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To blush, or not to blush

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CHAPTER 1

Introduction

Blushing is a remarkable example of the inextricable interaction between the mind and the body. *Thinking* of what others think of us elicits a *physiological* dilation of facial veins. Moreover, the veins in this very visible area of the human body appear to be the only ones that are able to produce a blush (Mellander, Andersson, Afzelius, & Hellstrand, 1982; Wilkin, 1988). Since facial expressions function to influence our environment (Frijda, 1986), it seems obvious to suggest that also the blush serves a communicational function. In line, contemporary researchers who study the blush note that blushing can serve as an acknowledgement and apology after wrongdoing (e.g., Castelfranchi & Poggi, 1990; Leary, Britt, Cutlip, & Templeton 1992, de Jong 1999); and by that means it serves to facilitate interactions between adversaries (Frank, 1988). In clear contrast, most people consider blushing an unpleasant experience (Shields, Mallory, & Simon, 1990). Some people even have such an extreme fear of blushing that they develop a blushing phobia and seek treatment (e.g., Mulkens, Bögels, de Jong, & Louwers, 2001; Scholing & Emmelkamp, 1993). Yet, why some people fear their blushes is not entirely clear, and it seems especially odd considering the alleged positive value of the blush. It has been shown, however, that the effect that the blush has on observing others depends on the type of situation in which the blush occurs (de Jong, Peters, & De Cremer, 2003). For example, when the blushing person's motives are unclear, blushing can have negative revealing effects (de Jong, et al., 2003). It might be that this negative signal value is what bothers people about the blush.

Note that there are two perspectives that play a role. First, the effect that blushing has on an observer. Observing someone's blush might elicit emotions that remediate a relationship after a disturbed social interaction, or might elicit negative feelings such as distrust about the blusher's motives (de Jong, Peters, De Cremer, & Vranken, 2002; de Jong et al., 2003). Second, and more central to understanding fear of blushing, the signal value can be studied from an actor's perspective. A blushing actor, for example, might lack confidence in the ability to control his/her appearance or might anticipate social rejection because of the blush. The present thesis deals with these two perspectives in studying the (anticipated) communicative value of the blush.

The Blush as a Functional Signal

In 1839 Dr. Thomas H. Burgess wrote a profound scientific work on the blush. He stated: “[...] that the probable intent of the Creator, in endowing man with this peculiar property, was, that the soul might have the sovereign power of displaying in the cheek, that part of the human body which is uncovered by all nations, the various internal emotions of the moral feelings whenever they are infringed upon either by accident or design, and that this precaution had the salutary effect of enabling our fellow beings to know

whenever we transgressed or violated those rules which should be held sacred, as being the bond that unite man and man in the civilized state of social existence” (p. 49). Clearly, Burgess thought of the blush as a sign of moral integrity which prevents people from going astray. Several decennia later Darwin (1872/1989) wrote a chapter about the blush in his famous book: “The Expressions of Emotions in Man and Animals”. In this chapter Darwin lent greatly on Burgess’ observations. However, in contrast to the notion of Burgess, Darwin concluded that the blush serves no function at all: “[...] as it makes the blusher suffer and the beholder uncomfortable without being at least service to either of them” (p. 264). This objection of the blush as a functional signal might have been due to his resistance against any idea of design. Nevertheless, most contemporary researchers agree with Burgess’ account of the blush. Although they omit the idea that the blush was especially designed by a higher force, they do propose that the blush signals that the blusher experiences moral/self-conscious emotions and that signaling this might serve an important communicative function.

Note, in passing, that it is not claimed that a blush exists *because of its* communicative function. Blushing is an uncontrolled response that is mediated by sympathetic vasodilatation (Drummond & Lance, 1987). According to the derivation principle (Tinbergen, 1952), uncontrolled signals do not primarily originate for the function of signaling. Tinbergen illustrates this with the dung beetle. This beetle has an advantage: because it resembles a piece of dung, it will not be eaten by predators. However, it is unlikely that this advantage was already present in the first step of evolving from a normal beetle appearance into a dung resembling beetle; the first changes in the beetle occurred for reasons unrelated to resembling dung. Only then when the beetle could really be mistaken for a piece of dung, would its appearance receive its advantage. Correspondingly, it might very well be that a blush is merely a physiological response that happens to co-occur with an emotional state. However, because it is a highly visible response, it obtained signal value. As another example, draw a parallel between blushing and trembling. Trembling occurs when one is afraid, and thereby it can signal fear. However, no one seems to suggest that the trembling exist because of its signal function.

That the blush could be an un-intentional physiological byproduct of an emotional state does not mean that it is not an important signal. Frank (1988) noted that for an emotion-signal to be credible, the signal has to correlate strongly with the emotion, it must be difficult to fake, and the failure to convey the signal should be taken as signaling the absence of the associated emotions (Frank, 1988, ch. 5). All three principles seem to apply to the blush response.

Benefits

Blushing is often seen as a distinctive feature of self-conscious emotions such as shame and embarrassment (Buss, 1980; Castelfranchi & Poggi, 1990; Darwin, 1872/1989). In a broader sense, people appear to blush when they take the perspective of someone else on the self (Crozier, 2004). When observers of a blush learn to recognize this mental state of the blusher, the blush obtains signal value. Several researchers elaborated on this alleged positive signal value. Castelfranchi and Poggi (1990) note that blushing serves to communicate to observers that an individual feels ashamed. According to them, blushing occurs when people believe their esteem in others' eyes has been damaged and conveys about blushers that "they know, care about, and fear the others' evaluation, and that they share their values deeply; and they also communicate their sorrow over any possible faults or inadequacies. [...] Blushing, then, serves as an acknowledgement, a confession, and an apology aimed at inhibiting the others' aggression or avoiding social ostracism" (p. 240). Leary and Meadows (1991) put the blush within a broader social exclusion theory (cf. Baumeister & Tice, 1990). They pose that people have a basic need to maintain their membership in important social groups and relationships, and state that blushing is one facet of an involuntary "remedial display" that occurs when people perceive that their standing in an important social group or relationship may be in jeopardy (Leary & Meadows, 1991).

Although there have been several speculations about the role the blush might play in governing social interactions (e.g., Darwin, 1872/1989; Castelfranchi & Poggi, 1990; Leary, et al., 1992, Edelmann, 2001), empirical documentation of its function remained scarce. A series of vignette studies showed, that when participants were asked to imagine that actors had committed seemingly involuntary mishaps or voluntary transgressions, imagining that these actors blushed attenuated the negative impression they made (de Jong, 1999; de Jong, et al., 2003). However, it seems very likely that the participants in these experiments did not just imagine a sole reddening of the face, but a complete emotional display including a blush. It has already been shown that muscular displays of self-conscious emotions, such as embarrassment and shame, can underpin the very emotions that establish and promote human relationships after a social transgression has been performed (e.g., Keltner, 1995; Keltner, Young, & Buswell, 1997). Hence, it cannot be deduced from the available evidence, whether blushing has a signal value above and beyond these other facial expressions. Likewise, studies that tested the interpersonal effects of blushing in the context of real interactions (e.g., de Jong, et al., 2002), were obviously unable to isolate the blush from other concomitant (facial) expressions.

There is reason to assume that blushing has signal value on top of other facial displays. A clear disadvantage of relying on the muscular

expressions of emotions is that these can also be used by cheaters, who try to simulate (Frank, 1988). The blush does not have this drawback. Because the vasodilatation of the facial veins is controlled by the autonomous nervous system (Drummond & Lance, 1987), it is almost impossible to intentionally elicit a blush (e.g., when it would be helpful to pretend shame). Therefore the blush might serve as a more sincere signal than muscular displays of self-conscious emotions. To be able to investigate the communicative value of the blush on top of other emotions one should separate the effect of the blush from the facial displays. A way of doing this is with the help of photographs of the same display, with and without a blush. By comparing the effects of an expression with a blush with the effect of that same expression without a blush, one is able to test directly the effect of the blush on top of the expression. In this way, in the study in chapter 2, we used vignettes describing a social transgression or a mishap that are followed by photographs to test whether blushing has signal properties on top of the emotional displays.

Besides serving as an apology after wrongdoing, it has also been suggested that the blush serves to facilitate social interactions (Crozier, 2006); especially in the context of interactions between adversaries (Frank, 1988). That is, when we interact in situations in which we can choose to cooperate for the benefit of all or to be selfish and maximize ones own interests, it is important for us to untangle who we can trust in cooperating (De Cremer, 1999). It has been shown that facial expressions are often used in deriving the trustworthiness of others (Boone & Buck, 2003; Krumhuber, Manstead, Cosker, Marshall, Rosin & Kappas, 2007). However, facial expressions related to trust can be simulated by cheaters. Since the blush does not have that drawback, it has been suggested that the blush after a social transgression might serve to restore trust (Frank, 1988). That is, in line with Burgess early notion, the blush shows that the blusher experiences moral/self-conscious emotions and feels remorse (Burgess, 1839). Showing that one experiences self-conscious emotions, thus showing that one is bothered by the social disruption, might decrease the expectancy that the blushing individual will defect again (e.g., Frank, 1988; Gold & Weiner, 2000). In Goffman's (1959) words: "showing one's discomfort, demonstrates that, while he cannot present a sustainable and coherent self on this occasion, he is at least disturbed by the fact and may prove worthy at another time" (p. 111). A critical outcome in support of the blush as a signal that can restore trust would be, that people not only *say* that they consider the blushing person to be more trustworthy (e.g., de Jong, 1999), but also *act* accordingly.

A controlled way of testing the behavior of one person towards another person is with the use of experimental games. Trust-related behaviour, for example, can be explored with the help of a trust game (Berg, Dickhaut, & McCabe 1995). In a trust game a participant (called the Investor) receives an

amount of money from the experimenter. The Investor can send any part of this amount (between zero and all) to another person (who is called the Trustee). The experimenter triples the amount sent, so that the Trustee receives three times of what was sent by the Investor. Then, the Trustee is free to return any part of the amount of the money back to the Investor. The Trustee earns what he or she is left with. The Investor earns the amount of money he did not give to the Trustee in the first place plus what he receives back from the Trustee. In experiments in several countries, Investors typically invest about half the maximum on average (Camerer & Fehr, 2002). The amount of money an Investor gives to the Trustee can be seen as a measure of how much the Investor trusts the Trustee (to give a fair amount of money back). If blushing helps to restore trust, one would predict that, after performing a social transgression, a blushing Trustee will receive more money than a Trustee that did not blush. Chapter 3 describes such an experiment.

To recapitulate, the first two empirical chapters of this thesis investigate if blushing has communicative value. Especially, the studies in these chapters examined if blushing positively affects the judgment that an observer has of a blushing actor. This alleged positive value of the blush does not explain why people generally dislike the response (Shields, et al., 1990). However, two previous studies have shown that in some contexts blushing can negatively affect an observers' judgment (de Jong, et al., 2002; de Jong, et al., 2003).

Costs

A first study that discovered that blushing can sometimes be costly was actually set up to test the alleged appeasing properties of blushing. After testing the communicative value of the blush with the use of vignettes, de Jong and colleagues (2002) set up a further study, to test the effects of blushing in a more real-life interactional setting (cf. Parkinson & Manstead, 1993). They selected a homogeneous group of individuals sharing the important social goal of cooperation and let these individuals participate as pairs in an experimental game (a Prisoners Dilemma Game) in which they were obliged to defect instead of cooperate. As expected, this led to a significant blush response in the defecting participant. However, this blush response did not seem to create a higher level of cooperation in the observers of the blush. It even appeared that the more the defector blushed, the less positive she was judged by the opponent. A possible explanation for this unexpected finding is that the victim used the blush to infer the defector's motives: innocently playing around or brutally maximizing her own profit; and that in this rather ambiguous context the blush led to inferring the latter. After all, if the defector was really innocent, then why should she blush? This last hypothesis was put to the test in a subsequent vignette study (de Jong, et al., 2003). Participants read vignettes

referring to prototypical mishaps, transgressions, and ambiguous situations (which could be interpreted as transgression but not necessarily so). In support of its alleged face-saving properties, blushing had remedial effects after obvious mishaps and voluntary transgressions. However, in social situations that are ambiguous with respect to the actor's intentionality, blushing undermined the actor's trustworthiness. The findings of both studies suggest that the functional properties of blushing are context dependent. In the case of clear-cut deviant behaviors, blushing has face-saving qualities, but in the context of more ambiguous social situations that may be interpreted as reflecting a transgression blushing might be revealing rather than appeasing. The effect of ambiguity about the blusher's motives on an observer has also been put to the test in chapter 3. Before playing the PDG, half of the participants received the information that the opponent was forced to defect (unambiguous condition) and in the other half this information was omitted (ambiguous condition).

Fear of Blushing: Afraid of Costs?

In real life, many situations involve some ambiguity, thus blushing might often have a negative effect on others. It has been hypothesized by de Jong and Peters (2005) that this characteristic of the blush may help to explain why people generally consider blushing as an undesirable response (Shields, et. al., 1990), and why some individuals have such an extreme fear of blushing that they develop a blushing phobia (Mulken, et al., 2001; Scholing & Emmelkamp, 1993). That is, it might be that especially blushing-fearfuls are characterized by a negative expectancy of the interpersonal consequences of blushing.

Fear of blushing is considered to be a social fear (Crozier, 2006). It is often described as a marker of social phobia (e.g., Bögels & Reith, 1999; Fahlén, 1997; Pollentier, 1992; Scholing & Emmelkamp, 1993). In line with this, the fear of showing bodily symptoms of anxiety, such as blushing, is the main complaint in about one third of the people who seek clinical help for their social fears (Bögels & Scholing, 1995; Essau, Conradt & Petermann, 1999). In a similar vein, Gerlach and Ultes (2003) showed the connection between fear of blushing and social phobia in reverse; they found that 58.2% of the people who sought (surgical) treatment for their reddening could be diagnosed with social phobia.

Socially phobic individuals are characterized by several information processing biases (Heinrichs & Hofmann, 2001). For example, they tend to overestimate the possible costs and/or probability of social events that are generally considered to be socially threatening (Foa, Franklin, Perry & Herbert, 1996; Voncken, Bögels & de Vries, 2003). These overestimations of the costs and probability of negative events are referred to as judgmental biases. It has

been suggested that people who fear blushing have a judgmental bias for blushing. That is, they are afraid that others will evaluate them negatively, specifically as a result of showing somatic symptoms such as blushing (Bögels & Reith, 1999). Furthermore, several studies that compared socially anxious individuals with non-anxious individuals have shown that highly anxious individuals report a much greater perceived physiological blush, whereas in their actual physiological activation they showed no difference from non-anxious individuals (e.g., Drummond, 1997; Gerlach, Wilhelm, Gruber & Roth, 2001; Mauss, Wilhelm & Gross, 2004; Mulkens, de Jong, Dobbelaar, & Bögels, 1999). This leads to the suspicion that blushing fearfuls also might have judgmental biases for the probability to blush. If people with fear of blushing expect that blushing has costs and meanwhile also expect to blush relatively easily or intensely, this might explain why blushing-fearfuls fear blushing.

Two studies tested this hypothesis for blushing in ambiguous situations, in which it already appeared that blushing has costs (de Jong & Peters, 2005; de Jong, Peters, Dijk Nieuwenhuis, Kempe, & Oelerink, 2006). In these studies, high and low blushing-fearful participants were asked to read several vignettes containing obvious mishaps/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 blushing in the situation, 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 were asked 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. Blushing-fearful participants were consistently found to overestimate the probability and costs of undesirable outcomes (a negative judgment by the observer). However, this judgmental bias was not inflated by displaying a blush. On the contrary, if anything, participants expected blushing to have a *positive* effect on the judgment of an observer, and these anticipated desirable effects were most pronounced in individuals with relatively high levels of fear of blushing (de Jong et al., 2006).

These findings do certainly not explain why blushing-fearfuls fear blushing. However, all of these earlier studies relied exclusively on a particular class of blush-eliciting situations; that is, situations in which the actor (possibly) committed a social or moral transgression (e.g., Edelman, 2001). It might still be that people expect negative effects from their blushing in situations in which it is less likely that they are conscious of the possible desirable effect of the blush. For example, people often blush when they are in the center of attention (Leary et al., 1992), or when something personal or taboo is being

exposed (Crozier, 2001; 2004). Furthermore, blushing-fearfuls often mention that they blush in totally ordinary situations in which people normally would not blush, such as when talking to a neighbor, or visiting a hairdresser. In the present thesis several chapters are set up to test if people do expect a negative judgment by others when they blush in these other types of situations. The study in chapter 4 uses a vignette approach to test the anticipated effects of blushing in situations in which people typically blush, and the study in chapter 5 was set up to test the anticipated effects of blushing in neutral, ordinary situations.

Testing the anticipated judgments using a vignette approach has drawbacks. First, the question remains whether individuals are always able to accurately predict how they would react (e.g., Parkinson & Manstead, 1993). And second, the set up of these vignette studies made it difficult to investigate whether the expected costs and probability of blushing are biased or reflect accurate beliefs. To test this it is helpful to create a more real life setting, where both the judgment anticipated by the blushing actor and the observer's real judgment of this actor can be measured simultaneously. The study in chapter 6 was designed accordingly. In that study, people with and without fear of blushing were invited to have a short conversation with two confederates who were unknown to them (Öst, Jerremalm & Johansson, 1981). During the conversation they received the feedback that they blushed intensely. The study tested whether the feedback that one is blushing leads to the anticipation that one will be judged negatively by the confederates, while the confederates' real judgment could also be measured. This approach allowed testing whether the anticipated judgment reflects an accurate belief or a bias.

In addition, this "in vivo" approach allowed investigation of the physiological blush-response during the social task. This is especially interesting since people who are bothered by their blushing often indicate that they blush relatively often/intensely (e.g., Neto, 1996; Bögels, Alberts & de Jong, 1996). Yet, studies that examined blushing fearfuls' physiological blush response have shown mixed results. Several studies that compared high (blushing) fearful individuals with people without the fear, showed that high anxious gave higher self report ratings of their blushing, whereas physiologically there was no difference (e.g., Drummond, 1997; Gerlach, et al., 2001; Mauss, Wilhelm, & Gross, 2004; Mulken, de Jong & Bögels, 1997). This seems to indicate that people who fear blushing overestimate the intensity of their blush. Nevertheless, several studies have found that blushing-fearfuls do sometimes blush more often or intensely than people without this fear (Bögels, Rijsemus, & de Jong, 2002; Gerlach, et al., 2001; Hofmann, Moscovitch, & Kim, 2006; Voncken & Bögels, 2006). Also studies using chemical instead of social stimuli to trigger a vascular response, revealed a difference in facial vasodilatation between high and low fearful participants

(Katzman et al., 2003; Stein & Bouwer, 1997), suggesting that they might have a different physiological make-up. Thus, these results indicate that people who fear their blushing do blush (slightly) more intensely than people without the fear. More research is necessary to elucidate the factors underlying fearful individuals' expectancy to blush relatively easily.

It has been suggested that the belief that one will blush can serve as a self-fulfilling prophecy: when believing that blushing is a sign of weakness, believing one is blushing causes the self-consciousness that actually enhances the blush response (Drummond, 2001). How logical this suggestion might seem, it remains unclear if self-consciousness is in fact the driving force behind a blush response. Although we do have some knowledge about the physiology of the response (see, e.g., Wilkin, 1988; Shearn, Bergman, Hill, Abel, & Hinds, 1990; Drummond, 1997), what precisely causes people to blush is still a matter of debate (see e.g., Crozier, 2006; Edelman, 2001).

Requisites of the blush response

Several studies have examined the antecedents of blushing. A clear, and often mentioned, antecedent of blushing is a faux pas or social transgression (Shields, et. al., 1990). Furthermore, people also appear to blush after they are accused of blushing or receive a compliment (Leary, et al., 1992). All these antecedents fall within a broader concept of unwanted social attention, which Leary and colleagues (1992) mention as the main reason to blush. Crozier (2001; 2004) noted another antecedent of blushing, not related to (unwanted) attention of others. Imagine you are terribly in love with a colleague at work, but you do not want other people to know this. When someone raises the topic of this colleague's love life, there is a fair chance that you will blush. That is, "if an event X brings into the open (or threatens to do so) a topic Y, and Y is something that the individual wishes to keep hidden, X will elicit a blush" (Crozier, 2001, p. 63). Thus besides unwanted social attention also the (possible) exposure of something that ought to be hidden can elicit a blush response. Furthermore, Castelfranchi & Poggi (1990) argued that people are likely to blush if they violate social rules which they share with the observing group members. For example, if you are a vegetarian, you will blush if a fellow vegetarian catches you eating a burger, but not if a carnivore catches you. In other words, according to Castelfranchi & Poggi (1990), people only blush if they are ashamed before other people, and not when they are ashamed before themselves.

It appears in all the above mentioned antecedents, people blush after they become aware of a discrepancy between their position and the position as it may appear to the other (Crozier, 2004). Darwin (1899/1872) even suggested a more direct link between the attention of other people and blushing. He assumed that attention directed to the body tend to interfere with the standard

tonic contraction of the small vessels in that part of the body, causing the vessels to dilate (Darwin, 1989/1872). Although several writers doubted this direct link between visual attention and the blush (Castelfranchi & Poggi, 1990; Leary, et al., 1992), more recently there has been empirical support for this notion. In a study, participants had to perform the embarrassing task of singing in front of an experimenter. During this task the experimenter sat on one side of the participant and looked closely at only that side of the face. In accordance with Darwin's hypothesis, increases in cutaneous blood flow were greater on the observed, than on the unobserved side of the forehead (Drummond & Micro, 2004).

However, although these findings clearly showed that visual attention may contribute to the blush response, they do not demonstrate that visual attention from others is a necessary prerequisite for blushing to occur. A more thorough understanding of the factors critically involved in eliciting a blush may help to improve our thinking about the proposed instrumental value of the blush (e.g., Castelfranchi & Poggi, 1990; de Jong, 1999; Leary et al., 1992). In addition, it may also help our understanding of why people generally consider the blush a highly undesirable response (Shields, et al., 1990). Thus more empirical evidence is necessary to disentangle the necessary prerequisites of blushing and to examine how the awareness of one self in a social context is involved in the blush response. A first attempt is presented in Chapter 7 of this thesis. The chapter describes a study that examined if visual attention is a prerequisite for the physiological blush response. In the study participants used MSN to chat with or without a webcam; during the chat-session a confederate chat partner asked an embarrassing question that may elicit a blush.

Besides the role of direct (visual) attention of other people (e.g., Drummond & Micro, 2004; Shearn, Bergman, Hill, Abel, & Hinds, 1992), there are several more cognitive mechanism that are assumed to play a role in blushing. For example, besides suggesting the role of visual attention, Darwin (1989/1872) also noted that "the thinking of what other's think of us" elicits a blush response. And as mentioned above, Crozier (2004) noted that a blush occurs when circumstances cause someone to take another's perspective of the self. In line, several researchers found mild correlations between the subscales of the self-consciousness scale (Fenigstein, Scheier & Buss, 1975) and self reported blushing. Several small correlations were found between self reported blushing and public and/or private self-consciousness (Edelmann, 1990; Leary & Meadows, 1991) and moderate correlations were found between blushing and the social anxiety subscale of the self-consciousness scale (Crozier & Russell, 1992; Bögels, et al., 1996). Furthermore, Bögels and colleagues (1996) correctly note that the self-consciousness scale lacks the specification of the direction of attention; whereas especially the focus of attention on the self may be a relevant factor blushing. Correspondingly, a questionnaire aimed to

measure self focused attention was also related (moderately) to blushing propensity (Bögels, et al., 1996). Nevertheless, these findings leave open the possibility that the correlations reflect an overestimation of the blush response instead of an actual tendency to blush more often (cf. Mulken, et al 1999). In an attempted to causally test the relationship between an enhanced focus on the self and blushing, a study of Bögels and colleagues (2002) used mirrors to increase self focus during a conversation. Unexpectedly, this did not increase blushing. More research is necessary to uncover exactly which psychological mechanisms enhance/ elicit the blush response. In chapter 7 an exploratory attempt is made; besides the role of the webcam (i.e., visual attention) in the blush response, the study also explored the role of “thinking about the impression you made” and “seeing yourself through the eyes of the other” on fear of blushing.

Outline of the Thesis

The first two empirical chapters focus on the distinct signal value of the blush from an observer’s perspective. Chapter 2 tests if blushing has distinct signal value on a neutral face as well as on top of shame and embarrassment. Chapter 3 takes the remedial value one step further and tests if blushing after a social transgression leads to trust related behavior in the observers of the blush. Furthermore, it tests the effect of ambiguity about the actor’s motives on the signal value of the blush. Chapters 4 and 5 use a vignette approach to test, from an actor’s perspective, if people anticipate that blushing has costs, such as a negative evaluation by others. Chapter 6 uses a social task to test the anticipated cost of blushing during a real-time social interaction. The last empirical chapter, Chapter 7 tests the role of actual visual attention and imagined attention from other people in the blush response. Finally, chapter 8 provides a summary and integration of the findings presented in the empirical chapters and discusses the implications of these findings for the understanding of fear of blushing.