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The Inhibition of Verbally Aggressive Behaviour

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Abstract

We studied the inhibition of verbal aggression, defined as not displaying verbal aggression when one would want to. The approach we used was based on a situation–response questionnaire containing 15 anger provoking situations and three verbally aggressive responses. Two questions were asked for each combination of a situation and a response: one about wanting to react in a verbally aggressive way and one about actually displaying the reaction. This questionnaire was administered to 316 participants. Based on different theories about inhibition, several logistic mixed models were constructed and tested against each other. In the best fitting model, inhibition was conceptualized as a trait. Trait inhibition was negatively correlated with external measures of Anger Out and positively with Control of Anger Out. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

Verbal aggression is a rather common but problematic behaviour (Infante & Rancer, 1996). It is a common behaviour because it is a rather easy expression of anger as only words or sounds are involved. As for how problematic verbal aggression is, one should differentiate between verbal aggression to oneself and to others. Cursing at oneself, for example, is a possible reaction to one's own behaviour when this behaviour is considered negative and attributed to oneself. For an outsider this verbal aggression may still be interpreted as unfriendly and as an indication that the verbally aggressive person is easily irritated or bad tempered. When directed at others, it can seriously hurt other people, and it may arouse a mutual aggressive reaction and further escalation (deTurck, 1987; Fitness & Fletcher, 1993; Infante, 1987; Infante & Rancer, 1996; Roloff, 1996).

Not all aggressive inclinations a person experiences are expressed (Averill, 1982, 1983; Kassinove, Sukhodolsky, Tsytsarev, & Solovyova, 1997). 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). Here, we are

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interested in withholding one's verbal aggression, defined as wanting to be verbally aggressive (curse, scold, shout) while not behaving accordingly, as 'wanting' without 'doing'. According to King, Emmons, and Woodley (1992), this wanting without doing can be due to two kinds of inhibition: (i) behavioural inhibition, which may be considered as an inhibition of the overt expression of emotional experiences, and (ii) emotional inhibition, which may be considered as control over naturally occurring emotional reactions.

Inhibition has the advantage that it prevents the problems that may follow from verbal aggression, but it may create new problems. For example, inhibiting verbal aggression by turning one's anger (emotional inhibition) inwards instead of expressing it may have consequences for one's health (Begley, 1994; Culbertson & Spielberger, 1996; Engebretson, Matthews, & Scheier, 1989; Greenglass, 1996; Julkunen, 1996; Martin et al., 1999; Venable, Carlson, & Wilson, 2001). One can assume that avoiding negative consequences is a primary cause for inhibition (see, e.g., Averill, 1982; 1983; Beatty & McCroskey, 1997). For example, one can inhibit the tendency to be verbally aggressive to avoid being disliked by others, or to avoid an aggressive counterreaction of others (Deffenbacher, Oetting, Lynch, & Morris, 1996; Fitness & Fletcher 1993; Infante & Rancer, 1996).

To situate and delineate the logic of our study, we first make a conceptual analysis of verbal aggression in terms of its constituents. Verbal aggression will be conceptualized here as based on three constituents: the anger feelings, the verbal aggressive action tendency, and the verbal aggressive act. The anger feelings are assumed to feed the action tendency towards verbal aggression (Averill, 1983; Cornell, Peterson, & Richards, 1999; Fitness & Fletcher, 1993; Frijda, 1986; Kassinove, et al., 1997; Kinney, Smith, & Donzella, 2001), and the action tendency in turn is assumed to be at the basis of the verbally aggressive behaviour (Frijda, 1986; Frijda, Kuipers, & ter Schure, 1989). This view implies two links: between the feeling and the action tendency, and between the action tendency and the behaviour. Inhibition at the level of the action tendency would affect the first relation, and inhibition at the level of the behaviour would affect the second relation.

We will concentrate on behavioural inhibition and therefore on the link between the action tendency and the behaviour. Various situations will be presented, and the participants in the study will be asked whether they would want to be verbally aggressive (want to curse, want to scold, and want to shout) and whether they would actually display the corresponding behaviour (curse, scold, shout). The situations are selected from two sets Endler and Hunt (1968) have constructed to be familiar for students (our respondents). All selected situations evoke anger or represent what Rosenzweig (1944) considers as personal frustrating events.

Following the previous conceptual analysis, the basis for either displaying verbal aggression or not is twofold: the action tendency and the behavioural inhibition. We will now link the action tendency and behavioural inhibition to factors in the person and in the situation.

Person factors

As for the verbal aggression (VA) action tendency, an evident person factor is *Trait Anger*, because anger is considered to have a causal role in aggression (Anderson & Bushman, 2002). Trait Anger, which can be defined as the relative stable tendency to experience anger (Forgays, Forgays, & Spielberger, 1997; Spielberger, Jacobs, Russell, & Crane,

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1983), is hypothesized to correlate positively with the VA action tendency. We assume that Trait Anger feeds the action tendency, but we have no basis to expect also a correlation with behavioural inhibition.

A second type of factor, one that may play a role in both the action tendency and the behavioural inhibition, refers to *coping with anger* (Averill, 1983; Boddeker & Stemmler, 2000; Deffenbacher et al., 1996; Forgays et al., 1997; Spielberger, Johnson, & Jacobs, 1982; Spielberger et al., 1983; 1985; Spielberger, Krasner, & Solomon, 1988). A first coping with anger variable is *Anger Out*, which is the tendency to express one's anger outwards. The VA action tendency is an important step towards expression, so a positive correlation is expected between Anger Out and the VA action tendency (Kinney et al., 2001). Furthermore, we expect a negative correlation between Anger Out and behavioural inhibition, since the behavioural inhibition counteracts the anger expression.

A second coping with anger variable is *Anger In*, in contrast to Anger Out in that it refers to the tendency to turn one's anger inwards (e.g. bottling anger up, boiling inside). In the literature this concept is often denoted as the regulation of the anger by suppressing it (Begley, 1994; Greenglass, 1996; Julkunen, 1996; Schwenkmezger & Hank, 1996). This implies that the VA action tendency is counteracted and therefore we expect a negative correlation with this action tendency. Given that anger is turned inwards so that the outward action tendency is prevented, there seems to be no reason to inhibit the expression of this action tendency. Therefore, we have no basis to expect a correlation between Anger In and behavioural inhibition.

A third variable is *Anger Control*, which refers to the control of one's anger. Van Elderen, Maes, Komproe, and Van der Kamp (1997) have distinguished between Anger Out Control, and Anger In Control. *Anger Out Control* is the extent to which one controls the externalization of anger. Therefore, it may be expected to correlate negatively with the VA action tendency, and positively with behavioural inhibition (the opposite pattern as for Anger Out). *Anger In Control* is the extent to which one controls the internalization of anger. As such, we have no basis to expect correlations with the VA action tendency and the behavioural inhibition.

A third type of person factor refers to the aggressive style, which can be direct or indirect (Averill, 1983; Dehghani & Lange, 1993; Lange, Dehghani, & de Beurs, 1995; Ramanaiah, Conn, & Schill, 1987). Direct Aggression can be defined as the physical or verbal expression of aggression, which can be recognized as such by others. We expect that Direct Aggression is positively correlated to the VA action tendency and that it is negatively correlated to the behavioural inhibition. Indirect Aggression is covert and would therefore correlate positively with the VA action tendency, which is also covert (Averill, 1982; Frijda, 1986). We do not expect a correlation with behavioural inhibition, as the indirect style is not necessarily a consequence of inhibition.

All these hypotheses are summarized in Table 1.

Situation variables

From the situational perspective, differences in the VA action tendency may be seen as related to how frustrating a situation is (Anderson & Bushman, 2002), and to the value of the aggressive act. The value can be of an instrumental or of an expressive kind. In sum, three situational factors will be linked with the situational activation of a VA action tendency: how frustrating the situation is, how instrumental the aggressive action in question is, and how well it serves as an expression of feelings within the situation.

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Table 1. Expected correlations between α_i, κ_i and external person variables

	TA	AO	AI	CAO	CAI	DA	IDA
α_i	+	+	−	−	.	+	+
κ_i	.	−	.	+	.	−	.

'+' indicates a positive correlation, '−' indicates a negative correlation, and '.' means that no specific hypothesis is formulated about the correlation.
α_i: person parameter for the action tendency.
κ_i: person parameter for the behavioural inhibition.
TA = Trait Anger (ZAV); AO = Anger Out (SECS); AI = Anger In (SECS); CAO = Control Anger Out (SECS); CAI = Control Anger In (SECS); DA = Direct Aggression (BDHI-D); IDA = Indirect Aggression (BDHI-D).

As far as inhibition is considered situational, it may be linked to the problems verbal aggression may lead to. First, one of the most common problems is dislike on the part of others or loss of likability, for example, as a consequence of the fact that being verbally aggressive in the situation can hurt other people (Infante, 1987). Second, verbal aggression may also be inhibited because it is a transgression of norms one has, with as a consequence a negative self-evaluation (Infante, 1987; Campbell & Muncer, 1987; Roloff, 1996). Therefore, we expect that situational effects on inhibition are related to expected dislike from others and to expected negative self-evaluation in the situation in question. To support the interpretation of these relations, correlations will be derived of expected dislike and expected negative self-evaluation with ratings of how much someone in the situation would feel hurt by a verbally aggressive act, and with ratings of how much a norm would be violated in the situation, respectively. Since all these ratings are situation specific, the means across raters may be considered situational properties.

It may be expected as well that more objective properties, such as the presence of the person to whom the VA behaviour is directed and the presence of witnesses, may play a role, for example because they are necessary conditions for the VA behaviour to have an effect on dislike from the part of others.

Studying the inhibition of verbal aggression is of interest in several respects. First, since verbal aggression is a rather light form of aggression, it is more open to observation and to self-report than more serious types of aggression. It is less socially undesirable to report and it is also more common, so that the opportunity to study its inhibition is much broader than for the more severe types of aggression. Second, verbal aggression pertains to daily life and may determine a broad range of relationships one has with colleagues, family members, and friends. It may have an effect on these relationships more often than more serious forms of aggression. The effect it has may be smaller, and therefore it may be less important in total, but it is more widespread and it pertains more to daily life than do stronger forms of aggression.

An indirect self-report approach

We will study behavioural inhibition without asking direct self-report questions on behavioural inhibition. A direct approach would imply direct items such as 'How much do you feel inhibited to curse in this situation?'. Instead we ask two questions, one whether one would want to react with verbal aggression, and one on whether one would actually display verbal aggression. The easiest indirect measure of inhibition is the difference between the two responses, but several problems are associated with difference scores

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(Bereiter, 1963; Embretson, 1991, 2000; Lord, 1963). Therefore, we chose a modeling approach inspired by Embretson (1991), to be explained in the section on data analysis.

THEORIES

The theories we will focus on are formal theories on discrete events of experiencing a VA tendency (wanting to curse, scold, shout) and displaying a VA behaviour (cursing, scolding, shouting). They are theories for the probability of these events. The theories are formal in the sense that the contribution of persons and situations can be isolated, so that in a next step these contributions can be related to personality traits regarding anger and aggression, and situational properties. In this way we can shed light on the process of how behaviours come about.

In the inventory, the participants will be asked whether these events would occur in the corresponding situations. Based on a general interest of personality psychology in the contribution of persons and situations to behaviours (see, e.g., Kenrick & Funder, 1988; Mischel, 1984), we will study the role of person and situation in the VA tendency and the inhibition of VA behaviour. Based on previous work we can assume that anger-related action tendencies also depend on both the person and the situation (Kuppens, Van Mechelen, Smits, & De Boeck, 2003). Therefore, the basic assumptions of all theories we will formulate to explain the probabilities are that (i) people differ in the strength of their VA action tendency, called the *personal VA action tendency*, which will be regarded as a VA trait (Beatty & McCroskey, 1997; Infante, 1987; Infante & Rancer, 1996; Kinney et al., 2001), and that (ii) situations differ in how much they activate the VA action tendency, which will represent the situational VA activation. We assume throughout that the situational VA activation may also depend on the behaviour type (curse, scold, shout), and therefore the term *situational VA behaviour activation* will be used.

The probability of a person's VA action tendency for a given behaviour and situation is considered a function of the personal VA action tendency and the situational VA behaviour activation. Note that three simpler formulations of the same theory are possible: with the situational VA behaviour activation being reduced to situation main effects, behaviour main effects, or the combination of both.

According to inhibition, which is our main point of interest, our aim is to find out whether inhibition exists, and where it primarily depends on whether inhibition is constant over persons and situations, whether it depends either on the situation, or on the person, or on both the person and the situation. We will compare several alternative theories. The hypotheses we have formulated earlier are for the case in which inhibition turns out to be a function of the person and the situation.

The first inhibition theory we formulate is a *null theory*, in which it is assumed that no inhibition at all occurs. It will be used as a base-level theory, as a reference point for other more complicated theories.

The second theory is the *constant inhibition theory*. It differs from the null theory in that a constant inhibition holds for all persons and for all combinations of situations and VA behaviour types. The effect is hypothesized to be negative. Consequently, the probability of displaying a VA behaviour is lowered in comparison with the probability of having the corresponding VA action tendency.

The third theory is the *situational inhibition theory*, implying that each situation has its own inhibitory effect, possibly a different one for each VA behaviour, without any

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individual differences. In principle also three subset theories can be formulated: one with situational main effects on inhibition, one with behavioural main effects on inhibition, and one with both kinds of main effect.

The fourth theory is the complement of the former, and is called the *personal inhibition theory*. All inhibition is assumed to stem from the person, independent of the situation and the VA behaviour. This theory implies that inhibition is primarily a trait.

The fifth and final theory is the *combined theory*, stating that the inhibition depends both on the person and the combination of a situation and a VA behaviour. This theory is a combination of the third and the fourth theory.

In principle, a sixth theory is possible, one that allows for person-by-situation-by-behaviour interactions. Such a theory would be a theory with so much flexibility that it could explain everything concerning inhibition. It is a so-called saturated theory and it cannot be rejected by the data. As such it will not further be considered.

The external person variables and the external situation variables will be related to the corresponding theoretical concepts from the theories: the external person variables to the VA action tendency and the personal VA inhibition, the situational properties, to the situational VA behaviour activation and the situational VA behaviour inhibition.

METHOD

Subjects

The participants were 316 first-year psychology students from a university in the Dutch speaking part of Belgium. Participation in the study was a partial fulfillment of the requirement to participate in research. The sample consists of 73 males and 243 females, which reflects the proportion of the two sexes among psychology students. The average age was 18.4 (SD = 1.2).

Measures and procedure

The data collection was part of a larger study by the third author. Only the characteristics relevant for the present study are mentioned here.

Situation–response questionnaire

Fifteen situations were taken from two situation–response inventories by Endler and Hunt (1968). Endler and Hunt (1968) selected situations students are familiar with and that are likely to evoke anger or represent what Rosenzweig (1944) considers to be personal frustrating events. The 15 situations are listed in the Appendix. For each of these situations, three verbally aggressive behaviours were presented as possible reactions: cursing, scolding, and shouting. The construction of the inventory is in line with the facet methodology (Canter, 1985; Guttman, 1981; Guttman & Greenbaum, 1998; Shye, Elizur, & Hoffman, 1994): For each combination of a situation and a behaviour, two questions are asked: a 'want' question ('Would you want to curse/scold/shout in this situation?'), and a 'do' question ('Would you curse/scold/shout in this situation?'), yielding 90 items in total. For each item three response categories were provided (0 = no, 1 = to some extent, and 2 = to a strong extent).

To disguise our design and to counteract response tendencies, per situation the just mentioned six reactions were mixed with 15 other reactions of various kinds, leading to 21

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possible reactions per situation. Because our total number of items equals $21 \times 15 = 315$, the subset of items we were interested in is less than one-third of the total number of items. Moreover, the order of the items was randomized.

External person variables

Three questionnaires on anger, anger expression, and aggression were used as measures of external subject characteristics: the Zelf-Analyse vragenlijst (ZAV, Van der Ploeg, Defares, & Spielberger, 1982), which is the Dutch adaptation of the State–Trait Anger Scale (STAS, Spielberger, 1980), to have a measure of Trait Anger; the Self-Expression and Control Scale (SECS, Van Elderen et al., 1997), an adaptation of the Anger Expression Scale (AX) of Spielberger et al. (1982) containing the subscales Anger In, Anger Out, Control Anger In, and Control Anger Out; and the Buss–Durkee Hostility Inventory–Dutch (BDHI-D, Lange, Hoogendoorn, Wiederspahn, & de Beurs, 1995). The latter inventory comprises three subscales labelled Direct Aggression, Indirect Aggression, and Social Desirability. Because the Social Desirability scale is very short (five items), and has a rather low internal consistency (Cronbach's alpha = 0.50; Lange et al., 1995b), it will be excluded from the analyses.

VA behaviour—situation properties

Ten raters evaluated all situations on several properties: (i) the amount of frustration elicited by the situation, (ii) how well the VA behaviour in general expresses the feelings elicited by the situation, (iii) how instrumental the VA behaviour is in each of the situations, (iv) expected dislike from others in the case of VA behaviour, (v) expected negative self-evaluation in the case of VA behaviour, (vi) the degree in which VA behaviour hurts others, (vii) how much a norm is violated by VA behaviour, (viii) the presence of witnesses, and (ix) the presence of the person to whom VA behaviour is directed. Note that for the ratings of the situations VA behaviour in general was rated, without a distinction depending on the type of VA behaviour. All ratings were made on a four-point scale varying from 0 to 3. For each property, the mean of the ten raters was used as a measure. The reliabilities of the ratings for the nine properties are the following: 0.87 (frustration), 0.73 (expressiveness), 0.92 (instrumentality), 0.80 (dislike from others), 0.83 (negative self-evaluation), 0.85 (hurt others), 0.85 (norm violation), 0.92 (witness), and 0.97 (presence of person to whom the VA behaviour is directed). These coefficients are the Cronbach alphas for internal consistency.

Analysis

For the analysis of the data, mixed logistic regression models are used, both for the ordered-category data (0, 1, 2) and for the same data after dichotomization (0 versus 1 and 2). We will mainly report on the analysis of the dichotomized data, and only briefly on the analysis of the ordered-category data, for two reasons. First, all the conclusions for the dichotomized data are supported by the analysis of the ordered-category data. Second, the former analysis is based on fewer parameters and the interpretation of the parameters is much simpler, because they refer directly to the logarithm of the odds for the reactions.

We will now briefly present the types of model. The broader category of models is generalized linear models which are considered the natural kind of model for categorical repeated measures in the statistical literature (Fahrmeir & Tutz, 2001; McCullagh & Nelder, 1989; McCulloch & Searle, 2001), and this category is also considered a very flexible and broad approach for psychological data (Rijmen, Tuerlinckx, De Boeck, & Kuppens, 2003). For example, structural equation models (SEMs) for repeated-measurements

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categorical data are also a specific case of these models. For SEMs a probit link function is used, whereas the models we use are based on a logit link function, but it is well known that this is only a minor difference, and that one can approach one with the other. Another difference is that SEM estimation is not a full information method. It does not use all information in the data: only the means and the pairwise associations are considered, but not the higher order associations (Muthén & Muthén, 2001). From the viewpoint of mathematical tractability logistic models are also considered simpler models. We chose the logistic mixed models because they have a long tradition in psychometrics (as item response theory (IRT) models), and because in that tradition an important aspect is modelling the effect of factors on the means (proportions correct). This is of course also possible within the SEM approach, but given the approximate equivalence of the probit and the logit links, one may expect similar results.

We now present the specific models and their parameters. As for the parameters, we distinguish between the following:

- α_i, the VA action tendency of person i (a latent trait);
- κ_i, the VA inhibition of person i (a latent trait);
- β_{jk}, the situational VA behaviour activation for situation j and behaviour k (an item parameter);
- δ_{jk}, the situational VA behaviour inhibition for situation j and behaviour k (an item parameter); and
- τ, an overall inhibition constant (a parameter that is used if neither δ_{jk}, nor κ_i are used).

It is further assumed that α_i and κ_i are normally distributed. For model identification reasons, the mean of α_i is fixed to zero. This leaves us with three distributional parameters, var(α) (the variance of the α), μ_κ and var(κ) (the mean and variance of the κ, respectively). Furthermore, we hypothesize that τ and μ_κ, and the correlation between α and κ, are greater than zero.

The five models can now be formulated as follows, in terms of the logit of positive want-responses and do-responses, respectively, with $\text{logit}(\text{want}_{ij})$ and $\text{logit}(\text{do}_{ij})$ formally defined as

$$\text{logit}(\text{want}_{ij}) = \log\left[\frac{\Pr\left(Y_{ijk}^{\text{want}} = 1\right)}{\Pr\left(Y_{ijk}^{\text{want}} = 0\right)}\right],\ \text{logit}(\text{do}_{ij}) = \log\left[\frac{\Pr\left(Y_{ijk}^{\text{do}} = 1\right)}{\Pr\left(Y_{ijk}^{\text{do}} = 0\right)}\right]$$

All models are equivalent for the want-items:

$$\text{logit}(\text{want}_{ijk}) = \alpha_i + \beta_{jk}^{(\text{want})} \tag{1}$$

The models differ for the do-items: In the *null theory* there is no inhibition, so that the model for the do-items is exactly the same as for the want-items:

$$\text{logit}(\text{do}_{ijk}) = \alpha_i + \beta_{jk}^{(\text{want})} \tag{2}$$

In the *constant inhibition theory*, inhibition is assumed to be a constant value, independent of the person and the combinations of a situation and a behaviour. Therefore, the model reads as

$$\text{logit}(\text{do}_{ijk}) = \alpha_i + \beta_{jk}^{(\text{want})} - \tau \tag{3}$$

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In the *situational inhibition theory*, inhibition is assumed to be situation and behaviour dependent. This can be modelled by subtracting a parameter that is specific for the combination of a situation and a behaviour:

$$\text{logit}\left(\text{do}_{ijk}\right) = \alpha_i + \beta_{jk}^{(\text{want})} - \delta_{jk} \tag{4}$$

In the *personal inhibition theory*, it is assumed that the inhibition of VA behaviour is a source of individual differences. Therefore, for the do-items a person-dependent parameter κ_i will be subtracted:

$$\text{logit}\left(\text{do}_{ijk}\right) = \alpha_i + \beta_{jk}^{(\text{want})} - \kappa_i \tag{5}$$

Finally, the *combined theory* is a combination of the two previously mentioned theories. In the combined theory, inhibition is both person dependent, and situation and behaviour specific:

$$\text{logit}\left(\text{do}_{ijk}\right) = \alpha_i + \beta_{jk}^{(\text{want})} - \delta_{jk} - \kappa_i \tag{6}$$

In order to show the equivalence with SEM, we give an SEM-like representation of the combined inhibition model; see Figure 1.

As our original data are ordered-category data, we have also used the rating-scale model variants (Andrich, 1978) and the partial credit model variants (Masters, 1982) in order to check whether the conclusions also hold without dichotomization. We will briefly report on these results. We have not used the SEM variant because it is shown that the parameter estimates based on probit models, such as SEM, are very similar to the ones obtained by a logistic model (after applying the well known scaling constant of 1.7) (Camilli, 1994, 1995).

For the analysis we have used PROC NLMIXED (Wolfinger, 1999) from SAS V8 (1999), a broadly available general purpose package. A quasi-Newton–Raphson optimization technique was used, together with a nonadaptive Gauss–Hermite quadrature approximation as described by Pinheiro and Bates (1995) with 15 quadrature points to estimate the parameters of the different models. The fit of the different models can be compared using two information criteria: the AIC statistic (Akaike's information criterion; Akaike, 1977) and the BIC statistic (Bayesian information criterion; Schwartz, 1978). Given that both information criteria penalize for the number of parameters, an optimal balance between model fit and model parsimoniousness is obtained. The penalty is larger

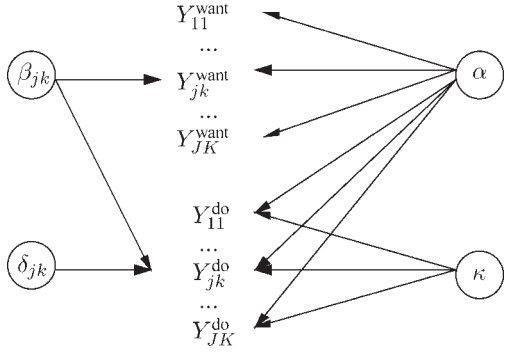

Figure 1. SEM-like representation of the combined inhibition model with two latent person variables (α, κ), and for one item the item parameters (β_{jk}, δ_{jk}) are also shown.

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for the BIC than for the AIC. The lower the value of these statistics, the better the model fits the data. The specific values of each person on both person dependent parameters (α_i and κ_i) were obtained by requesting empirical Bayes estimates.

Subsequently, the values for the external trait measures—i.e. the sum scores on subscales of the ZAV, the SECS, and the BDHI-D—were correlated with the estimated values of the personal VA action tendency (α_i) and the personal VA inhibition (κ_i). The nine situational properties were correlated with the estimated values of the situational VA behaviour activation (β_{jk}) and with the situational VA behaviour inhibition (δ_{jk}).

RESULTS

Modelling the situation–response questionnaire

The values of the fit statistics for all models are listed in Table 2.

First note that the fit statistics of the simpler models, in which the situational VA behaviour activation or the situational VA inhibition are reduced to situation main effects, to behaviour main effects, or to the combination of both, are not mentioned in Table 2, as these three models turned out to be clearly inferior: their AIC values varied from 32 137 to 29 611 and their BIC values varied from 32 163 to 29 848.

As can be seen in Table 2, all the models with inhibition fit the data clearly better than the null model. Within the group of inhibition models, the models containing a person-dependent inhibition parameter fit the data better than the models without personal VA inhibition. The effect of adding situational inhibition is much smaller (AIC), or even opposite (BIC). According to the AIC values, the combined model has the best fit. However, according to the BIC value, the personal inhibition model has a somewhat better fit. This difference is due to the stronger penalty the BIC gives to the number of parameters. Hence, depending on how important one considers it for a model to be parsimonious, either the combined model (less parsimonious) or the personal inhibition model (more parsimonious) should be preferred. We opt for the personal inhibition model, since this model is more parsimonious, and since the two types of situation-by-behaviour parameter estimate (the estimates of β_{jk} and δ_{jk}) of the combined model were correlated rather strongly (-0.56) and showed an analogous, but opposite, pattern of correlations with the situational properties. Therefore, we do not have a strong basis to differentiate empirically between the situational VA activation and the situational VA inhibition. The estimates for the personal inhibition model are given in Table 3.

For the interpretation of the estimates given in Table 3, one has to keep in mind that the higher β_{jk}, the higher the situational VA behaviour activation. The β_{jk} vary from -2.62 to 1.58. Their mean value is equal to -0.16, meaning that on average (over all situations and behaviours) a person with an average VA action tendency has a probability of 0.46 of

Table 2. Fit statistics of the models

Model	AIC	BIC
Null model	30 354	30 527
Constant inhibition	29 762	29 938
Situational inhibition	29 647	29 989
Personal inhibition	29 077	29 261
Combined	28 968	29 317

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Table 3. Situational VA behaviour activation parameter estimates for the personal inhibition model

Par.	Est.	SE	Par.	Est.	SE	Par.	Est.	SE
$\beta_{1,1}$	0.65	0.11	$\beta_{6,1}$	1.51	0.12	$\beta_{11,1}$	0.57	0.11
$\beta_{1,2}$	0.06	0.11	$\beta_{6,2}$	0.75	0.11	$\beta_{11,2}$	0.34	0.11
$\beta_{1,3}$	−1.04	0.12	$\beta_{6,3}$	−0.13	0.11	$\beta_{11,3}$	−0.31	0.11
$\beta_{2,1}$	0.89	0.11	$\beta_{7,1}$	−1.05	0.12	$\beta_{12,1}$	0.34	0.11
$\beta_{2,2}$	0.70	0.11	$\beta_{7,2}$	−1.89	0.13	$\beta_{12,2}$	−0.96	0.12
$\beta_{2,3}$	−0.19	0.11	$\beta_{7,3}$	−2.62	0.16	$\beta_{12,3}$	−1.36	0.12
$\beta_{3,1}$	1.54	0.12	$\beta_{8,1}$	0.13	0.11	$\beta_{13,1}$	1.58	0.12
$\beta_{3,2}$	0.14	0.11	$\beta_{8,2}$	−0.74	0.11	$\beta_{13,2}$	0.59	0.11
$\beta_{3,3}$	−0.14	0.11	$\beta_{8,3}$	−1.56	0.13	$\beta_{13,3}$	−0.44	0.11
$\beta_{4,1}$	0.56	0.11	$\beta_{9,1}$	0.42	0.11	$\beta_{14,1}$	1.48	0.12
$\beta_{4,2}$	−0.49	0.11	$\beta_{9,2}$	−0.84	0.12	$\beta_{14,2}$	0.11	0.11
$\beta_{4,3}$	−1.20	0.12	$\beta_{9,3}$	−1.92	0.14	$\beta_{14,3}$	−0.19	0.11
$\beta_{5,1}$	1.27	0.11	$\beta_{10,1}$	0.63	0.11	$\beta_{15,1}$	−0.81	0.12
$\beta_{5,2}$	0.54	0.11	$\beta_{10,2}$	−0.08	0.11	$\beta_{15,2}$	−1.14	0.12
$\beta_{5,3}$	0.27	0.11	$\beta_{10,3}$	−0.98	0.12	$\beta_{15,3}$	−2.26	0.15

The first index refers to the situation (see the Appendix), the second to the type of VA behaviour (curse, 1; scold, 2; shout, 3).

wanting to display VA behaviour. The mean β_{jk} per kind of VA behaviour are 0.65 for wanting to curse, −0.19 for wanting to scold, and −0.94 for wanting to shout. These estimates correspond to mean probabilities of 0.66, 0.45, and 0.28 for respectively wanting to curse, wanting to scold, or wanting to shout for a person with a mean action tendency. In Figure 2, the probabilities of the VA behaviour activation for the person with an average VA action tendency are plotted per kind of VA behaviour, for the 15 situations. It is clear from the figure that there is a lot of variability in the action tendencies, primarily depending on the situation. In situations 3, 5, 12, and 14 the probability of wanting to scold approximates the probability of wanting to shout, whereas in situations 2, 11, and 15 the probability of wanting to scold lies closer to the probability of wanting to curse. A possible

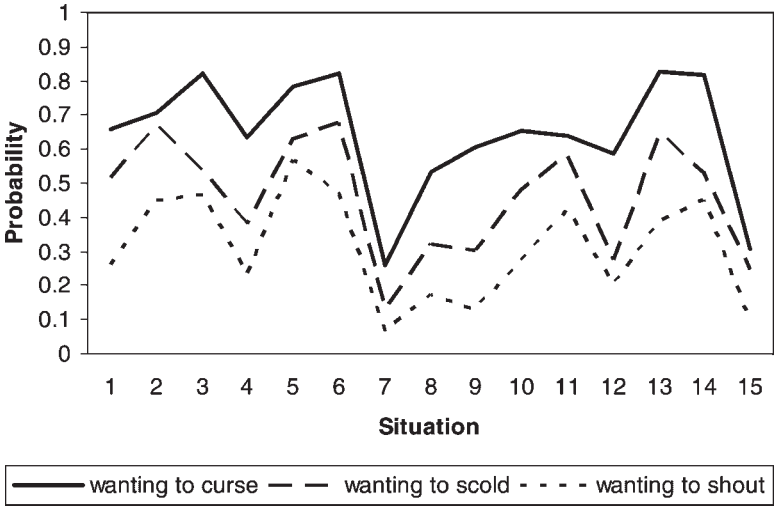

Figure 2. Probability of wanting to curse, wanting to scold, and wanting to shout for the average person in all 15 situations.

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explanation is that in situations 3, 5, 12, and 14 the frustrating event is caused by a thing or a material breakdown, whereas in situations 2, 11, and 15 the event is caused on purpose by another person. If no-one else is involved, the reaction may expected to be primarily expressive (cursing and shouting—the Dutch word for shouting 'het uitschreeuwen' is expressive), so that scolding is relatively less popular. When other persons are involved, the reaction may be expected to be primarily of a blaming kind (cursing and scolding) so that scolding is relatively more popular than shouting.

Regarding the personal VA action tendency (α_i) and the personal VA inhibition (κ_i) it was found that both latent variables have a variance significantly different from zero ($p < 0.0001$): 1.94 (SE = 0.14) and 1.03 (SE = 0.10) respectively. Note that the test of the variance estimate by using its standard error is a conservative test, since the variance is bounded by zero (Snijders & Bosker, 1999; Verbeke & Molenberghs, 2002, 2003). The variance of the personal VA action tendency is larger than the variance for the personal VA inhibition, meaning that people differ more in action tendency than they differ with respect to inhibition. The correlation between the action tendency and inhibition is 0.42 ($p < 0.001$), meaning that the inhibition is stronger for a stronger action tendency. Also, the mean of the personal VA inhibition is highly significant ($p < 0.001$): 0.73 (SE = 0.06). As a result, in the average situation the person with an average action tendency and an average personal inhibition has a probability of 0.29 of displaying VA behaviour (averaged over the three types of VA behaviour), which is about 0.17 less than the probability of wanting to display the VA behaviour.

The models for ordered-category data lead to similar conclusions about the best fitting model. In addition, the correlation between the situational VA behaviour activation parameters of the personal inhibition model for binary data and the corresponding parameters of the rating scale model (i.e. the location parameters of the items) was 0.99. For the latent traits, the correlations were 0.95 (action tendency) and 0.94 (inhibition) ($p < 0.001$).

We also looked for gender differences in the means of the person dependent parameters. For example, replacing α_i by $\alpha_i^* + \beta^{(\text{male})}\text{Gender}$, with 'Gender' coded as male = 1; female = 0, leads to a model which can be used for detecting gender differences in the mean of the personal verbal aggression activation. We fitted two different models: one in which we allowed for gender differences in the mean of the personal verbal aggression activation and one in which we allowed for gender differences in the mean personal VA inhibition, as a model that allows for both kinds of gender difference is not identified. The first model did not have a better fit than the original personal inhibition model without gender differences (AIC = 29 079, BIC = 29 267), and the latter had a somewhat better fit (AIC = 29 057, BIC = 29 245). The difference between the means of the personal VA inhibition is equal to 0.69 ($p < 0.0001$), resulting in a mean of 0.19 for males and a mean of 0.88 for females. As a result, in the average situation the male person with an average action tendency and an average personal inhibition has a probability of 0.41 of displaying VA behaviour (averaged over the three types of VA behaviour), and the corresponding female person has a probability of 0.26 of displaying VA behaviour (averaged over the three types of VA behaviour). However, the inclusion of this gender parameter has no further impact on our conclusions.

Correlations with external person variables

The correlations between the parameter estimates and the external variables are given in Table 4. Comparing Table 4 with Table 1, it can be concluded that, except for Anger In, all

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Table 4. Correlations between person-dependent parameters and external person variables

Parameter	TA	AO	AI	CAO	CAI	DA	IDA
α_i	0.17**	0.15**	0.08	−0.12*	−0.09	0.21**	0.21**
κ_i	−0.08	−0.20**	0.18**	0.14*	0.08	−0.16**	0.04

*$p < 0.05$ (two tailed).
**$p < 0.01$ (two tailed).
α_i: person parameter for the action tendency.
κ_i: person parameter for the behavioural inhibition.
TA = Trait Anger (ZAV); AO = Anger Out (SECS); AI = Anger In (SECS); CAO = Control Anger Out (SECS); CAI = Control Anger In (SECS); DA = Direct Aggression (BDHI-D); IDA = Indirect Aggression (BDHI-D).

expected correlations are significant, and if no correlation is expected the empirical correlation is not significant. For Anger In, the opposite pattern was found, as it correlates significantly with inhibition but not with the action tendency. It seems that Anger In suppresses the act given the action tendency, rather than preventing an outward action tendency. Anger In seems to be a way of coping with aggressive action tendencies (by preventing their expression) rather than with anger itself (by turning it inwards).

Correlations with external situational variables

The situational VA behaviour activation as estimated through β_{jk} was positively correlated with situational frustration (0.38) and with instrumentality (0.43) and expressiveness (0.44) of VA behaviour in the situation, all $p < 0.01$. From a multiple regression analysis, it can be concluded that together the situational variables explain 36% of the variance in the β_{jk} (adjusted $R^2 = 0.31$).

As we opt for a model without situational VA behaviour inhibition, we cannot relate dislike from others and negative self-evaluation to a situational inhibition parameter. Correlating the situational VA behaviour activation with dislike from others and with negative self-evaluation, a correlation of −0.50 was found for dislike from others and a correlation of −0.40 for negative self-evaluation, both $p < 0.01$. The correlation of situational VA behaviour activation with the presence of a witness is −0.19 (n.s.), and with the presence of the person to whom the VA behaviour is directed is −0.41 ($p < 0.01$). From a multiple regression analysis, it can be concluded that, together, all situational properties explain 51% of the variance in the β_{jk} (adjusted $R^2 = 0.42$). Finally, the correlation between expected dislike from others and expected hurting others is 0.78, and the correlation between expected negative self-evaluation and norm violation to 0.74; both $p < 0.01$.

DISCUSSION

The model we selected assumes that the VA action tendency in a certain situation is a function of the person and of the combination of a situation and a behaviour. When it comes to actually displaying the VA behaviour, inhibition also plays a role, but this inhibition depends largely on the person and not so much on the combination of a situation and a type of VA behaviour (or on the situation and the behaviour separately). Although the combined model is an intuitively appealing model and has a better fit when the penalty for number of parameters is not high, the personal inhibition model is preferred for two reasons. First, it is a more parsimonious model with about the same fit. Second, for the

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combined model the correlations of situational VA inhibition with the situational properties are about the opposite of the correlations of situational VA activation. Moreover, the estimates of both parameters have a high negative correlation. It turned out difficult to differentiate between the situational action tendency and the situational inhibition, which detracts from the attractiveness of the combined model from a substantive point of view.

A similar problem did not occur for the two types of individual differences. The variances of the personal VA action tendency and the personal VA inhibition are significant and the correlation between the two latent variables is only 0.42, meaning that VA behaviour depends on two different person-dependent processes or traits: the personal VA action tendency, supplemented with a trait for the inhibition of verbal aggressive inclinations (personal VA inhibition). Comparing the correlations of these two person-dependent parameter estimates with the external person variables (see Table 4), one can see that they have a differentiated pattern of correlations. The personal VA action tendency (α_i) is primarily correlated with Direct and Indirect Aggression, and with Trait Anger, whereas the personal VA inhibition is primarily correlated with Anger Out (negatively) and Anger In (positively). It seems that inhibition concerns the direction of the anger (in or out), whereas the action tendency is related to aggressiveness, whether of a direct or indirect kind.

The results shed light on the external variables, especially on the coping with anger variables and the aggressive style variables. From the correlations with the action tendency and with the behavioural inhibition, interpretations can be made about the activating and the inhibitory nature of the variables. A positive correlation with the action tendency suggests an activating role, and when the correlation with behavioural inhibition is negative this activating role is of a general kind as it includes the behavioural expression. A negative correlation with the action tendency suggests an inhibitory role, but one that is important earlier than between the action tendency and the behavioural inhibition. When the correlation with behavioural inhibition is positive at the same time, the inhibitory role is a rather general one, as it includes inhibition in an earlier and a later stage.

First, Trait Anger seems to have an activating role in the earlier part of the VA scheme, since it is not negatively correlated with behavioural inhibition. Second, Anger Out and Anger In seem primarily related to behavioural inhibition. To have an Anger Out coping style means to follow one's verbal aggression tendency and not to inhibit that tendency. To have an Anger In coping style means to inhibit one's verbally aggressive inclinations, so that they are not expressed. As far as verbal aggression is concerned, both styles seem to concern what happens with the action tendency: expression (Anger Out) or inhibition (Anger In), and not so much with the activation or inhibition of action tendency itself. One might have expected that an aggressive action tendency as such fits an Anger-Out style and contradicts an Anger-In style, but this is much less the case than that these styles are associated with the expression of the action tendency. As for Anger Out Control, the inhibitory role is rather general (a negative correlation with the action tendency and a positive correlation with behavioural inhibition), as expected, but the correlations are low. The additional control variable (Control Anger In) does not show significant correlations. Third, the aggression style variables are of an activating kind. Direct Aggression as a style, as well as Indirect Aggression as a style, are positively correlated with the action tendency. The difference is that a direct aggression style also activates the expression of the action tendency, whereas the indirect style does not.

That the correlations with trait measures are low overall is perhaps not so surprising given the specificity of the situations and behaviours (Wu & Clark, 2003), and given that

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only a subdomain (verbal aggression) is investigated. The personal VA action tendency and the personal VA inhibition have a moderate positive correlation, so that the action tendency is compensated somewhat by the inhibition. People with a higher aggressive tendency tend to have a somewhat stronger inhibitory tendency. This is remarkable, and at first sight perhaps contradictory. However, people with a very low VA action tendency will seldom feel the urge to act verbally aggressively, and by consequence they do not have the need to develop inhibition in order to cope with social norms and to maintain good relationships. On the other hand, people with a strong VA action tendency may have learned to inhibit this tendency, indeed, in order to stay within social norms and to maintain good relationships.

Gender differences were found for personal VA inhibition, resulting in a model in which females in general show a somewhat stronger inhibitory tendency than males do. Similar to the current finding, Zuckerman, Kuhlman, Thornquist, and Kiers (1991) also found that women scored higher on the Inhibition of Aggression scale of the Karolinska Personality scales (Schalling, 1978), and that men scored higher on the Aggression scale of the Personality Research Form (Jackson, 1974). At a more general level, the inhibition of aggression is positively related to the Big Five factors Neuroticism and Agreeableness (Zuckerman et al., 1991). As such gender differences in the personal VA inhibition can be related to the higher scores for women on the Big Five factors Neuroticism and Agreeableness (Costa, Terracciano, & McCrae, 2001). Probably, this difference in strength of inhibitory tendency between males and females can be explained based on the finding of Crane-Ross, Tisak, and Tisak (1998) and Richardson and Green (1999) that females, more than males, indicated that aggressive behaviour is less acceptable, and a reason to be concerned about negative self-evaluation and negative effects on others.

No situational inhibition component is included in the personal inhibition theory of our choice. Based on the results, it did not pay off much to include such a component. However, because the situational VA action tendency negatively correlated with expected dislike from others and with expected negative self-evaluation, it may as well be that a situational inhibitory effect occurs earlier and affects the action tendency. Because we have no measure of feelings, we cannot investigate the inhibition in the relation between the feeling and the action tendency (an inhibition that would occur earlier in the process). Nevertheless, it seems that situationally induced inhibition mainly occurs earlier, and affects the action tendency, whereas there is still a substantial type of person-induced inhibition that plays a role later, in preventing the action tendency from being expressed in behaviour.

These results were confirmed by an analysis of the ordered-category data, as mentioned earlier. For binary data, the same models as we have used can be estimated with SEM (Mplus), but given the approximate equivalence of the logit link and the probit link, and because of the possibility of also analysing ordered-category data, we chose logistic mixed model estimation in PROC NLMIXED.

One should realize that not only is our sample of situations and behaviours small, but also the sample of behaviours (verbally aggressive behaviours) and respondents (psychology students) is rather specific. Therefore, our findings do not necessary generalize to other anger-related behaviours, and to people in general. On the other hand, the gender differences we found are in agreement with other findings in the literature.

As the estimation of both the action tendency and the behavioural inhibition are based on a limited number of behaviours in a restricted set of situations, this may attenuate the magnitude of the correlations with the more general external trait measures. On the other

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hand, working with a limited number of behaviours and situations allowed us to make a fine-grained analysis, one that looks at individual situations and behaviours.

Another limiting aspect of the present study is related to the questionnaire format: Participants were presented with parallel questions, one about wanting, the other about doing. Despite the precautions described in the method section, we cannot exclude a consistency tendency. Individual differences in inhibition may in fact partially stem from individual differences in wanting to be consistent. Perhaps for the behaviours a different approach could be followed, such as behaviour observation, but a measure of the action tendency necessary requires self-report (wants are not directly observable), so that again the same response style may occur. On the other hand, the meaningful correlations we have found with external variables are an indication that more than a response style is involved.

CONCLUSION

Although our research has limitations (self-report data, restricted sample of respondents, only 15 situations, three types of verbally aggressive behaviour), it seems that the approach was successful in modelling and understanding the data from a situation–response questionnaire, including its external validation. The two basic concepts, the verbal aggressive action tendency and the inhibition of verbal aggressive behaviour, seem slightly correlated and they each have interesting correlations with external variables. The action tendency to verbal aggression is related to Trait Anger, Direct and Indirect Aggression style, and several situational properties. The inhibition of verbally aggressive behaviour seems related to coping with one's anger, more than the action tendency itself is.

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APPENDIX

1. Someone has lost an important book of yours.
2. You have just found out that someone has told lies about you.
3. You are driving to a party and suddenly your car has a flat tyre.
4. You arrange to meet someone and he/she does not show up.
5. You are trying to study and there is incessant noise.
6. You are waiting at the bus stop and the bus fails to stop for you.
7. You are in a restaurant and have been waiting a long time to be served.
8. You are very tired and just asleep when awakened by some friends passing by.
9. The grocery store closes just as you are about to enter.
10. Someone has splashed mud over your new clothes.
11. Someone makes an error and blames it on you.
12. You are reading a mystery novel and find that the last page of the book is missing.
13. You miss your train because the clerk has given you incorrect nformation.
14. You are typing a term paper and your typewriter breaks.
15. Someone pushes ahead of you in a theatre ticket queue.

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