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From anger to verbal aggression: Inhibition at different levels

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Abstract

A factor-analytic-based method to measure the inhibition of three verbally aggressive behaviours was investigated in two studies on self-report data. Inhibition was subdivided into two types: inhibition of the tendency to become verbally aggressive and inhibition of the verbally aggressive behaviour. In Study 1, it was investigated whether both kinds can be separated and measured by using a factor-analytic model. In Study 2, the approach was validated by relating both types of inhibition to broad and specific trait measures, either related to behaviour regulation or not. Inhibition of the *tendency* to become verbally aggressive was negatively related to Extraversion and Anger Out, and positively to hostility and a general inhibition measure. The inhibition of verbally aggressive *behaviour* was positively related to Agreeableness, Anger In (keeping anger inside) and anger out control (control of outward expression of anger), and negatively to Verbal Aggression and Anger Out.
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1. Introduction

Anger and verbal aggression are two closely related processes. Anger is often conceived as the emotion which motivates aggression. However, not all aggressive inclinations a person experiences

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are expressed (Averill, 1983). One may withhold an aggressive reaction for several reasons, often even without any conscious reflection, for example because the other person has a higher social rank (Allan & Gilbert, 2001), to avoid negative consequences (Averill, 1983; Beatty & McCroskey, 1997), or to avoid an aggressive counterreaction (Deffenbacher, Oetting, Lynch, & Morris, 1996). We will focus on two different kinds of inhibition related to verbally aggressive (VA) behaviour: the inhibition of the tendency to become verbally aggressive, called Action-tendency Inhibition, and the inhibition of the VA behaviour, called Behaviour Inhibition. Scope is twofold: a method to measure inhibition of VA behaviour is presented and validated, and simultaneously, the empirical differentiation of both types of inhibition is tested.

Measuring inhibition is not straightforward because inhibition is not directly observable. Trying to measure inhibition with a direct, situation-based approach, one can end up with questions like 'How much do you feel inhibited to curse in this situation?' or 'In case you feel a tendency to curse in this situation, to which degree do you inhibit this tendency?' Such direct items may be too complex, certainly if one wants to distinguish between the just mentioned types of inhibition. Alternatively, Smits, De Boeck, and Vansteelandt (2004) successfully developed an indirect strategy to measure inhibition based on a simple view on verbal aggression. An extensive description of the theoretical framework can be found in Smits et al. (2004); here a short description will be presented. It is assumed that anger feelings feed the tendency to react in a VA way, the VA action-tendency, (Anderson & Bushman, 2002; Frijda, 1986; Kinney, Smith, & Donzella, 2001), and the VA action-tendency can be seen as the basis of VA behaviour (Frijda, 1986; Frijda, Kuipers, & Schure, 1989). Whether inhibition is present or not, can be derived from anger feelings without a VA action-tendency or from a VA action-tendency without a VA behaviour (see Fig. 1 for a graphical representation).

In a first study, we tested whether it is possible to distinguish both types of inhibition. As a result, a situation-based measure of anger and indirect measures of both inhibition types are obtained. In the second study, first, we tested whether the results can be replicated, and second, the inhibition measures will be related to external variables of three types: the big five personality dimensions, behaviour regulation variables, and specific trait variables concerning anger and aggression. The relations with external variables are important from a theoretical and a validity point of view.

2. Study 1: Measuring inhibition

2.1. Method

2.1.1. Participants

The participants were 361 first-year psychology students (60 males, 299 females, 2 gender unknown; average age = 18.6, SD = 1.81). Participation was a partial fulfilment of a requirement to participate in research.

2.1.2. Materials

To measure both types of inhibition, a direct imagery task was used: the participants received 15 vignettes with situation descriptions, that were taken from two existing situation–response

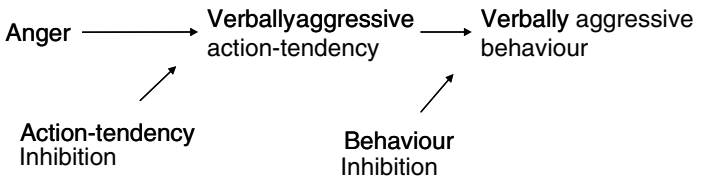


Fig. 1. Graphical representation of the two types of inhibition.

inventories by Endler and Hunt (1968). These are situations students are familiar with and that are likely to evoke anger or represent personal frustrating events, see Smits et al. (2004) for a description of the situations.

Three verbally aggressive behaviours were used to construct the items: cursing, scolding and shouting. The situations were presented three times to the participants. The first time, they were asked whether they would be angry when being in the situation (Anger items). The second time three questions were asked regarding the action tendency: whether they would *want to curse*/*want to shout*/*want to scold* when being in the situation (Want items, for example: "Do you want to curse when being in the described situation?"). The third time three questions were asked on the actual behaviour: whether they would actually *curse*/*shout*/*scold* when being in the situation (Do items, for example: "Do you curse when being in the described situation?"). As such, participants answered 105 items in total. For each item, three response categories were provided (0 = ' not at all', 1 = ' to some extent' and 2 = ' to a strong extent').

2.1.3. Procedure

Measurements were collected in several sessions with at most 30 participants. The order of presentation was determined at random. Between each part, another inventory with at least 40 items was given to the participants, preventing them from reviewing and remembering previous responses. Finally, the participants were instructed that consistency with previous answers was not an issue for the current research.

2.2. Results and discussion

For each type of items, an aggregate score was derived: Anger items, Want items (reflecting the VA action-tendency), and Do items (reflecting the VA behaviour). For the Anger items, the score is an average over the 15 situations; for Want and Do items, the score is an average over 15 situations and three behaviours. Descriptive statistics are given in Table 1.

Table 1
Descriptive statistics per type of item

	Study 1					Study 2				
	Mean	SD	Anger items	Want items	Do items	Mean	SD	Anger items	Want items	Do items
Anger items	1.13	.31	1			2.85	.39	1		
Want items	.68	.30	.56	1		2.35	.55	.60	1	
Do items	.51	.26	.45	.68	1	2.19	.45	.55	.69	1

All correlations are significant at $p < .01$.

A repeated measures within-subjects ANOVA revealed significant differences between the three means ($F(2,636) = 446.90$, $p < .001$). Post-hoc paired comparisons were made with Turkey's HSD-test, $\alpha = .05$. The mean Anger response was higher than the mean Want response, which was in turn higher than the mean Do response. The differences between the means generalize over contexts: For all situations except one, the mean Anger response was higher than or equal to the mean Want response, which was in turn higher than the mean Do response. Only in one situation the mean Do response was slightly higher than the mean Want response (.53 vs. .54).

The differences between the mean responses are a first indication that VA action-tendency and the VA behaviour are inhibited to a certain degree. However, because alternative explanations can be found for these differences, a person-specific measure for each type of inhibition will be derived to be used for further analyses.

The easiest person-specific inhibition measures are difference scores: Anger minus Want for Action-tendency Inhibition, and Want minus Do for Behaviour Inhibition. However, serious problems are associated with the use of difference scores (Bereiter, 1963; Lord, 1963). Instead, a factor-analytic method will be used. The resulting factors will be rotated to a target matrix (see Fig. 2) based on the assumed sequential dependency structure as implied by the theory. First, the common source of anger, wanting and doing should reflect in a general factor. Second, the first type of inhibition contrasts anger feelings with wanting to be aggressive and the actually behaving aggressively: it intervenes between anger and both the action tendency and the behav-

Item parcels	Factor 1 Anger	Factor 2 Action-tendency Inhibition	Factor 3 Behaviour Inhibition
Anger (sit.1 – 4)	1	1	0
Anger (sit. 5 – 8)	1	1	0
Anger (sit. 9 – 12)	1	1	0
Anger (sit. 13 – 15)	1	1	0
Want (sit. 1 – 4)	1	-1	1
Want (sit. 5 – 8)	1	-1	1
Want (sit. 9 – 12)	1	-1	1
Want (sit. 13 - 15)	1	-1	1
Do (sit. 1 – 4)	1	-1	-1
Do (sit. 5 – 8)	1	-1	-1
Do (sit. 9 – 12)	1	-1	-1
Do (sit. 13 – 15)	1	-1	-1

Fig. 2. Target matrix for procrustes rotation.

iour. This should reflect in a bipolar factor of Anger versus Want and Do, and can be interpreted as *Action-tendency Inhibition*. The second type of inhibition contrast wanting with doing, because it intervenes between these two. This should result in a second bipolar factor of Want versus Do, and can be interpreted as *Behaviour Inhibition*. The two bipolar factors explain why some persons would show their anger, but suppress the action tendency, and therefore also the corresponding behaviour, and why some people would not act aggressively, although they experience the corresponding action tendency.

Note that the fact that the first factor underlies all items, means that all items partly refer to anger, beside their specific parts, which are modelled by the second and the third factor. Note also that the factor structure in Fig. 2 has an orthogonal structure as in contrast coding for an analysis of variance, but that this does not necessarily imply zero-correlations between the factors.

Our response scale is ordinal and contains only three levels. As continuous-like variables are a prerequisite for a principal component analysis (PCA), the units to be analyzed will not be individual items but groups of items, called item parcels. The Anger item parcels are sums of anger ratings for three or four situations (1 to 4, 5 to 8, 9 to 12 and 13 to 15); the Want and the Do-item parcels are sums of want or do ratings for all three VA behaviours in three or four situations. Two additional advantages of the grouping of items are that (1) it reduces measurement error in the observed indicators (Bentler, 1989) and (2) it protects against idiosyncratic effects due to specific features of the situations, the chosen VA behaviours, or the interaction between both, because the responses were summed over at least three situations and over three VA behaviours.

The PCA on the item parcels, retaining three factors, explained 74.74% of the variance. The factor pattern of the Procrustes rotated PCA turns out to have the expected structure (see Fig. 2 and Table 2). Only for the third factor the result is less clear (2 factor loadings below .20). The factors were almost unrelated: Factor 1 correlated .02 with Factor 2 and .04 with Factor 3; Factor 2 related .11 with Factor 3. Alternatively, several random partitions of items were tried

Table 2
Factor pattern of procrustes rotated PCA (Study1/Study2)

Item parcels	Factor 1 anger		Factor 2 action-tendency inhibition		Factor 3 behaviour inhibition	
	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2
Anger (sit.1–4)	**.68**	**.69**	**.30**	**.38**	.16	.05
Anger (sit. 5–8)	**.72**	**.76**	**.37**	**.39**	−.14	−.03
Anger (sit. 9–12)	**.71**	**.75**	**.43**	**.38**	.13	−.01
Anger (sit. 13–15)	**.74**	**.78**	**.43**	**.24**	−.07	0
Want (sit. 1–4)	**.70**	**.73**	**−.36**	**−.37**	**.49**	**.39**
Want (sit. 5–8)	**.71**	**.77**	**−.37**	**−.28**	.14	**.33**
Want (sit. 9–12)	**.74**	**.75**	**−.41**	**−.33**	**.39**	**.37**
Want (sit. 13–15)	**.76**	**.74**	**−.36**	**−.43**	**.23**	**.35**
Do (sit. 1–4)	**.65**	**.74**	**−.48**	**−.35**	−.19	**−.30**
Do (sit. 5–8)	**.72**	**.76**	**−.33**	**−.29**	**−.46**	**−.40**
Do (sit. 9–12)	**.73**	**.74**	**−.43**	**−.38**	**−.23**	**−.40**
Do (sit. 13–15)	**.73**	**.74**	**−.37**	**−.41**	**−.41**	**−.34**

Loadings >.20 are bold faced.

out. They all led to similar results, so that our result may be generalized over other groupings of the items.

Although the results of Study 1 are in line with the two hypothesized types of inhibition, not all loadings of the second inhibition factor were as high as .20, so that a replication may help to corroborate the findings. Furthermore, the two inhibition factors would have a stronger interpretation if related to external variables. These are the reasons to set up a second study.

3. Study 2: Correlates of inhibition, validation

The aim of Study 2 is to replicate the three-factor structure and to validate the inhibition factors. For the validation with external measures, a two-by-two design is used: First, the variables are either broad variables or more specific traits related to anger and aggression, and second, the variables concern behaviour regulation (inhibition, expression) or not. Inhibition should primarily relate positively to inhibitory traits and negatively to expression traits, in both cases: broad measures, as well as domain specific measures. The two-by –two design yields four sets of variables. The first two sets of variables concern traits without a direct link to behaviour regulation: the Big Five (Costa & McCrae, 1987; Digman, 1990) and traits related to anger and aggression. A positive correlation of the Anger factor with Neuroticism is expected, because Neuroticism is associated with negative affect (Markon, Krueger, & Watson, 2005) and anger is a negative emotion; and a negative correlation with Agreeableness, because anger mostly is a negative feeling towards others (Gleason, Jensen-Campbell, & Richardson, 2004). Beside the broad personality dimensions, also Trait Anger, Hostility, and Verbal Aggression are considered. They can be interpreted as reflecting the affective, the cognitive, and the behavioural components of anger (Buss & Perry, 1992). The Anger factor is expected to correlates with all three but primarily with Trait Anger. It is also expected that Action-tendency Inhibition is negatively correlated with Hostility, because hostility refers to an internal state with motivational consequences as may be expressed in wants and that Behaviour Inhibition is negatively correlated with Verbal Aggression, because of the behavioural meaning of the latter. This means that apart from the association of all three with the Anger factor, three pairs of specific associations are expected: the Anger factor with Trait Anger (higher than with Hostility and Verbal Aggression), Action-tendency Inhibition with Hostility (negatively), and Behaviour Inhibition with Verbal Aggression (negatively).

The last two sets of variables relate to the domain of behaviour regulation: inhibition/activation and expression. Again the first of these two is broad, and the second is specific for anger and aggression. Gray (1990) has proposed two general systems for the regulation of behaviour. The behaviour inhibition system (BIS) deals with aversive motivation and avoidance or withdrawal behaviour, whereas the behavioural approach system (BAS) deals with appetitive motivation and approach behaviour. BIS is expected to be positively correlated with all three factors: with the first, because BIS is associated with negative affect (Clark, Watson, & Mineka, 1994; Gable, Reis, & Elliot, 2000), and with the second and the third because BIS is associated with inhibition. Because BAS refers to approach behaviour, it may be expected to correlate negatively with the inhibition factors. In the literature, empirical evidence is found for positive correlations between BAS and anger and thus BAS is also expected to be positively related to the Anger factor (Harmon-Jones, 2003; Smits & Kuppens, 2005).

Beside the broad regulation measures, also anger control and expression measures are included: Anger Out, Anger In, and Anger Out Control. Anger Out refers to the tendency to express one's anger outwardly. Anger In refers to the tendency to turn one's anger expression inwards (bottling anger up, boiling inside). Anger Out Control is the extent to which one controls the external expression of anger (Van Elderen, Maes, Komproe, & van der Kamp, 1997). We expect Anger In and Anger Out Control to be positively related to Behaviour Inhibition, as both variables refer to a suppression of anger-motivated behaviour: Anger In by turning the expression inwards and Anger Out Control by controlling the outward expression of anger. Anger Out is expected to relate negatively to Behaviour Inhibition.

3.1. Method

First, the results of Study 1 will be replicated. Second, the three factors will be related to the external measures.

3.1.1. Participants

The participants were a new set of 361 first-year psychology students (61 males, 268 females, 32 gender unknown, because not indicated; average age = 18.4, SD = 2.88). Participation was a partial fulfilment of a requirement to participate in research.

3.1.2. Materials

For the directed imagination task, the same vignettes and questions and a similar procedure as in Study 1 were used. In comparison to Study 1, the response scale was extended to four categories (1 = 'not at all', to 4 = 'to a strong extent').

3.1.2.1. Big Five. The Big Five (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) were measured with the authorized Dutch translation of the NEO-FFI (Costa & McCrae, 1992; Hoekstra, Ormel, & de Fruyt, 1996), which comprises 60 items, 12 per factor.

3.1.2.2. Anger, Hostility and Verbal Aggression. Three scales of the aggression questionnaire (BPAQ: Buss & Perry, 1992; Claes, Vertommen, & Ponnet, 1999) were used: the Anger scale (a measure of Trait Anger), the Hostility scale (cognitive component of aggression, described as "feelings of ill will and injustice"), and the Verbal Aggression scale (frequency of behaving verbally aggressive).

3.1.2.3. BIS/BAS. BIS/BAS sensitivity was measured with the BIS/BAS inventory of Carver and White (1994), Smits and De Boeck (2006). It comprises one BIS scale and three BAS scales: The BIS scale assesses concerns over the possibility of a bad occurrence and sensitivity to such events when they occur. The BAS Drive scale (BASD) reflects the persistent pursuit of desired goals, the BAS Fun Seeking scale (BASF) reflects a desire for new rewards and a willingness to approach a potentially rewarding event, and the BAS Reward Responsiveness scale (BASR) reflects a focus on positive responses to the occurrence or anticipation of reward (p. 322, Carver & White, 1994). In contrast with Smits and De Boeck (2006), we have no special reasons to differentiate between the BAS subscales in this study; therefore, they will be summarized in one general BAS scale.

3.1.2.4. Anger expression. A popular questionnaire for the behavioural regulation of anger is the Self Expression and Control Scale (SECS, Van Elderen et al., 1997), an adaptation of Spielberger's Anger Expression Scale (Spielberger, 1996). Three scales were used: Anger Out (AO), Anger In (AI), and Anger Out Control (AOC).

3.1.3. Procedure

Three to four months prior to the directed imagination task, two additional sessions were planned. In the first session, the participants completed the SECS, the BPAQ, and the BIS/BAS inventory. In the second session, they completed the NEO-FFI. Finally, in small sessions for at most 30 participants, they completed the directed imagination task (see Study 1). A reference number without a link to the identity of the persons was used to couple the data over the different sessions. For 180 participants (35 men, 145 women), data were available from the SECS, the BPAQ, the BIS/BAS inventory, and the directed imaginary task, and for 289 participants (47 men, 210 women, 32 gender unknown) data from the NEO-FFI and the directed imaginary task were available.

3.2. Results

3.2.1. Replication of results of Study 1

Descriptive statistics for each type of item (Anger, Want, Do) are given in Table 1. Because of the different response scale (0 to 2 in Study 1 versus 1 to 4 in Study 2), the mean responses per type of item are higher than those found in Study 1. A repeated measures within-subjects ANOVA revealed significant differences between the types of items ($F(2,636) = 446.90$, $p < .001$). Post-hoc paired comparisons were made with Tukey's HSD test, $\alpha = .05$. Again, the mean response is the highest for anger (Anger), somewhat lower for the VA action-tendency (Want), and the lowest for the VA behaviour (Do), which can be seen as an indication that both kinds of inhibition are present.

Second, a PCA was performed on the previously defined item parcels. Three factors were retained, explaining 77, 52% of the variance. A Procrustes rotation was performed to the target matrix of Study 1. The rotated factor pattern, which has the desired structure, is given in Table 2. The factors were almost unrelated: Factor 1 correlated −.02 with Factor 2 and .06 with Factor 3; Factor 2 correlated .07 with Factor 3. All expected loadings are higher than .20. Again alternative and random item groupings were tried out and lead to similar results.

Subsequently, the factor scores were calculated and correlated with all four sets of variables (see Table 3). Note that only modest correlations are expected, because the factors are based on specific situations and only three behaviours. This kind of situation and behavioural specificity is known to yield only moderate correlations with trait measures (Mischel, 1968; Wu & Clark, 2003).

3.2.2. Correlations with external variables

3.2.2.1. Big Five. As expected, Neuroticism was positively and Agreeableness negatively related to the Anger factor. In addition, Extraversion correlated negatively to Anger and Action-tendency Inhibition, and Agreeableness was positively correlated to Behaviour Inhibition. These results, although only weak, suggest an interesting communality and difference between Extraversion and Agreeableness. Both share a negative correlation with anger feelings. Extraversion is not inhibitory but favours an aggressive action-tendency, whereas Agreeableness is inhibitory, preventing aggressive behaviours being shown (see also Gleason et al., 2004).

Table 3
Study 2: Correlations of factor scores with external variables (p-value)

Variable set	Scale	Factor 1	Factor 2	Factor 3
		Anger	Action-tendency inhibition	Behaviour inhibition
Big five	Neuroticism	.24 (< .001)[a]	.03 (.658)	.10 (.084)
	Extraversion	−.13 (.029)[b]	−.17 (.003)[a]	−.06 (.302)
	Openness	−.04 (.477)	.01 (.088)	.02 (.674)
	Agreeableness	−.22 (<.001)[a]	−.03 (.648)	.12 (.038)[b]
	Conscientiousness	−.08 (.181)	.07 (.216)	.03 (.578)
BAPQ	Anger	.35 (<.001)[a]	−.12 (.098)	−.06 (.381)
	Hostility	.20 (.006)[a]	−.16 (.025)[b]	−.02 (.734)
	Verbal aggression	.18 (.011)[b]	−.11 (.133)	−.28 (<.001)[a]
BIS/BAS	BIS	.21 (.003)[a]	.15 (.036)[b]	.14 (.048)[b]
	BAS	.24 (<.001)[a]	−.06 (.424)	−.15 (.039)[b]
SECS	AO	.21 (.004)[a]	−.15 (.036)[b]	−.33 (<.001)[a]
	AI	.02 (.764)	.04 (.585)	.19 (.009)[a]
	AOC	−.29 (<.001)[a]	.08 (.245)	.23 (.001)[a]

[a] Significant at $p < .01$.
[b] Significant at $p < .05$.

3.2.2.2. BPAQ. In line with our hypotheses, all three BPAQ scales related positively to the Anger factor: Trait Anger had the highest correlation. Also in line with the expectations, Hostility related negatively to Action-tendency Inhibition, and Verbal Aggression related negatively to Behaviour Inhibition.

3.2.2.3. BIS/BAS. The BIS scale related positively to all three factors, as expected. Further, in line with the expectations, BAS was positively related to the Anger factor, and negatively to Behaviour Inhibition. These results confirm that BIS is related to negative affect and is inhibitory, and that BAS has an approach activating effect, primarily on the affective aspect (anger being a negative approach emotion) but also on the behavioural aspect.

3.2.2.4. Anger expression variables. As hypothesized, AO correlated negatively and both, AI and AOC, positively with Behaviour Inhibition. However, some additional correlations were found: AO was positively related to the Anger factor and negatively to Action-tendency Inhibition. Finally, in contrast to AO, AOC was negatively related to the Anger factor. This pattern suggests that AO and AOC are not restricted to the expression of anger, primarily inhibiting/favouring aggressive behaviour, but that they relate also to anger itself, independent of the expression.

3.2.3. Discussion and conclusions

The results of Study 2 support and extend those of Study 1. In both studies, the mean Anger rating was higher than the mean Want rating, which was in its turn higher than the mean Do rating. The PCA with Procrustes rotation lead to similar results in both studies.

In Study 2, the validity of the three factors was investigated. The Anger factor shows its highest correlation with Trait Anger, which confirms its interpretation. This interpretation is further

corroborated by positive correlations with negative affect traits (Neuroticism and BIS), and by a positive correlation with an approach trait such as BAS (Gray, 1981; Harmon-Jones, 2003; Smits & Kuppens, 2005).

The first Inhibition factor was defined as Action-tendency Inhibition. Indications of the inhibitory nature of this factor are the positive correlation with BIS and the negative correlations with Extraversion and AO. The negative correlation with Hostility suggests that anger combined with lack of Hostility may not yield or detract from an aggressive action-tendency.

The second Inhibition factor refers to the inhibition of VA behaviour. Indications of its inhibitory nature are the negative correlation with AO and the positive with AOC. As for its differentiation from Action-tendency Inhibition, it seems more behavioural, given its higher negative correlation with Verbal Aggression (−.28 vs.−.11) and AO (−.33 vs. −.15), and less referring to an internal state, given its zero-correlation with Hostility (−.02 vs. −.16). The differences between the correlations are significant on the .05, .05 and the .10 level, respectively.

Although based on a simple theory, the factor-analytic method was successful in capturing two types of inhibition: Action-tendency Inhibition and Behaviour inhibition.

The fact that more than one inhibition factor is concerned in relation to VA behaviour, supports the multidimensional nature of several anger and aggression management programs: Programs may focus on different levels, for example: cognitive interventions for the reduction of anger or the action tendency (for example, relaxation, cognitive restructuring), or they may concentrate on behaviour, learning alternative behaviours.

An important limiting aspect of the present study relates to the questionnaire format: Participants were presented with parallel questions, one about anger, three about wanting, and three about doing. Despite the precautions described in the Method section, it cannot be excluded that a consistency tendency has played a role. Perhaps for the behaviours a different approach could be followed, such as observation, but unfortunately a measure of the action-tendency or the emotion necessarily requires self-report. On the other hand, the meaningful correlations we have found with external variables are an indication that more than a response style is involved.

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