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To blush, or not to blush

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CHAPTER 4

Fear of Blushing: No Overestimation of Negative Anticipated Interpersonal Effects, But a High Subjective Probability of Blushing

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Abstract

To explain blushing phobics' fearful preoccupation with blushing, this study investigated the anticipated consequences of blushing when considering the interpersonal influences of displaying a blush. Using a vignette study approach, participants ($N = 48$, mean age 20.47, $SD = 4.44$) with variable levels of fear of blushing were instructed to imagine that they did or did not blush in several situations, and were asked to indicate their expectations of an observer's judgment. Irrespective of their fear of blushing, participants generally attributed negative effects to their blush in these situations. This finding sustains the idea that people dislike blushing due to the anticipated influence of the blush on other's judgments about the self, but does not support the idea that fear of blushing is fuelled by an overestimation of these negative effects of blushing. Meanwhile, high-fearfuls did report a relatively high subjective probability of displaying a blush in these situations. Expecting to blush in situations in which people generally anticipate that blushing elicits a negative observer's judgment, may well contribute to blushing fearfuls' preoccupation with blushing.

Blushing is a very common emotional response; it is generally assumed that all people blush at least occasionally (e.g., Darwin, 1872/1955; Leary, Britt, Cutlip, & Templeton, 1992; Shields, Mallory, & Simon, 1990). Despite its commonplace nature, for most people blushing is an unpleasant experience (Shields, et al., 1990). Some people even have such an extreme fear of blushing that they develop a blushing phobia and seek treatment (Mulken, Bögels, de Jong, & Louwers, 2001; Scholing & Emmelkamp, 1993). However, why people actually dislike blushing is not entirely clear.

In apparent contrast with its generally negative connotation, several authors argued that blushing has desirable appeasing and/or face-saving effects (e.g., Castelfranchi & Poggi, 1990). Also empirical evidence confirmed that indeed, blushing may serve a remedial function. A series of studies (de Jong, 1999; exp.1 & 2; de Jong, Peters, & De Cremer, 2003; Dijk & de Jong, in press) has shown that after a seemingly involuntary mishap (e.g., spilling wine on the observer's clothes), or a voluntary transgression (e.g., damaging someone else's bicycle), blushing attenuated the negative impression of the actor. In further support of its implied instrumental value, it has been shown that individuals who believed that the researcher did not perceive their blushes in the context of a self-presentational predicament, subsequently engaged in alternative remedial behaviors, whereas participants who thought their blushes were noticed by the experimenter, did not (Leary, Landel, & Patton, 1996; experiment 2). That is, these individuals acted in a way as if they realized that their blushing served as a remedial gesture. Considering these clearly positive effects of blushing, one may wonder why people would not want to blush and consider blushing to be such an undesirable response.

However, it has recently been shown, both in real time interactions (de Jong, Peters, De Cremer, & Vranken, 2002) and with a vignette study approach (de Jong, et al., 2003), that the appeasing properties of blushing are restricted to particular contexts. For example, in situations that are ambiguous with regard to the intentions of an actor (that is, in situations that can be interpreted as an intentional transgression, but also as an unintentional accident), displaying a blush has been shown to have an undesirable, detrimental effect (de Jong et al., 2002; de Jong et al., 2003). Following on from this, it could be hypothesized that people dislike blushing because they are aware of these negative consequences of blushing in ambiguous situations. Also, since fear of blushing is seen as a marker of social phobia (e.g., Bögels & Reith, 1999; Fahlén, 1997; Pollentier, 1992; Scholing & Emmelkamp, 1993), and socially phobic individuals are characterized by several information processing biases, such as overestimating probable costs of social events (Foa, Franklin, Perry, & Herbert, 1996; Heinrichs & Hofmann, 2001), one could hypothesize that fear of blushing is (partly) caused by a more extreme anticipation of these negative consequences of blushing in ambiguous situations. Yet, two recent studies

failed to find evidence for the idea that high fearful individuals indeed expect negative effects of their blushing in these types of situations.

In these experiments, high and low blushing-fearful participants had to read several vignettes containing obvious mishaps/social transgressions or ambiguous situations, and were asked to imagine that they were the central actor in the situations. In the first study, in half of the trials participants were instructed to imagine that they started to blush in these situations, whereas in the other half this information was omitted (de Jong & Peters, 2005). In the second study the “blush” information was not merely omitted, but participants were explicitly instructed to imagine that they did not blush in these situations. In the other half of the situations, as in the first study, they had to imagine they started blushing (de Jong et al., 2006). Subsequently, participants were asked to indicate how they expected to be judged by someone observing them performing this action. Results showed that participants did not expect a negative observer’s judgment when they are explicitly invited to consider the influence of displaying a blush in ambiguous situations. On the contrary, if anything, participants indicated that they expected blushing to have a *positive* effect on the judgment of an observer (de Jong et al., 2006). Thus the evidence available from these studies does not provide a clue to why people dislike blushing or why some individuals even fear the response.

However, all of these earlier studies relied exclusively on a particular class of blush-eliciting situations, that is, situations in which the actor did something wrong; he or she committed a social or moral transgression (e.g., Edelmann, 2001). These are exactly the situations in which blushing may have desirable appeasing effects. Therefore, it might still be that people expect negative effects from their blushing in situations in which it is less likely that blushing would elicit any desirable effects. To test this possibility, the focus of the present study is on undesirable effects that people may expect from blushing in common blush-eliciting situations, in which appeasement is not likely to play a role in the actors’ evaluation of their blush response.

The first possible undesirable effect of blushing is a negative judgment of others when blushing while obtaining social attention. Being the center of attention makes people vulnerable to scrutiny, and may fuel fear of negative evaluation especially in socially anxious people who generally anticipate that people will judge them unfavorably (de Jong & Peters, 2005; Stopa & Clark, 2000). Since undesirable social attention has been identified as one of the most prominent elicitors of the blush (e.g., Leary et al., 1992) and blushing in its turn may attract more attention, blushing-fearful individuals may end up in a vicious circle which intensifies their fears (cf. Mulken, et al., 2001). Following on from this, blushing phobics’ fear of blushing may be (partly) due to inflated expectancies of the negative interpersonal effects of blushing when being the center of social attention.

A second possible undesirable effect of blushing may arise from the alleged revealing properties of the blush. Crozier (2000; 2001; 2004) proposed that people typically blush when a topic has been broached that one wishes to keep hidden. That is, if event X brings into the open, or threatens to bring into the open, topic Y, and Y is something that the individual wishes to keep hidden or believes ought to be kept hidden, then X will elicit a blush (Crozier, 2000). This topic can be a personal secret, as well as a taboo subject, for example a reference to sex or body parts. A remarkable thing about blushing in these kinds of situations is that people blush because of the exposure of something personal, but it is the blush itself that is actually doing the revealing. People may well be aware of this revealing effect of blushing in this type of situations. Following on from this, people may also expect undesirable revealing effects of their own blushing in situations that may expose something that they wish to keep hidden. The present study tested whether people indeed anticipate that displaying a blush may reveal information that they wish to keep hidden and whether the anticipated revealing effects of displaying a blush would be especially pronounced in blushing-fearful individuals.

In sum, the present study tested the following predictions for situations in which participants obtain social attention: (i) participants anticipate a negative judgment, when they are explicitly instructed to consider the impact of displaying a blush on others' judgments about themselves (e.g., less socially skilled); (ii) since fear of blushing is seen as a marker of social phobia, participants who are high in fear of blushing will expect a relatively negative judgment by others independent of displaying a blush; however, (iii) fear of blushing moderates the relationship between the presence or absence of a blush and the anticipated undesirable effects; that is, these anticipated undesirable effects of blushing are relatively pronounced in relatively high blushing-fearful individuals. The present study tested the following predictions for situations in which something could be revealed: (iv) participants expect blushing to have revealing properties when there is a threat that something personal will be exposed; (v) these anticipated revealing effects are relatively pronounced in relatively high blushing-fearful individuals.

Method

Participants

The participants were 48 women who were first-year psychology students at the University of Groningen (mean age 20.47, $SD = 4.44$). To optimize comparability with the previous studies (de Jong & Peters, 2005; de Jong et al., 2006) we restricted our sample to female participants. Also, there could be a difference in the way men and women expect to be judged when they blush. Since we were not primarily interested in sexual differences, we decided to keep this potential source of variance out of the design. All first-year

psychology students ($N = 475$) completed the blushing subscale of the Blushing, Trembling and Sweating Questionnaire (BTS-Q; Bögels & Reith, 1999). On the test form they could indicate whether they were willing to cooperate in further research. From those who indicated that they were willing to do so, we selected the individuals with the highest BTS-Q scores as well as the individuals with the lowest BTS-Q scores, thus ensuring that a broad range of individuals with various levels of fear of blushing participated in the experiment. In return for participation participants received course credits.

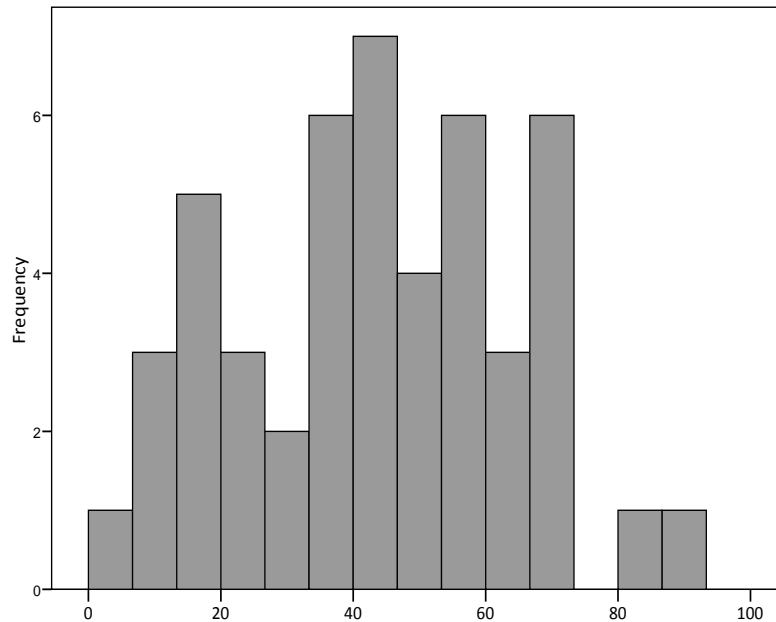


Figure 1. Histogram of the distribution of BTS-Q scores

Assessment

For a more comprehensive description of the sample, the participants completed the twelve-item version of the Fear of Negative Evaluation Scale (FNE; Leary, 1983); the social phobia subscale of the Fear Questionnaire (FQ; Marks & Mathews, 1979); and the nineteen-item version of the Blushing Propensity Scale (BPS; Bögels, Alberts, & de Jong, 1996) that was originally developed by Leary & Meadows (1991). Also, we measured the blushing subscale of the Blushing, Trembling and Sweating Questionnaire (BTS-Q; Bögels & Reith, 1999) for a second time. Although we initially selected our participants on the basis of extreme BTS-Q scores, this bimodal distribution did not hold in the second pretest (see Figure 1), which was several months later. However, as can be seen in both Figure 1 and Table 1, the participants'

BTS-Q scores showed considerable variation, and our sample contained high-fearful participants in the phobic range. A substantial part of the sample (25%) had a BTS-Q score above 58, which is similar to the mean scores that Mulkens and colleagues (2001) reported for their treatment-seeking groups, and also similar to high-fearful groups in other analogous studies (e.g., de Jong & Peters [2005] reported $M = 59.4$, $SD = 14.5$ for their high-fear group).

Table 1
Descriptive Variables and Their Inter-Correlations

Scale (possible values)	Mean (sd)	Range min – max	Correlations		
Mean BTS-Q (0-100)	43 (21)	5 – 90	BTS-Q	BPS	FNE
Sum BPS (0-76)	36 (13)	9 – 62	.72**		
Sum FNE (0 – 48)	25 (11)	5 – 47	.49**	.55**	
Sum FQ- Avoidance (0 – 40)	16 (7)	5 – 32	.55**	.53**	.50**

Note. BTS-Q = Blushing, Trembling, and Sweating Questionnaire (Blushing Subscale); BPS = Blushing Propensity Scale; FNE = Brief fear of negative evaluation scale; FQ = Fear Questionnaire (Social phobia subscale), ** $p < 0.01$, (2-tailed).

Consistent with previous research (e.g., Bögels, Alberts, & de Jong, 1996; Neto, 1996), fear of blushing was associated with social anxiety as indexed by the social phobia subscale of the FQ (see Table 1). A similar association was evident with FNE scores. The modest correlations between indices of social anxiety and fear of blushing support the validity of differentiating between fear of blushing and the more general concept of social anxiety (cf. Bögels & Reith, 1999).

Materials and Measures

The participants were told that this experiment concerned an investigation into the appraisal of events. Following the procedure of earlier research by de Jong and colleagues (2006), participants were presented with a series of vignettes, and each vignette was either coupled with the comment “imagine that you start blushing visibly” or “imagine that you do not start blushing visibly.” The participants were prompted in the perspective of the actor in the situation and were asked to imagine themselves in this situation as clearly as possible. In an attempt to strengthen the imaginative power, all vignettes were presented aurally, using a prerecorded CD. Subsequently, several Visual Analogue Scales (VASs) were presented on paper.

There were two different categories of vignettes (see Appendix). To eliminate the influence of particular contexts, we used four different but

conceptually similar incidents for each of the two distinct categories of vignettes, and systematically varied the blush vs. no-blush information for these different incidents. In one category, the situations that were described could elicit undesirable *personal exposure* (e.g., a conversation about a sexually transmitted disease). The other category of vignettes described situations in which one could expect a *negative judgment* from observing others. In these situations the participants had to imagine they received social attention (e.g., having your class sing “Happy Birthday to You”).

Thus there were four different types of vignettes: Two kinds of undesirable effects (personal exposure vs. negative judgment) times two actor’s responses (blush vs. no blush). Participants were presented with a series of eight vignettes (two of each type); for each series a particular incident appeared only once. To minimize the influence of carry-over effects, the order of vignettes was randomized for each participant.

After hearing a vignette, the participants were asked to indicate how they thought someone who observed them would evaluate them in this situation. The vignettes that were aimed to examine *personal exposure* were followed by one VAS in order to index the revealing properties that the participants (explicitly) attribute to their blushing. With this VAS the participants were asked to indicate their subjective probability (0% - 100%), that the observers of the situation would think that something personal had been exposed (e.g., rate the probability that this boy thinks you like him – after hearing a vignette describing a situation in which you meet a boy you like). Three VASs followed all vignettes describing social attention to examine an anticipated *negative judgment*. First, participants were asked to indicate how they think that an observer of the situation would evaluate them globally. That is, to what extent they thought others would judge them positively or negatively as a person (positive = 0, negative = 100). Secondly, participants had to indicate how socially skilled they expect to be judged by others (0 = socially skilled, 100 = socially unskilled), and thirdly, they were asked to indicate how they anticipated that the observing others would judge them concerning their competence (0 = competent, 100 = incompetent).

After hearing these vignettes and filling out the VASs, we let our participants read the vignettes again, this time without the information about whether or not a blush had been displayed, and asked them to answer three more VASs about constructs to test the validity of the selected situations for fear of blushing. That is, the absence of a relationship between these constructs and fear of blushing could explain the absence of an enhanced anticipation of negative effects of blushing. First, we examined the subjective probability of displaying a blush in the situations that were the focus of the present study. If someone expects blushing to have undesirable effects but simply does not think that he or she will blush, it is unlikely that fear of

blushing sets in. Therefore participants had to indicate the probability that they would blush if they were to encounter such a situation in reality (0 % - 100 %). Secondly, if someone is not concerned about other's opinion then an overestimation of the negative interpersonal effects of blushing is not likely to occur. We know that fear of blushing is (mildly) related to fear of negative evaluation (de Jong & Peters, 2005; de Jong et al., 2006). To ensure that this was also true in the selected situations we examined if fear of blushing is positively related to being concerned about the opinion of others in these specific situations. Thus participants were asked to indicate the importance of the opinion of others in this particular situation (0 = not important at all, 100 = very important). Finally, to check whether the situations used in the study were indeed eliciting fear in individuals who fear blushing, we asked the participants to indicate how anxious they would feel if they did blush in this situation (0 = not anxious at all, 100 = very anxious).

After finishing this study we undertook a subsequent pilot study in an independent sample, to verify that the vignettes describing situations that could elicit a negative judgment from observing others while obtaining social attention were indeed successful in eliciting the feeling of being the center of attention. Furthermore we wanted to check if these vignettes are more connected to being the center of attention than to performing a social transgression. We asked participants (N=17 females, mean age 21.59) to read the four vignettes and asked them to indicate on a VAS to what extent they felt they were the center of attention in this situation and to what extent they felt they had performed a social transgression (0 = not at all, 100 = very much). By and large the results of this pilot study sustained the validity of the selected situations; all vignettes were successful in eliciting social attention (all mean scores > 81). Moreover, although some vignettes also contained elements of a social transgression (Daydreaming), all vignettes were considered to involve more social attention than transgressions (all mean difference between the VAS measuring 'center of attention' and the VAS measuring 'social transgression' were significant at the $p < 0.001$ level). More detailed information of this pilot study can be obtained from the first author.

Data analyses

Since the effect of blushing vs. no blushing is measured within subjects, blush vs. no blush constitute the first level (i) and participants the second (j). Before running the analyses (using the program MLwiN, see <http://www.cmm.bristol.ac.uk/index.shtml>), we coded a dummy variable for *Response* (no blush=0, blush =1) and centered the values of BTS-Q. For each of the dependent variables (revealing properties, global evaluation, social skills, and competence), we tested the following multilevel regression equation: $y_{ij} = \beta_{0ij} \text{Constant} + \beta_1 \text{Response}_{ij} + \beta_2 \text{BTS-Q}_j + \beta_3 \text{Response} * \text{BTS-Q}_{ij}$. In this

equation “Constant” denotes the intercept (average of the VAS scores for a particular variable when the BTS-Q score has its mean score and Response is zero). The constant β_{0ij} was allowed to have random variance at both levels. The β 's can be interpreted as an indication of effect size. For example, a $\beta = 1$ for response would mean that participants are expected to increase one point on the dependent variable if they blush compared to if they do not blush. Likewise, a $\beta = 1$ for BTS-Q means that an increase of one point on the BTS-Q scale is expected to result in an increase of one point on the dependent variable.

Following this approach, we investigated the contribution of (i) the main factor “blush” in the design; (ii) individual differences for fear of blushing irrespective of the displayed response; and (iii) displaying a blush as a function of blushing fear (i.e., the interaction term). For all variables we started with the full equation. Via stepwise deletion of the non-significant predictors we eventually arrived at the final equation (i.e., the equations most efficiently defining the target variables) (e.g., de Jong et al., 2006). The means and standard deviations of the dependent variables as well as their correlations with BTS-Q are listed in Table 2, and the initial full equation as well as the final equation are listed in Table 3.

Table 2

Means (SD) of the Anticipated Revealing Properties and the Anticipated Observers' Judgment when being the Center of Attention, as a Function of the Displayed Response (Blush vs. No blush) and the Correlation of the Mean As Well As the Difference Scores with BTS-Q

	Response		r BTS-Q	r blush-no blush, BTS-Q
	Blush	No Blush		
Revealing properties	71 (14)	28 (16)	.18	-.02
Anticipated				
Observers' Judgment				
Global Evaluation	33 (14)	23 (12)	.35*	.02
Social Skills	44 (17)	21 (12)	.42**	.08
Competence	45 (14)	27 (15)	.15	.00

Note. High scores indicate a more negative anticipated judgment, ** $p < 0.01$, * $p < 0.05$ (2-tailed)

Table 3
Parameter Estimations (and Their Error Estimations) of the Full (F) and Final (E) Regression Equations

Dependent	Equation	# Para- meters	Model Deviance	Random component		R ² level
				[U _{0j}]	[e _{0ij}]	
Revealing properties _{ij}	F- = b _{0ij} constant + 42.95 (4.23) Response _{ij} + 0.10 (0.10) B(TS)-Q _j - .02 (0.15) Response*B(TS)-Q _j b _{0ij} = 26.15 (2.99) + u _{0ij} + e _{0ij}	6	792.64	[-]	[225.60]	
	E- = b _{0ij} constant + 42.47 (3.09) Response _{ij} b _{0ij} = 28.06 (2.18) + u _{0ij} + e _{0ij}	4	793.98	[-]	[228.77]	[-] [0.66]
Global evaluation _{ij}	F- = b _{0ij} constant + 8.88 (3.62) Response _{ij} + 0.15 (0.09) B(TS)-Q _j + 0.02 (0.12) Response*B(TS)-Q _j b _{0ij} = 20.45 (2.56) + u _{0ij} + e _{0ij}	6	762.93	[-]	[165.55]	
	E- = b _{0ij} constant + 9.23 (2.63) Response _{ij} + 0.16 (0.06) B(TS)-Q _j b _{0ij} = 20.28 (2.24) + u _{0ij} + e _{0ij}	5	762.95	[-]	[165.58]	[-] [0.16]
Social skills _{ij}	F- = b _{0ij} constant + 21.71 (3.82) Response _{ij} + 0.17 (0.09) B(TS)-Q _j + 0.07 (0.13) Response*B(TS)-Q _j b _{0ij} = 17.33 (2.70) + u _{0ij} + e _{0ij}	6	773.31	[-]	[184.45]	
	E- = b _{0ij} constant + 23.17 (2.78) Response _{ij} + 0.20 (0.07) B(TS)-Q _j b _{0ij} = 16.60 (2.36) + u _{0ij} + e _{0ij}	5	773.61	[-]	[185.04]	[-] [0.45]
Competence _{ij}	F- = b _{0ij} constant + 17.18 (3.60) Response _{ij} + 0.08 (0.10) B(TS)-Q _j + 0.00 (0.14) Response*B(TS)-Q _j b _{0ij} = 25.94 (2.82) + u _{0ij} + e _{0ij}	6	781.30	[36.20]	[164.25]	
	E- = b _{0ij} constant + 17.22 (2.61) Response _{ij} b _{0ij} = 27.49 (2.06) + u _{0ij} + e _{0ij}	4	782.61	[28.96]	[164.25]	[0.13] [0.11]

Note. We started out testing the full (F) equation and ended up with the final equation (E) using a stepwise deletion of non significant beta's (significance can be tested by dividing the parameter by its error estimate, which should be > 1.96; furthermore, all deleted beta's were smaller than 0.10).

Dummy variables were computed for Response (no blush = 0, blush = 1). [U_{0j}] = random component variance on the person level, [e_{0ij}] = random component variance on the Response level. When [U_{0j}] = [-], the random component variance on the person level is not estimated due to a very large random component variance on the measurement level. Specific details of the stepwise analyses can be obtained from the first author.

Results

Anticipated negative judgment while obtaining social attention

(i) *Global Evaluation.* For the global evaluation, the multilevel analyses resulted in the following parameter (and error) estimates of the final equation: β_{0ij} constant + 9.23 (2.63) Response_{ij} + 0.16 (0.06) BTS-Q_j, with β_{0ij} constant = 20.28 (2.24) + $u_{0j} + e_{0ij}$. The positive β of Response indicates that participants expected to be judged more negatively as a result of displaying a blush (note that Global Evaluation is scored in such a way that high values indicate a more negative evaluation). The positive β of BTS-Q indicates that participants with relatively high levels of fear expected a less positive evaluation. However, the negative anticipated effect of displaying a blush was not additionally enhanced in high fearful participants; the Response by BTS-Q interaction did not contribute significantly to the equation.

(ii) *Social Skills.* For social skills the multilevel analyses resulted in the following parameter (and error) estimates of the final equation: β_{0ij} constant + 23.17 (2.78) Response_{ij} + 0.20 (0.07) BTS-Q_j, with β_{0ij} constant = 16.60 (2.36) + $u_{0j} + e_{0ij}$. The positive β of Response indicates that the participants anticipate that observers will judge them as less socially skilled as a result of displaying a blush (note that Social Skills are scored in such a way that high values indicate less Social Skills). The positive β of BTS-Q indicates that participants with relatively high levels of fear, expect to be judged less socially skilled. The negative anticipated effect of displaying a blush on the anticipated judgment of their social skills was not additionally enhanced in high fearful participants; the Response by BTS-Q interaction did not contribute significantly to the equation.

(iii) *Competence.* For competence the multilevel analyses resulted in the following parameter (and error) estimates of the final equation: β_{0ij} constant + 17.22 (2.61) Response_{ij}, with β_{0ij} constant = 27.49 (2.06) + $u_{0j} + e_{0ij}$. The positive β of Response indicates that participants anticipate that observers judge them as less competent as a result of displaying a blush (note that Competence is scored in such a way that high values indicate less competence). BTS-Q did not contribute significantly to the equation, thus fear of blushing did not relate to the anticipation of a less competent judgment. Also, the negative anticipated effect of displaying a blush on the anticipated judgment of their competence was not additionally enhanced in high fearful participants; the Response by BTS-Q interaction did not contribute significantly to the equation.

Revealing properties of blushing when something personal might be exposed¹

For the revealing properties of blushing, the multilevel analyses resulted in the following parameter (and error) estimates of the final equation: β_{0ij} constant + 42.47 (3.09) Response_{ij}, with β_{0ij} constant = 28.06 (2.18) + u_{0j} + e_{0ij} . The positive β indicates that, as expected, the participants considered blushing to be revealing. BTS-Q did not contribute significantly to the equation, indicating that fear of blushing did not relate to a generally increased subjective probability that something personally would be revealed in the selected situations. The BTS-Q by Response interaction did not contribute significantly to the equation either; thus fear of blushing is not related to an additionally enlarged anticipation of the revealing properties that are attributed to a blush.

Validity of the selected situations for fear of blushing.

(i) *Fear of blushing in the selected situations.* To check whether the situations used in the study were relevant for blushing fearful individuals (i.e., if indeed the situations elicited relatively strong fear in individuals who fear blushing), we computed Pearson's p - m correlations between the mean BTS-Q score and the VAS that asked participants to indicate how anxious they would feel if they did blush in this situation. For both situations, the correlations were significant at the $p = .001$ level (r personal exposure = 0.76, r negative judgment = 0.81). This sustains the relevance of the selected situations for blushing fearful individuals.

(ii) *Sensitivity to others' opinions in the selected situations.* There was a positive association between the sensitivity to others' opinions and BTS-Q scores for situations that could elicit personal exposure [$r = 0.32$, $p = 0.028$] and for situations in which participants could anticipate a negative judgment [$r = 0.52$, $p < 0.001$]. Thus, for both types of situations, people with relatively high levels of fear of blushing also indicated that they considered others' opinions as relatively important.

(iii) *Subjective probability of blushing in the selected situations.* There was a convincing positive association between the subjective probability of blushing and the BTS-Q scores for situations that could elicit personal exposure [$r = 0.63$, $p < 0.001$] and for situations in which participants could anticipate a negative judgment [$r = 0.50$, $p < 0.001$]. Thus for both kinds of situations relatively fearful participants reported a relatively high subjective probability of starting to blush.

¹ To verify if all individual vignettes describing personal exposure were indeed successful in eliciting anticipated revealing effects of blushing in our participants, we analyzed the effects of blushing per vignette. This analysis showed that indeed all individual vignettes had revealing effects (for all individual vignettes the mean difference between blush and no blush was significant at the $p < 0.001$ level).

Discussion

The major results can be summarized as follows: (i) the participants anticipated a negative judgment if they blushed while being the center of attention; (ii) irrespective of displaying a blush, individuals with a relatively strong fear of blushing generally anticipated a less positive global evaluation and a relatively negative judgment of their social skills; (iii) the anticipation of these undesirable effects of blushing were not particularly pronounced in relatively fearful individuals; (iv) the participants clearly attributed undesirable revealing effects to their blushing; (v) yet the strength of these revealing effects of blushing were not particularly pronounced in relatively fearful individuals.

Unlike previous studies in the context of transgressions, where appeasing effects can be more easily attributed to blushing (de Jong et al., 2006; de Jong & Peters, 2005), the present results show clearly that in other kinds of situations people do find it disturbing to blush. Consistent with the idea that people typically blush when a topic has been broached that one wishes to keep hidden (Crozier, 2000; 2004), participants attributed undesirable revealing properties to their blush response in this type of situations. In addition, participants generally expected blushing to have a negative effect on the observers' judgment (they expected to be judged less positive, less socially skilled, and less competent) when acquiring social attention. Note that hereby we are not saying that people expect to be judged very negatively when they blush while being the center of attention; all of the mean values of the dependent variables for this type of situation fell within the positive range of each scale. However, people did anticipate to be judged less positive when they blushed than when they did not blush. This finding may help explaining why people generally consider blushing an undesirable response (Shields et al., 1990). To see if these negative properties that are attributed to blushing are based on a correct view, a necessary next step would be to investigate from an *observers'* perspective how people judge others when they blush while they are the center of attention, and to what extent blushing indeed reveals a topic that ought to be hidden (cf. de Jong, Peters & De Cremer, 2003).

The anticipated undesirable effects of displaying a blush were not especially pronounced in people with relatively high levels of fear of blushing. In line with previous studies which have shown that socially fearful individuals were characterized by a general tendency to expect a relatively negative evaluation by others (de Jong & Peters, 2005; Stopa & Clark, 2000), relatively high blushing-fearful participants indicated that they expected a more negative global evaluation when being observed by others, as well as a relatively negative judgment of their social skills. However, these effects were not inflated by displaying a blush. So neither the earlier findings in the context of social or moral transgressions (de Jong & Peters, 2005; de Jong et al., 2006), nor the present findings with respect to situations involving social scrutiny or personal

exposure, provide any ammunition for the idea that fear of blushing is due to biased expectancies of the undesirable interpersonal effects of displaying a blush.

Blushing-fearful individuals did however expect to blush relatively easily. This finding adds to previous studies showing that fear of blushing is related to the subjective probability of displaying a blush (e.g., Neto, 1996; Bogels, Alberts & de Jong, 1996). Together with the anticipated negative interpersonal outcome of displaying a blush that all participants held, these inflated expectancies of actually starting to blush may contribute to blushing phobic individuals' fearful preoccupation with blushing. A factor that may further aggravate their concern over displaying a blush resides in the finding that individuals who indicate a relatively high fear of blushing also indicated that they were more sensitive to the opinion of others in these particular situations.

It has been argued that it is important to differentiate between two kinds of judgmental biases that may be at work here (e.g., Voncken, Bögels & de Vries, 2003). Fearful individuals may overestimate the costs of a negative social event such as blushing (e.g., a negative judgment by others), and they may overestimate the probability that such an undesirable event (e.g., displaying a blush when being the center of attention) will occur. The present findings indicate that where it concerns fear of blushing, the judgmental bias concerning the overestimation of the probability appears more relevant than the judgmental bias concerning the costs of events. We do take into account that the actual probability to blush in the selected situations has not yet been systematically tested. Most studies which compared high blushing-fearful individuals with non-anxious individuals have shown that blushing-fearful individuals report a much greater perceived physiological blush activation, whereas in their actual physiological activation they showed no difference from non-anxious individuals (Drummond, 1997; Gerlach, Wilhelm, Gruber, & Roth, 2001; Mauss, Wilhelm, & Gross, 2004; Mulken, de Jong, & Bögels, 1997; Mulken, de Jong, Dobbelaar, & Bögels, 1999). However, there are also some indications that, although blushing fearfuls do overestimate the intensity of their blush, they also do blush more often or on more occasions (Bögels, Rijsemus, & de Jong, 2002; Drummond, 2001, 2003; Gerlach et al., 2001; Voncken & Bögels, 2006).

The finding that people consider blushing to have undesirable communicative properties in some contexts, together with the finding that blushing fearful individuals expect to blush more easily/intensely, may explain their fear irrespective of the actual correctness of this subjective probability about starting to blush. This is not only of theoretical interest, but may also have certain clinical implications. To the extent that the inflated expectancy of displaying a blush is not due to a differential physiological make-up, the

present data indicate that it may be profitable to address this type of judgmental bias through therapy. However, if blushing-fearfuls' inflated probability of blushing is based on a correct view, it may be more helpful to focus on the more general characteristics of blushing-fearful individuals (i.e., those not related to blushing per se) such as their enhanced sensitivity to the opinions of others, since the sensitivity to others' opinions in a particular context was found to be closely associated with individuals' fear of blushing. Although there are several therapies specific for fear of blushing (Bögels & Scholing, 1995; Bögels, Mulken, & de Jong, 1997, Mulken, et al., 2001), the clinical impression is that this fear is often unrecognized by therapists (Bögels & Scholing, 1995). More insight in this complaint is necessary to provide better help. Especially because a substantial number of people with fear of blushing consider extreme options, such as surgical treatment to remove the possibility to blush altogether (Drott, Claes, & Olsson-Rex, 2002; Nicolaou, Paes, & Wakelin, 2006), which seems not a wise decision since blushing does have important instrumental value in many contexts (Dijk & de Jong, 2006).

Some comments are in order with respect to the methodology of the present study. First, in line with the earlier studies (de Jong & Peters, 2005; de Jong et al. 2006), the present study relied exclusively on female participants. Therefore, it cannot be ruled out that different results might have been obtained in a mixed sample. Since there are some indications that women generally report a higher blushing propensity than men do (e.g., Bögels, Alberts, & de Jong, 1996), it would be an interesting next step to replicate the study with a male sample.

Second, one could speculate that we did not find an overestimation of the negative effects of blushing by high fearful participants due to a lack of power. However, a substantial proportion of our participants (25 %) scored in the clinical range of the fear of blushing subscale of the BTS-Q. Hence the present finding that fear of blushing was not related to an overestimation of the undesirable effects of blushing seems not attributable to fear levels in the present sample being insufficiently high. Moreover, the coefficients from the interaction of fear of blushing and displaying a blush or not that were deleted from the original equation, were all very small and did not even show a trend in the hypothesized direction, casting further doubt on the idea that lack of power might explain the present pattern of results.

Third, because we initially selected a group of high fearful and a group of low fearful participants and this bimodal distribution did not hold, one could question if our anxious participants were truly anxious, hence questioning if we can generalize this sample to blushing fearfuls in general. However, since the sample still contained a substantial number of participants within the phobic range of fear of blushing, the present study seems not deteriorated by this regression towards the mean of the BTS-Q scores.

Finally, it should be acknowledged that the present study relied on vignettes rather than actual interactions, and thus relied upon hypothetical situations and hypothetical responses. Such an approach relies upon participants' ability to accurately report on how they would react, and one may question whether individuals are indeed (always) able to do so. Clearly then the present vignette approach has limitations as the anticipated interpersonal effects of the blush response in real-life situations may not fully correspond with the anticipated effects in imagined situations (e.g., Parkinson & Manstead, 1993). One could nevertheless argue that what is of major concern here is whether people do anticipate an effect of their blushing on others' judgments when they explicitly consider the impact of displaying a blush (similar to situations in which individuals reconsider past interactions or anticipate on future interactions), and it seems that the influence of such explicit considerations regarding the anticipated interpersonal effects of displaying a blush can be reasonably successfully investigated with a vignette methodology (cf. Semin, 1982).

Meanwhile, it remains important to see whether the present findings can be replicated in the context of real time interactions. Therefore, we currently examine the anticipated effects of blushing in an "in vivo" setting in which high and low fearful participants receive false blush feedback during a conversation with two confederates (see chapter 6). This in vivo set up allows us to measure both the anticipated interpersonal effect of displaying a blush and the actual influence of blushing on the judgment of the observers (i.e., the two confederates).

To conclude, whereas previous studies showed that in the context of social or moral transgressions even high blushing-fearfuls anticipate *positive* (remedial) rather than socially threatening effects from their blushing (de Jong & Peters, 2005; de Jong et al., 2006), the present study indicates that in other common blush-eliciting situations (center of attention, self exposure), in which blushing is not likely to have any appeasing effects, people generally anticipate *negative* effects from displaying a blush. Thus the available evidence indicates that the anticipated interpersonal effects of blushing are highly context-dependent. This may solve the paradox that despite its face-saving properties people generally do not want to blush (cf. Leary et al., 1996). Meanwhile, the present study provides no support for the idea that fear of blushing is fueled by a biased conception of the undesirable effects of displaying a blush. Together, the empirical evidence casts serious doubt on the idea that a bias for overestimating the costs of displaying a blush is a relevant factor in blushing phobia and suggests rather that individuals' heightened expectancy for displaying a blush in these types of situations may be the critical factor in generating blushing-phobics' fearful preoccupations with their blushing.

Appendix

Possible exposure to something personal

City. Meeting a boy that you like but you do not want him to know this.

Party. At a friend's party, the conversation suddenly turns to STDs.

Presentation. You are afraid to show your nervousness during a presentation to teachers.

Colleague. A colleague tells you she knows that you have complained about her; you try to deny this.

Negative Judgment by Others

Happy Birthday. During class you have to stand on a chair and the whole class of students sings "Happy Birthday" to you.

Wedding. You are Master of Ceremonies at your best friend's wedding and you have to give a speech.

Clothes. You get a compliment from a friend about your clothes. Then everybody focuses their attention on you and confirms that you look good.

Daydreaming. You are daydreaming during a formal lecture. Suddenly the teacher asks you something.