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Multidimensional individual differences in anger-related behaviors

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Abstract

In this study, we investigate the individual difference structure of anger-related behaviors. In particular, we examine the extent to which individual differences in anger-related behaviors are multidimensional (that is, behavior- and/or situation-specific), and how the resulting individual differences dimensions relate to traditional dispositional variables. For this purpose, participants were asked to recall anger instances in which they had been angry with someone else, who was either of a higher, an equal, or a lower status. Next, they were asked to indicate, for each recalled situation, the degree to which they had wanted to display and had actually displayed each of a set of eight anger-related behaviors. Subsequently, they completed dispositional questionnaires. The results clearly demonstrated that there are considerable and multidimensional individual differences in anger-related behaviors that primarily pertain to three different behavior domains: external aggression, tension reduction, and communication.
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Keywords: Anger-related behaviors; Individual differences; Multidimensionality; Behavior specificity; Contextualised personality psychology

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1. Introduction

Several authors have underscored the obvious link between anger and behavior (e.g., Berkowitz, 1994; Rubin, 1986). As such, angry people may often feel an urge or action tendency to display anger-related behaviors. Moreover, individual differences may occur in this regard: Not everyone, if angry, will behave in a similar way (e.g., Böddeker & Stemmler, 2000).

An important question regarding individual differences in anger-related behaviors is how specific or differentiated they are. One possibility is that they are one-dimensional, meaning that all individuals can be situated on a single anger–behavior dimension. Depending on their score on this dimension, persons will then display more or less anger-related behaviors. An alternative may be that individual differences in anger–behaviors are multidimensional, with different dimensions possibly pertaining to different types of behaviors, to different types of situations the anger-related behaviors are displayed in, or to different types of situation–behavior combinations.

So far, there are theoretical and empirical indications that individual differences in anger-related behavior may be multidimensional. From a theoretical point of view, claims for multidimensionality link up with contextualised personality psychology, which focuses on individual differences in particular "if situation–then response" links (Mischel, 2004; Mischel & Shoda, 1995). On an empirical level, evidence for behavior-specific multidimensionality of individual differences in anger-related behaviors can be found in the research on the traditional 'anger-in' and 'anger-out' response styles (Spielberger, Krasner, & Solomon, 1988). Empirical evidence for individual differences with regard to particular situation–behavior combinations was found by Vansteelandt and Van Mechelen (1998), who for instance reported individual differences in the display of intentional hostile behaviors in frustrating situations with minor consequences, next to other individual differences in the display of automatic hostile reactions in frustrating situations with severe consequences.

With the present study, we will address the issue of individual differences in anger-related behaviors. In particular, we will investigate the extent to which these individual differences are multidimensional, and behavior- and/or situation-specific, and how they relate to some traditional dispositional variables.

As to the behaviors we included in our study, recent research has demonstrated that, apart from aggression, a wide variety of non-aggressive behaviors is associated with anger (Linden et al., 2003; Van Coillie & Van Mechelen, in press). For the present study, we therefore relied on a comprehensive anger-related behavior taxonomy consisting of overt behaviors (Van Coillie & Van Mechelen, in press) that was systematically derived from free-listing data. The taxonomy in question encompasses three aggressive (physical, verbal and self-aggression) and five non-aggressive behavior categories (talk, flight, shattered, behaviors to decrease tension, and behaviors to let the anger fade away). In Table 1, one may find a detailed description of these categories, together with some illustrative examples.[1]

With regard to the situations we included in our study, as anger is generally conceived as an interpersonal emotion (e.g., Averill, 1982), we focused on a situational feature that pertains to the relation between the angry person and the target of the anger, namely the status of the latter.

[1] As behavior examples, we took for each behavior category, the three behaviors that were most frequently reported in the study of Van Coillie and Van Mechelen (in press).

Table 1
Overview of behavior categories and selected examples

Label of behavior category	Description of behavior category	Selected examples
Physical aggression	Every form of physical aggression	Slamming doors, hitting someone, throwing things
Verbal aggression	Every form of verbal or non-physical aggression	Screaming, shouting, cursing
Self-aggression	Aggression directed towards yourself	Starting to drink, hurting yourself, working it off in yourself
Talking about your anger	Talking about your anger with the person at whom you are angry or with other persons, without using verbal or physical aggression	Talking, talking about it with someone else, going to a friend
Turning yourself away	Turning yourself away physically, non-verbally, or verbally from the person at whom you are angry or from the physical situation, without doing something else	Running away, going away, being silent
Showing that you are moved	Showing that you are shattered or moved, without showing any form of aggression to other persons	Weeping, crying, sighing
Decreasing tension or relaxing yourself	Working off tension in a non-destructive way or relaxing oneself	Playing a sport, running, listening to music
Trying to let your anger fade away	Trying to, within oneself, cognitively or passively, let the anger disappear or fade away	Putting things in perspective, doing nothing, staying calm

In previous studies, it has been demonstrated that this target status may influence the display of anger-related behaviors, in that people are more likely to express their anger towards a lower status target than towards a higher status one (e.g., Allan & Gilbert, 2002; Kuppens, Van Mechelen, & Meulders, 2004). Moreover, in some studies individual differences have been found in the occurrence of this status-effect (Allan & Gilbert, 2002). In our study, we selected three values for status (higher, equal and lower as compared to the status of the angry person), and, in line with the results of Allan and Gilbert, we expect to find individual differences in the display of anger-related behaviors towards persons with a lower status.

As to the dispositional variables that we will investigate in relation to individual differences in anger-related situation–behavior combinations, we will include the Big Five personality traits (Costa & McCrae, 1992), of which in past research predominantly neuroticism, extraversion, and agreeableness have been related to anger and anger behavior (e.g., Böddeker & Stemmler, 2000; Martin, Watson, & Wan, 2000). Furthermore, we also included the habitual anger expression styles of anger-in, anger-out, and anger-control, as well as trait-anger (Spielberger et al., 1988; Spielberger & Sydeman, 1994). We hypothesize that especially individual differences in aggression will relate to several dispositional variables, with more agreeable people, and people scoring high on anger-in and/or anger-control displaying less, and people scoring high on trait anger and/or anger-out displaying more aggression (e.g., Deffenbacher, Oetting, Lynch, & Morris, 1996; Martin et al., 2000; van Elderen, Maes, Komproe, & van der Kamp, 1997).

Note also that so far, we only discussed individual differences in displayed behaviors. Nevertheless, many anger-related behaviors may be inhibited (e.g., Averill, 1982). Consequently, in this study, we will not only consider individual differences in behaviors people actually do, but also

in behaviors they want to do (i.e., action tendencies). We hypothesize that individual differences will show up for displayed behaviors as well as for action tendencies.

2. Method

2.1. Participants

Participants were 393 psychology students of the University of Leuven. Participation in the study was in partial fulfillment of a study course requirement. Participants who had missing values for more than one situation were excluded from the sample. This was the case for 29 persons, which left us with a final sample of 364 participants, of which 59 were men and 305 women. Their mean age was 18.53 years (SD = 1.80).

2.2. Materials

A cued-recall task and three standard personality questionnaires were used to assess the variables of interest. All four will now be discussed in more detail.

2.2.1. Cued-recall task

To examine which anger-related behaviors participants wanted to display and displayed in three different pre-specified situation types, we made use of a cued-recall task that consisted of two parts. In the first part, participants had to recall nine recently experienced anger instances in which they had been angry with someone else, who had either a higher, an equal, or a lower status (three situations each). In the second part, participants had to indicate the degree to which they had wanted to display and had actually displayed each of the above-mentioned anger-related behaviors (see Table 1) making use of an eight-point Likert scale, ranging from (0) "never" to (7) "a lot", and this separately for each recalled situation. As such, participants had to rate 144 (9 situations × 2 want vs. do × 8 behaviors) situation–behavior items.

2.2.2. NEO-FFI personality questionnaire

The NEO-FFI personality questionnaire was originally developed by Costa and McCrae (1992). It was adapted to Dutch by Hoekstra, Ormel, and De Fruyt (1996), the Dutch version being an exact translation of the original English version. The questionnaire consists of 60 items, grouped into five scales of 12 items that measure the Big Five personality dimensions of extraversion, neuroticism, openness, agreeableness, and conscientiousness. Cronbach alpha coefficients for the five scales are 0.77, 0.88, 0.71, 0.68, and 0.80, respectively. Respondents were asked to indicate the degree to which they agree or disagree with each of the statements, using a five-point Likert scale ranging from (0) "strongly disagree" to (4) "strongly agree".

2.2.3. Self-Expression and Control Scale

The Self-Expression and Control Scale (van Elderen et al., 1997) is a 40-item self-report instrument consisting of four subscales: anger-in, anger-out, anger-in-control, and anger-out-control. Each scale consists of 10 items. Cronbach alpha coefficients for the four scales are 0.90, 0.86,

0.94 and 0.91, respectively. The questionnaire is an extension of the widely used Anger-Expression scale (Spielberger et al., 1988). Respondents were asked to indicate the degree to which they generally experience each of the items using a four-point Likert scale, ranging from (1) "almost never" to (4) "almost always".

2.2.4. Self-Analysis Questionnaire

The trait-anger scale of the Self-Analysis Questionnaire (Van der Ploeg, Defares, & Spielberger, 1982), which is the Dutch translation of the trait-anger scale developed by Spielberger et al. (1988), was administered to measure trait-anger. This 10-item scale measures individual differences in the disposition to experience anger. The internal consistency of the scale was high, the Cronbach alpha coefficient equaling 0.87. Respondents had to indicate on a four-point Likert scale, ranging from (1) "almost never" to (4) "almost always", the degree to which they agree or disagree with each of the statements.

2.3. Procedure

Participants were tested in small groups, ranging between 20 and 40 persons, during two separate sessions. In the first session, participants completed the cued-recall task, finishing in an hour or less. In the second session, which took about 30 min, participants completed the three personality questionnaires.

Before starting with the cued-recall task, participants were informed that the aim of this task was to discover which behaviors people want to display and actually display when they are angry with someone else. Next, they were told that they would have to generate nine situations; first three situations in which they had been angry with someone of a higher status, then three situations in which they had been angry with someone of an equal status, and then three situations in which they had been angry with someone of a lower status. They were told that, whereas the specific situations had to differ, the target did not have to differ across the three situations that referred to the same status. For each situation, participants were asked to write down briefly what had happened and at whom the anger was directed, in order to ensure that they recalled an actual instance they had experienced themselves.

After having completed these nine open-ended questions, participants were instructed to look back at the description of each situation, to imagine that they were again in it, to feel again what they had felt, and to remember what they had thought, wanted to do and had done. Next, they had to indicate to what extent they had wanted to display and had actually displayed each of a list of eight anger-related behaviors. On an adjacent sheet, an extensive description of the eight behaviors was provided, together with three specific instances of each (see Table 1). In this way, participants answered, successively for each generated situation, 16 behavior-related questions (first eight want-questions, then eight do-questions).

3. Results

As our data set consists of behavioral ratings for all combinations of persons, situations, and behaviors (i.e., numerical three-mode three-way data, Carroll & Arabie, 1980), the use of

three-mode component analysis (3MCA; Kroonenberg & deLeeuw, 1980; Tucker, 1966) is appropriate. As a generalization of principal component analysis, which is a technique designed for the analysis of two-way data, 3MCA is meant for the analysis of three-way data; as such, it allows the researcher to investigate the three modes implied by the data (i.e., in our case: persons, situations and behaviors) simultaneously. This is particularly interesting in the present study, since we want to investigate the individual difference structure in situation-specific anger-related behaviors. More precisely, 3MCA allows us to check whether the individual differences as present in our data are multidimensional, and if so, whether they are behavior- and/or situation-specific. For this purpose, 3MCA searches for three limited sets of unobserved components defined on the three data modes (Kiers & Van Mechelen, 2001; Van Mechelen & Kiers, 1999). Furthermore, 3MCA includes a small three-way array, called the core, to relate the components of the three modes to each other. In our case, it yields a concise description of the individual differences structure in situation–behavior combinations.

First, we calculated average scores over the three situations referring to one situation type (higher, equal, or lower status) to eliminate variation due to other situation characteristics. Subsequently, we fitted 3MCA-models with the number of person and behavior components ranging from one to five, and with the number of situation components being fixed on three. Note that the latter means that the situation mode is not reduced. This was done because this mode contains three situation types only. The first, second, and third situation component get a score of one for the situations in which the target has a higher, an equal, and a lower status, respectively (their other scores being equal to zero); therefore, they are labeled 'higher', 'equal', and 'lower', in that order. A numerical convex hull based scree test (Ceulemans & Kiers, in press) further suggested a solution with four person and three behavior components. This model accounted for 79.75% of the total variance. To check the stability of the selected solution, the data set was divided into two equally large parts, based on a random split of the set of persons. On both halves, 3MCA-analyses with the same numbers of components were conducted. Congruence coefficients with values all above 0.88 showed that the resulting solutions were highly similar to that of the full data set.

Table 2 presents the component scores for the behaviors. From this table, we first see that the do- and the want-forms of the same behavior always load high[2] on the same behavior component, meaning that the three obtained behavior components always consist of both behaviors people do and behaviors they want to do. Regarding behavioral content, it can be derived from Table 2 that behaviors scoring high on the first behavior component primarily include physical and verbal aggression; hence, this component can be summarized as 'external aggression'. Decrease tension and let fade away (and to a somewhat smaller extent, flight) score high on the second behavior component. Since these behaviors share a reduction of tension or anger-related arousal, we label this behavior component 'tension reduction'. The third component is labeled 'communication', since it has high scores for talk and shattered, which both are behaviors that imply communication, in either a verbal or a non-verbal way. Furthermore, it is interesting to note that, whereas for most behaviors, the want- and do-loadings for one behavior are almost equally high, this is not

[2] In 3MCA, component scores do not represent correlations; accordingly, 'high' does not correspond to, e.g., larger than 0.50 or 0.30.

Table 2
Behavior component scores for both wanted (want) and displayed (do) behaviors

Performance status	Behavior	Behavior component		
		External aggression	Tension reduction	Communication
Want	Physical aggression	**0.35**	−0.02	−0.10
	Verbal aggression	**0.75**	−0.01	0.01
	Self-aggression	0.09	0.01	0.00
	Talk	−0.03	0.06	**0.58**
	Flight	0.15	0.19	−0.01
	Shattered	0.05	−0.06	**0.47**
	Decrease tension	0.03	**0.41**	0.00
	Let fade away	−0.08	**0.54**	0.05
Do	Physical aggression	0.11	−0.01	−0.02
	Verbal aggression	**0.47**	0.04	0.03
	Self-aggression	0.07	0.02	0.00
	Talk	0.00	0.01	**0.52**
	Flight	0.16	0.18	0.00
	Shattered	0.06	−0.04	**0.39**
	Decrease tension	0.03	**0.39**	−0.04
	Let fade away	−0.01	**0.56**	−0.01

Note: Component scores with absolute values > 0.30 have been printed in bold.

the case for physical and verbal aggression: For the latter two behaviors, the want-loadings are higher than their do-counterparts.[3]

To interpret the person components, we make use of Fig. 1, which shows line plots of the core values for the four person components (PC), each plot corresponding to one person component. Each core value shows the extent to which persons scoring high on the corresponding person component (want to) display behaviors that score high on the corresponding behavior component, in the situation that scores high on the corresponding situation component. In this way, it can be read that respondents scoring high on PC1 (line plot 1) (want to) behave aggressively, without differentiating between different types of target status. Respondents scoring high on PC2 (line plot 2) (want to) use tension reduction behaviors in all three situation types. Persons scoring positively high on PC3 (line plot 3) (want to) communicate, yet only when being angry at a target with an equal or higher status. Finally, persons scoring positively high on PC4 (line plot 4) (want to) communicate, yet only when the target has a lower status. Note that we only discuss the most prominent parts of line plots 3 and 4. Indeed, the corresponding person components also imply some other (albeit less striking) individual difference aspects, such as the use of external aggression towards peers for persons scoring high on PC3.

It may further be observed that the third and fourth person components are positively correlated, $r = 0.49$. This sizeable correlation means that persons who (want to) communicate when the target is of an equal or of a higher status, also tend to communicate more when the target

[3] This trend is also reflected in the mean behavioral scores for the eight behaviors (same sequence as in Table 1), which are respectively for the want- and do-items: 0.78 and 0.26; 3.05 and 1.88; 0.35 and 0.34; 3.35 and 2.89; 1.52 and 1.57; 2.33 and 2.03; 2.10 and 1.76; 2.73 and 2.79.

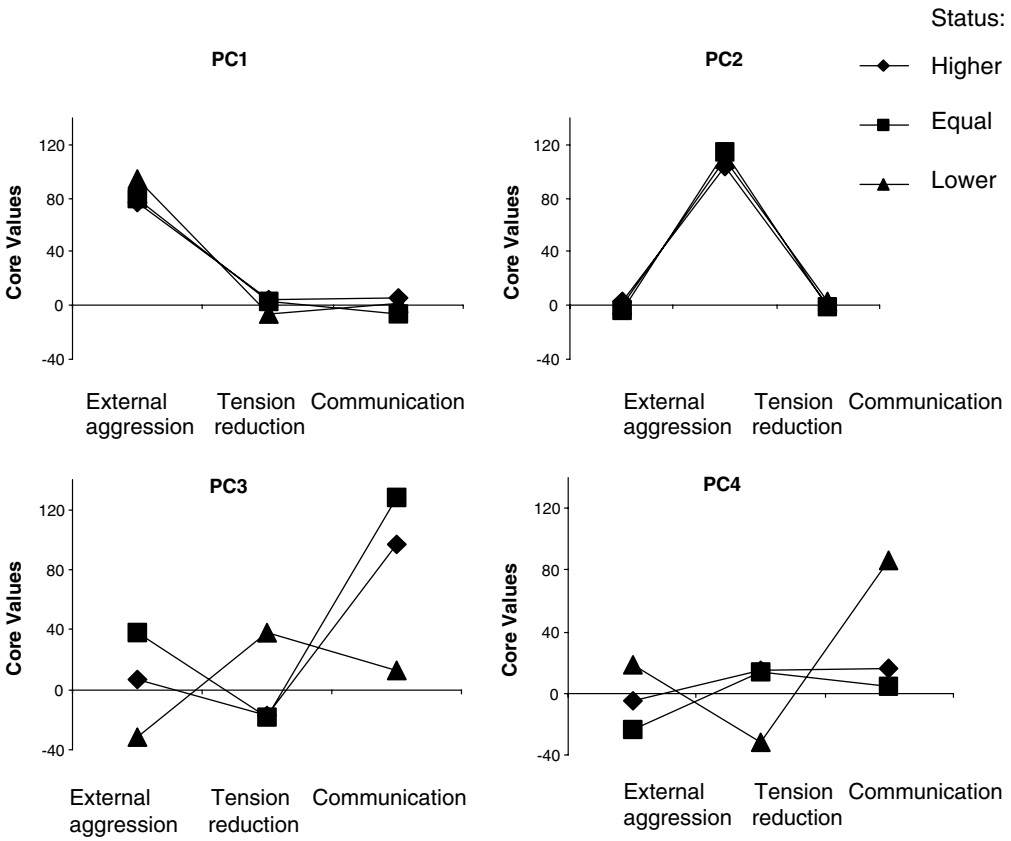

Fig. 1. Line plots of core values, each line plot representing core values for one person component.

is of lower status, and vice versa. This suggests the presence of an individual difference dimension representing the extent to which participants tend to communicate, irrespective of the situational context. However, as the correlation in question is far from perfect as well, there also undoubtedly is situational differentiation regarding communication. Note that all other correlations between person components are smaller than 0.40.

Finally, the person components that were derived from the 3MCA were related to the dispositional questionnaire scores, by means of a canonical correlation analysis. Two canonical correlations were higher than 0.45 (0.50 and 0.48) and significant, $F(50, 935) = 4.76$, $p < 0.0001$ and $F(50, 722) = 4.14$, $p < 0.0001$. The correlations of the person components and the personality scales with their respective canonical variables are displayed in Table 3.

Regarding the first pair of canonical variables, we see on the person component-side a strongly positive correlation for the second component, meaning that this variable represents individual differences in tension reduction behaviors. On the personality scale-side, we see sizeable positive correlations for the two anger-control scales. All this implies that anger-control relates to tension reduction behaviors.

Table 3
Correlations of person components and personality scales with their respective canonical variables

	First pair of variables	Second pair of variables
Person component		
PC1	0.06	**0.86**
PC2	**0.90**	0.04
PC3	−0.02	−0.10
PC4	0.20	**−0.47**
Personality scale		
Neuroticism	−0.30	0.14
Extraversion	0.04	−0.02
Openness	**0.34**	**−0.34**
Agreeableness	0.07	**−0.60**
Conscientiousness	−0.02	**−0.49**
Anger-in	**0.32**	0.14
Anger-out	−0.06	**0.55**
Anger-in-control	**0.82**	**−0.34**
Anger-out-control	**0.36**	**−0.49**
Trait-anger	−0.30	**0.70**

Note: Correlations with absolute values > 0.30 are printed in bold.

Regarding the second pair of canonical variables, we see on the person component-side, a strongly positive correlation for the first and a somewhat lower negative correlation for the fourth component, meaning that this variable primarily represents individual differences in aggressive behavior. On the personality scale-side, we see sizeable positive correlations for anger-out and trait-anger, and negative correlations for agreeableness, conscientiousness, and anger-out-control. All this implies that aggression relates to less agreeableness, less conscientiousness, and less anger-out-control, and to more anger-out and more trait-anger. Note that the same pattern of results showed up in the zero order correlations, although the correlations in question were all considerably lower (i.e., ranging between −0.35 and 0.35).

4. Discussion

In line with previous research (e.g., Böddeker & Stemmler, 2000), the results of this study clearly demonstrated that there are considerable individual differences in anger-related behaviors: Not everyone, if angry, will behave in a similar way. Moreover, the results also demonstrated that these individual differences are multidimensional, and primarily behavior-specific (see also Spielberger et al., 1988). As to the latter, our results show that there are three important anger-related behavior domains in which individual differences may occur: external aggression, tension reduction, and communication.

First, sizeable individual differences have been found indeed in the display of aggression. This individual differences dimension clearly links up with the traditional anger-out expression style

(Spielberger et al., 1988), which is also supported by our canonical correlation analysis. Furthermore, this individual difference dimension also relates in a predictable way to two Big Five factors, agreeableness and conscientiousness, and to trait anger (in line with earlier findings from Deffenbacher et al., 1996, and Martin et al., 2000). Note that, given the individual differences in anger-out behaviors, one might wonder whether clear individual differences in anger-in would also show up. This appeared not to be the case. The latter finding, however, can be attributed in a fairly straightforward way to the fact that anger-in does not include many overt behaviors, as addressed in the present study. On the other hand, we did find individual differences in anger-related behaviors that correspond to anger-in-control, more specifically, in the form of tension reduction behaviors.

Second, we also found individual differences in the display of tension reduction behaviors. Moreover, people who more often use these behaviors also score higher on anger-control, which may be considered fairly tautological, given the considerable overlap between tension reduction and the contents of the anger-control scales.

Another finding we can derive from our results is individual differences in communication, which further appear to be, at least in part, situation-specific. Indeed, on the one hand, individuals differ with regard to the link: 'if angry with someone of a lower status, then communicate'; On the other hand, also individual differences showed up with regard to a similar link, but now with the target being of equal or higher status. Apparently, people who communicate when angry at lower status persons (one particular situation), do not necessarily communicate when being angry at a target of equal or higher status, or vice versa. This finding illustrates the existence of individual difference dimensions that are both situation- and behavior-specific, and, as such, links up with contextualised personality psychology (Mischel & Shoda, 1995; Vansteelandt & Van Mechelen, 1998). Otherwise it is interesting to derive from our canonical correlation analysis that communication when the anger target is of lower status (unlike communication in general) requires people that can be characterized as well-disposed (i.e., agreeable, conscientious, and low in trait anger). One may note that this implies a non-tautological link between the specific individual differences as captured in our study and traditional dispositional variables.

Furthermore, from our results, it appears that individual differences not only show up with regard to behaviors people actually do, but also with regard to mere action tendencies. Moreover, individual differences in displayed behaviors strongly parallel those in the corresponding action tendencies. Furthermore, whereas for most behaviors, the individual differences variance in displayed behaviors is highly similar to that in the corresponding action tendencies, this is not the case for external aggression, for which the strength of the action tendency is much more outspoken. The latter suggests the presence of behavioral inhibition for external aggression, a finding that has often been reported in previous research (e.g., Averill, 1982).

As a final caveat, we must also note that our findings are limited because of the sample we used; as such, our results primarily pertain to young female adults. Also, we only addressed instances of anger within an interpersonal context with a clear target. Yet, the latter should not be too much of a limitation as anger very often (though not always) has an interpersonal target. Otherwise, our instructions did not require the target to be present during the anger episode.

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