobstudent yourself, an employee makes you do all his chores	1	1	1
A friend lets you down on an appointment to go out with his/her friend	1	1	1
You hear that a friend is spreading gossip about you	1	1	1

Note: In columns 2 through 4, "1" signifies that a situation belongs to the respective cluster, "0" signifies otherwise.

component items, or vice versa). In the two sequential versions, either each of the 24 situations was presented first with the anger item, followed by a presentation of each of the 24 situations with the other component items, or vice versa. For each situation description, the participants were instructed to vividly imagine how they would feel, think and act if they found themselves in the situation, and then to rate the presented items accordingly making use of a 4-point scale (ranging from 0 =*not at all*, to 3 =*very strongly*).

Dispositional questionnaires

The Spielberger Trait Anger Scale (van der Ploeg, Defares, & Spielberger, 1982) was included to assess each participant's general tendency to experience anger and the Rosenberg Self-esteem scale (M. Rosenberg, 1989) to assess self-esteem. A second pilot study was set up to construct experimental scales to assess appraisal tendencies. In this pilot study, 10-item experimental scales reflecting the general tendency to experience goal blocking (e.g., "I easily feel obstructed in reaching for what I want"), other accountability (e.g., "I often have the feeling that others determine what happens"), and unfair treatment (e.g., "I easily feel treated unfairly") were constructed, with items to be rated on a 4-point scale (ranging from 0 =*not at all*, to 3 =*totally agree*). These scales along with the Trait Anger Scale and the Rosenberg Self-esteem scale were administered to 106 participants (67 women, 39 men, mean age =21.1) who were paid a small amount (about $2.5) for participation. All scales proved to be one-dimensional: Cronbach alpha's ranged from .80 to .91 and, for each scale, the PCA analysis favoured a one-component solution (scree-test criterion), explaining between 39.7% and 59.7% of the total variance. Each of the experimental questionnaires was then reduced in length to five items in order not to overload the participants in the final study: The five items loading highest on the first principal component were selected to form the final questionnaire. In each case, this selection did not cause a substantial loss of internal consistency (with alpha's after reduction ranging from .80 to .90).

Procedure

A brief pretesting of the imagery task versions revealed that performing the sequential version took considerably longer than the parallel version. Therefore, it was decided to administer the additional dispositional questionnaires only to the participants who received the parallel version of the imagery task. In total, 631 subjects performed both the parallel version of the imagery task and the dispositional questionnaires; 201 subjects performed the sequential version of the imagery task. All questionnaires were administered in Dutch. Each participant was randomly assigned to one

of the task versions. Participants were given one class hour (50 minutes) for completion; all participants completed the task within this time limit.

Analyses

The data array were analysed by means of the Tucker3-Hierarchical Classes (Tucker3-HICLAS) algorithm for three-way binary data (Ceulemans, Van Mechelen, & Leenen, 2003). Hierarchical classes models have proved their usefulness in a variety of research domains (e.g., De Boeck & Van Mechelen, 1990; Reid & Deaux, 1996; S. Rosenberg, 1989), including contextualised personality psychology (Vansteelandt & Van Mechelen, 1998, 2006). In the current study, the data available from the imagery task provide information on the appraisal and anger reactions to a set of situations by a large group of participants. Once dichotomised (replacing a value of 2 = *quite strongly* and 3 = *very strongly* by 1, and a value of 0 = *not at all* and 1 = *only a bit*, by 0) these data may be organised into a three-way situation × anger component × person binary data array. The Tucker3-HICLAS algorithm searches for a parsimonious (in terms of low level of complexity) yet optimal (in terms of degree of approximation of the data) description of the relations present in the data. To this end, the algorithm derives: (a) clusters of persons ("person types") that have similar anger component profiles across the situations; (b) clusters of situations to which individuals emotionally respond in similar ways; and (c) clusters of anger components that co-occur across persons and situations. Additionally, the algorithm derives association rules between these three sets of clusters that indicate whether a particular person type displays a particular anger component cluster in a particular situation cluster or not. Combined, the results thus reveal how each person type is associated with distinct sets of if (situation cluster) then (anger component cluster) profiles. For a more elaborate description of the model, we refer to Ceulemans et al. (2003). On the basis of the Tucker3-HICLAS description of the relations present in the data, one can then derive: (a) individual differences in the links between situation characteristics and emotion components by examining how different person types respond to different situation clusters; and (b) individual differences in the relations between appraisals and subjective anger experience by examining how person types differ in the patterns of appraisals that accompany anger across different situation clusters.

Additionally, the person types derived from the Tucker3-HICLAS model were further characterised and compared with respect to the dispositional variables. To this end, mean scores on each of the dispositional questionnaires were calculated for each person type. For each questionnaire,

pairwise *t*-tests were performed in order to determine on which dispositional variables the person types significantly differed from one another.

RESULTS

Multiple Tucker3-HICLAS analyses of increasing complexity (reflected by the numbers of clusters) were performed on the imagery task data. On the basis of the selection rule described in Ceulemans et al. (2003) a solution that comprised three (partially overlapping) clusters of situations, four distinct person types, and four anger component clusters (with other accountability and unfairness clustering together) was selected. In terms of fit, this solution correctly represented 80% of the original data. In what follows, we will discuss the situation clusters, followed by a description of the person types and the resulting individual differences.

Situation clusters

Table 1 lists shortened descriptions of all unpleasant situations that were included in the imagery task and indicates to which cluster(s) each situation belongs based on the Tucker3-HICLAS analysis. On the basis of this, the situations can be grouped into classes, with situations from each class belonging to the same set of clusters (see Table 1). A substantive interpretation of the classification can be obtained by deriving cluster characteristics, features that characterise all situations that belong to the same cluster, but not situations that do not belong to this cluster (similar to interpreting factors in factor analysis): (0) As can be derived from Table 1, situation class 0 does not belong to any of the clusters. When inspecting the situations that constitute this class (see Table 1), all situations yield no or only *little disadvantages*, with *little at stake* for the protagonist in the situation as compared to all other situations (e.g., your sibling wakes up with a high fever in the morning; you're alone at home and you're bored); hence, they did not elicit any of the anger components included in this study. (1) Cluster 1 (containing situation classes 3 and 5) contains situations in which a clear *norm-violation* by another person occurs (e.g., you are blamed for someone else's failures; your sibling sneaks out when you both have to clean up). (2) Cluster 2 (situation classes 1, 3, 4 and 5) contains situations that implied some *externally induced disadvantage* (e.g., your computer destroys an important floppy disk; a fellow student fails to return your notes the day before the exam). Note that this feature also applies to all situations that involve norm violation. (3) Cluster 3 (situation classes 2, 4 and 5) consists of situations that contain *negative evaluative self-relevant information* (e.g., you are in love with someone but he/she is not interested; you work hard on an

assignment and it is still not better than your previous work). Situations that belong to more than one cluster incorporate the features of all clusters to which they belong (e.g., in situations from situation class 4 there is an externally induced disadvantage, and the situations contain negative evaluative self-relevant information).

In order to empirically corroborate our intuitive interpretation of the situation clusters, we asked 12 experts (researchers in personality and social psychology) to evaluate the situations with respect to the characteristics we had assigned to the situation clusters. In particular, the experts judged each of the situations (on a scale ranging from 0 =*does not apply* to 3 =*applies very strongly*) with respect to how much they were characterised by the following features: To what extent "is there something at stake for the protagonist in the situation?" (aimed to distinguish situations from situation class 0 vs. the rest), "does someone violate a norm" (aimed to distinguish situations from cluster 1 vs. the rest), "is someone or something outside the protagonist responsible for what has happened" (aimed to distinguish situations from cluster 2 vs. the rest), and "does this situation contain evaluative self-relevant information for the protagonist" (aimed to distinguish situations from cluster 3 vs. the rest). The experts mutually strongly agreed in their evaluation of the situations, with Cronbach alphas between .91 and .98, and intra-class correlation coefficients (i.e., ICC(2,k); Shrout & Fleiss, 1979) between .86 and .97 ($p < .0001$) for the separate items. Figure 2 displays the average expert ratings per situation class. The expert ratings clearly corroborated our intuitive interpretations of the unpleasant situation clusters: Panel (a) shows that in the situations from situation class 0, there is very little at stake compared to the other situations (the difference being significant, $t = -6.21$, $p < .001$); panel (b) shows that norm violation only occurs in situation classes 3 and 5, together forming cluster 1 ($t = 9.71$, $p < .001$); panel (c) shows that higher levels of external responsibility characterised situations from situation classes 1, 3, and 5, together forming situation cluster 2 ($t = 4.56$, $p < .001$); and panel (d) shows that higher levels of evaluative, self-relevant information characterised situation classes 2, 4, and 5, together forming cluster 3 ($t = 5.73$, $p < .001$).

Person structure

The model yielded 4 different person types, which were given neutral labels: Person type 0 (containing 147 or 18% of the participants) consisted of participants that experienced none of the anger components in any of the situations; the remaining three person types, Person types 1, 2 and 3, contained 269 (32%), 67 (8%), and 349 (42%) participants, respectively. Each of these person types was characterised by specific situation–anger component
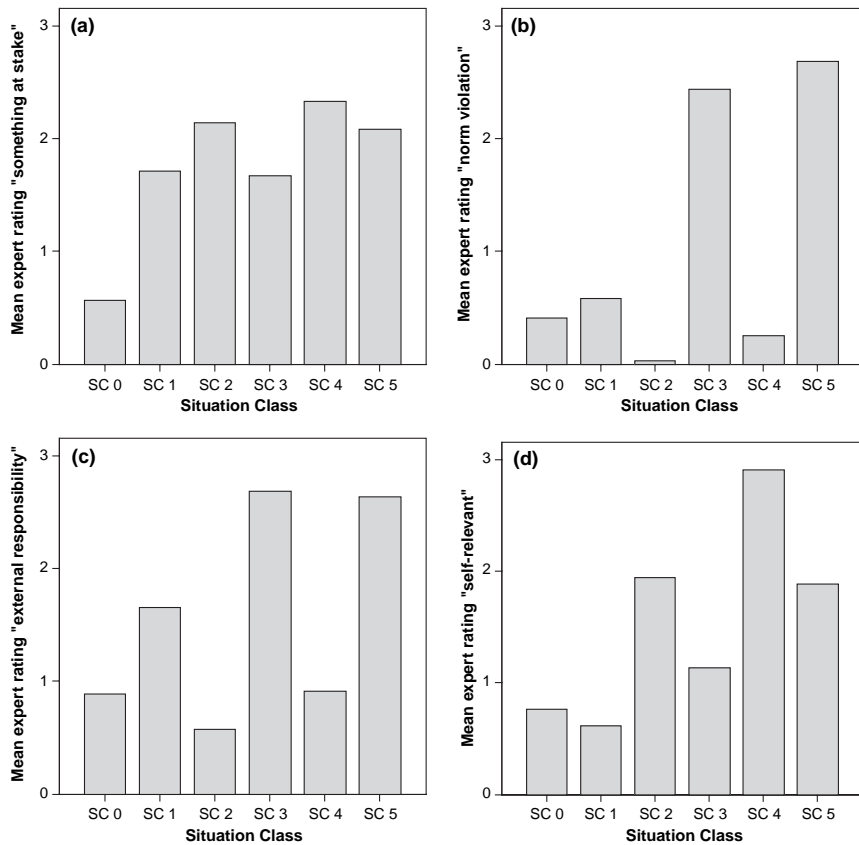
Figure 2. Average expert ratings of the situations per situation class with respect to (a) something being at stake for the protagonist in the situation; (b) occurrence of norm violation; (c) external responsibility; and (d) self-relevant evaluative information.

profiles, which are depicted in Figure 3 (situations in which little is at stake are not displayed in this figure; in such situations none of the participants experienced any of the anger components under study). We will now further discuss the person types in terms of (a) the anger components they experience as a function of the situational characteristics, and (b) relations between the appraisals and the subjective experience of anger. For each, we will first discuss findings that hold for all participants (i.e., the general psychology). Next, we will focus on individual differences in these links.

Link between situational characteristics and anger components.   As can be derived from Figure 3, only in situations that involve an externally induced unpleasant event (including all norm violation situations), anger was
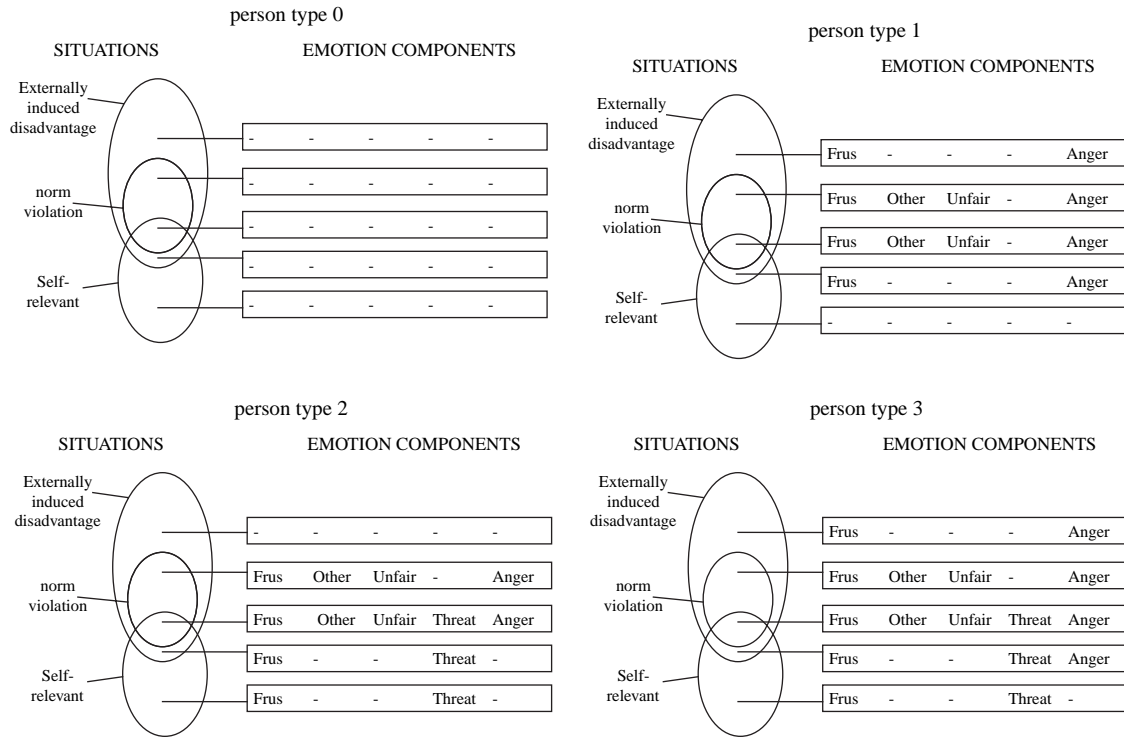
Figure 3. Anger component patterns experienced by the different person types in different types of situations. The leftmost part of each subfigure displays the situation clusters characterised by their situational characteristics; the rightmost part displays the experienced anger components in each situation type. *Frus* = appraisal of frustration; *Other* = appraisal of deliberate other accountability; *Unfair* = appraisal of unfairness; *Threat* = appraisal of threat to self-esteem; *Anger* = subjective experience of anger.

possibly experienced; mere negative evaluative self-relevant situations did not elicit anger for any of the person types. Furthermore, situations that involve norm violation were appraised by all person types as frustrating, as someone else being deliberately accountable, and unfair, and all person types (except person type 0) reported experiencing anger in such situations.

The person types differed, however, in several important respects. First, the participants from person type 0, unlike those from all other person types, did not experience any of the anger components in the situations under study. Second, if a situation solely involved an externally induced disadvantage, person types 1 and 3 experienced frustration and anger, whereas person type 2 did not. Third, if a situation merely contained self-relevant, negative evaluative information, only participants from person types 2 and 3 experienced threat to self-esteem along with frustration. As a result of the previous differences, the participants differed with respect to the extent and types of situation that were appraised as frustrating: person type 3 appraised frustration in all displayed situations (five situations types); person type 2 in situations that contain norm violation and/or self-relevant evaluative information (four situation types); person type 1 in situations that involve an externally induced disadvantage (four situation types); and person type 0 in none of the situations.

Link between appraisals and subjective experience of anger. From the situation–anger component profiles displayed in Figure 3, it is possible to derive which appraisals were necessary and/or sufficient for anger for each of the person types. Note that we consider necessity and sufficiency in logical terms: An appraisal is necessary for anger when it holds that "if anger occurs, then the appraisal occurs"; an appraisal is sufficient when it holds that "if the appraisal occurs, then anger occurs" (see also, Kuppens et al., 2003). An overview of these relations is given in Table 2. First, for all person types, frustration was a necessary component of anger: If anger occurred, then frustration also occurred (but not vice versa). Second, for all person

TABLE 2
Necessity and sufficiency of appraisals for anger as a function of person type

Appraisal	Person type 1	Person type 2	Person type 3
Frustration	n,s	n	n
Deliberate other accountability	s	n,s	s
Unfairness	s	n,s	s
Threat to self-esteem	–	–	–

Note: "n" =is necessary for anger, meaning that if anger occurs, then the appraisal occurs; "s" =is sufficient for anger, meaning that if the appraisal occurs, then anger occurs; "–" =neither necessary nor sufficient.

types, whenever a situation was appraised in terms of deliberate other accountability and unfairness, anger was experienced (i.e., in logical terms, the appraisals are sufficient for the occurrence of anger).

From Table 2, it further follows that individual differences showed up in the relations between several appraisals and the subjective experience of anger. First, for person type 1, unlike for the other person types, frustration appeared to be sufficient for anger; this means that for this person type, it holds that if frustration was experienced, anger was experienced as well. Second, for person type 2 deliberate other accountability and unfairness were necessary for the occurrence of anger but not for person types 1 and 3. This means that person types 1 and 3, unlike person type 2, reported experiencing anger in absence of these appraisals. The latter further implies that, compared with person type 2, person types 1 and 3 experienced anger in a broader range of situations, as may also be read from Figure 3. As a result, these findings demonstrate that anger can occur in combination with a variety of different patterns of appraisals across situations and across participants.

Characterisation of person types in terms of dispositional variables. Table 3 shows the mean scores of the person types on the dispositional questionnaires, as well as results of pairwise *t*-tests (performed for each

TABLE 3
Means and standard deviations of each of the person types on the dispositional questionnaires

Dispositional questionnaire	Person type 0	Person type 1	Person type 2	Person type 3
Trait Anger Scale (van der Ploeg et al., 1982)				
M	1.01_a	1.19_b	1.25_b	1.45_c
SD	.50	.53	.50	.58
Self-esteem Scale (M. Rosenberg, 1989)				
M	1.92_a	1.91_a	1.65_b	1.72_b
SD	.56	.53	.56	.60
Tendency to experience goal-blocking				
M	$.76_a$	$.89_b$	1.04_b	1.12_c
SD	.59	.62	.44	.65
Tendency to attribute events to others				
M	$.70_a$	$.71_a$	$.80_{a,b}$	$.85_b$
SD	.63	.60	.72	.56
Tendency to experience unfair treatment				
M	$.92_a$	1.04_a	1.26_b	1.32_b
SD	.63	.66	.67	.66

Note: Means in the same row that do not share subscripts differ at $p \leq .05$ in pairwise *t*-tests.

questionnaire separately). From this table, several interesting findings emerge that are in line with the characterisation of the person types derived from the Tucker3-HICLAS analysis: Participants from person type 0, who displayed no responses according to the model, were characterised by lower scores on all appraisal tendencies and trait anger. Such individuals are thus less prone to experience the various anger appraisals and, consequently, anger. With respect to self-esteem, person types 2 and 3 had a significantly lower self-esteem compared with person types 0 and 1, in line with the fact that only the former person types experienced threat to self-esteem and frustration in situations that contained self-relevant negative evaluative information. Interestingly, these person types with lower self-esteem were also charac-terised by higher tendencies to experience unfairness. Furthermore, the differences between the person types with respect to the general tendency to experience goal blocking and also trait-anger mirror their situational experience of frustration (i.e., person type 0 did not experience frustration in any of the included situations, person type 3 did so in all disadvantageous situations, and both person types 1 and 2 did so in a subset of the disadvantageous situations). Finally, no notable differences between the person types were found with respect to the tendency to attribute events to others.

DISCUSSION

Appraisal and emotion are generally considered to occur as a result of the interaction between situation and person characteristics. Surprisingly, however, few research efforts have been made to pinpoint the elements that define this interaction. Therefore, with the present study, we examined individual differences in situation-specific appraisals and anger experience and in the relations between both. Above all, the results revealed that anger is associated with a complex but intelligible interplay of objective situation characteristics, appraisals, and dispositional variables. As such, this study fully exploited the interactional nature of the appraisal approach to emotions in which person–environment relationships are seen as the cradle of emotional life. In the remainder of this section, we will first discuss general findings, followed by a discussion of the identified individual differences in anger and appraisal and the implications for theories on appraisal and anger.

General psychological findings

Four situation characteristics were identified to play a key role in the experience of the studied anger components: disadvantageous nature of the

situation (something is at stake), externally induced disadvantage, norm violation, and self-relevant, negative evaluative nature of the situation. Our findings suggest that at the basis of the experience of anger and its components lies a situation that is characterised by an externally induced disadvantage in which something is at stake for the person. This result is in line with one of the basic tenets of current emotion theory that a situation has to affect an individual's concerns or goals in order to elicit emotional responses (see, e.g., Frijda, 1986; Smith & Lazarus, 1993; Scherer, 1993); as such, the disadvantageous nature could be seen as reflecting the relevance of the situations for negative emotions. Moreover, it was found that if disadvantageous situations also involved the violation of a norm, almost all participants reported experiencing anger, as well as most of its appraisals (e.g., frustration, other accountability, unfairness), implying that norm violation can be seen as a sufficient situational characteristic to elicit anger (for at least the vast majority of the individuals).

Regarding the relations between anger appraisals and experience, our results demonstrated that the appraisal of frustration appears to be a necessary component of anger, whereas this is not the case for the appraisals of deliberate other accountability and unfairness. In other words, anger was necessarily experienced in conjunction with appraised frustration, but not necessarily in conjunction with the appraisals of other accountability and unfairness. These findings are in line with Berkowitz' (1989) review of evidence with regard to the frustration–aggression hypothesis, in which he argues that anger and aggression can arise from frustration even when the goal-blocking is not viewed as illegitimate or intentional. Also, more recently, Berkowitz and Harmon-Jones (2004) argued that aversive, frustrating circumstances constitute the core elicitor of anger, with other appraisals not being necessary for this emotion to occur. The possibility of anger occurring in absence of a deliberate wrongdoer has also been suggested by other authors (Frijda & Zeelenberg, 2001; Kuppens et al., 2003; Parkinson, 2001), but would be contested by others (Smith & Kirby, 2004), however (see below).

Individual differences

More importantly, however, our results revealed the existence of individual differences in the studied relations between situational characteristics, anger appraisals, and the subjective experience of anger. Furthermore, these differences were meaningfully related to several relevant dispositional person characteristics. For one, a person type was identified that did not experience any of the anger components in the presented situations. Individuals from this person type were characterised by lower levels of trait-anger and anger

appraisal tendencies as compared to the other person types. Thus, individuals who are not easily angered are so because they have high thresholds for being troubled with respect to appraisal dimensions relevant for anger. Along similar lines, across all person types, the general tendency to experience goal-blocking seemed to be highly relevant for the contextual appraisal of frustration, as the level of this tendency characterising the different person types was found to be proportional to the variety of situation types in which the appraisal of frustration was reported.

The person types that did report appraisals and anger further differed from one another in two important respects. First, individuals of two person types reported experiencing anger and frustration in situations that merely involved an externally induced disadvantage, whereas for individuals of another person type, a situation had to be additionally characterised by norm violation and appraised as deliberately caused and unfair in order to experience anger. As such, our results showed that the overall lack of necessity of the appraisals of deliberate other accountability and unfairness for the experience of anger in fact can be attributed to individual differences in the relations between these appraisals and anger, with necessity characterising the relation for some, but not for all persons.

Second, the findings with respect to threat to self-esteem are perhaps the most illustrative in capturing the interactional nature of the appraisal process. From the situation side, the results showed that an unpleasant situation must be evaluative in nature and relevant to an individual's Self in order to give rise to the experience of a threatened self-esteem, along with frustration. From the person side, it appears that a low self-esteem along with a tendency to experience unfairness predisposes an individual to experience threat to self-esteem. Experiencing threat to self-esteem was found to be a result of the interaction between both, however, in that a lower self-esteem and unfairness tendency facilitate the experience of threat to self-esteem, only in situations that are relevant to the Self. Persons with a lower self-esteem may thus be especially sensitive to situations that involve (negative) self-relevant evaluative information, leading to a lower threshold for experiencing threatened self-esteem and frustration in such cases (see also, Kernis et al., 1989; Stake, Huff, & Zand, 1995). Furthermore, a threatened self-esteem accompanies the experience of anger in low self-esteem and unfairness prone individuals when such situations also involve norm violation. As such, the findings are in line with previous research that relates low self-esteem and threats to self-esteem to anger (e.g., Herrald & Tomaka, 2002; Kernis et al., 1989). Our findings, however, do not seem to corroborate the view that relates a threatened high, and unstable, self-esteem to anger and violence (e.g., Baumeister et al., 1996). Given the key role of instability of self-esteem in the latter, a direct comparison between such accounts and our findings is somewhat difficult. Our findings do suggest,

however, that unpleasant evaluative situations must be additionally char-acterised by other anger-relevant situational features, in order to possibly elicit the experience of anger.

IMPLICATIONS FOR THEORIES OF APPRAISAL AND ANGER

Overall, the results demonstrated that anger can occur in combination with various different patterns of appraisals, meaningfully varying across persons and situations: Although the experience of anger was always accompanied by the appraisal of frustration, there exist individual differences in whether the pattern of appraisals that co-occurred with anger included other accountability, unfairness or threat to self-esteem, or not. In general, such findings contrast with statements that emphasise that an emotion is always accompanied by the same pattern of appraisals (e.g., Roseman & Smith, 2001; Smith & Kirby, 2004), but resonates with statements from other authors that questioned that an emotion can only follow from the generally predicted appraisal pattern for that emotion (e.g., Frijda & Zeelenberg, 2001; Parkinson, 1997, 2001; Scherer, 2001; Shweder, 1993).

The results highlighted a central necessary role of frustration or goal incongruence in the experience of anger, which is in line with both appraisal accounts of anger (see the overview in the introduction) and Berkowitz and Harmon-Jones (2004) neo-associationistic account of anger (in which frustrating circumstances are seen as the sole central determinant of anger). In contrast, however, the appraisals of other accountability and unfairness were not necessary for anger for all individuals: Although some individuals did need a frustrating event to be caused by someone else and unfair in order to experience anger, others did not. This finding is at odds with appraisal accounts that posit fixed appraisal patterns in association with particular emotions (e.g., Roseman & Smith, 2001; Smith & Kirby, 2004).

Above anything else, our results highlight the importance of individual differences for theories on anger and appraisal. Theories that state that emotions are always accompanied by fixed appraisal patterns need to acknowledge that for some individuals, certain appraisals may not be needed for an emotion to be experienced. Conversely, theories that posit minimal prerequisites for emotion elicitation—for instance, that frustrating events are a sufficient condition for anger (Berkowitz & Harmon-Jones, 2004)—need to acknowledge that this may not hold for everyone, and that for some indivi-duals additional conditions may need to be met for them to experience a particular emotion. In sum, our suggestion indicates that both types of appro-aches need to be more specific in formulating the conditions under which particular appraisals are related to particular emotions, as the present study did for anger. We believe that only by incorporating such more fine-grained

relationships and by taking into account both person and situational factors, theories of emotion elicitation can make progress in understanding and predicting the processes that underlie emotional experiences. An important question that remains, however, is how much of the variability in emotional experience is eventually due to individual differences in how situations are appraised and to individual differences in appraisal–emotion relationships. Future research is needed, however, to answer this question.

Concluding remarks

The found necessity of frustration for the experience of anger may be seen as being at odds with the assertion that it is impossible to formulate necessary components of emotions (e.g., Kuppens et al., 2003; Russell, 2003; Russell & Fehr, 1994; Shaver, Schwarz, Kirson, & O'Connor, 1987). In the present case, the nature of the technique used to analyse the data may lie at the base of this seeming contradiction: The Tucker3-HICLAS solution provides an approximate summary description of the data, such that a maximum number of data points (in the present case 80% of the data points) is correctly represented by the model. However, in the raw data response patterns exist that deviate from the summarising patterns that are formulated by the model. Upon inspection of the raw data, there are indeed several instances in which anger is experienced without the appraisal of frustration (and thus in which the appraisal is not necessary for anger). However, the occurrence of such cases is ruled over by the overall summarising description by the model.

It should be noted that our findings may be limited in that they are based on self-reported responses in reaction to hypothetical situations. Although such methods have been proven to produce valid information regarding appraisal and emotion (Schorr, 2001), the results may possibly be affected by implicit theories of the participants about the experience of the appraisals and anger. We therefore believe it is important that our findings be replicated and extended using other methods as well (e.g., on-line reactions to real-life emotional stimuli). Nevertheless, the presented research yielded intricate and meaningful configurations of the experience of anger, and demonstrated how the experience of emotion components and their interrelations is a function of person and situation. As such, we hope to contribute to delivering on the promise of appraisal theory of "explaining individual differences in emotional reactions, as well as how emotional reactions can be highly context sensitive" (Smith & Kirby, 2001, p. 124).

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