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When gushing leads to blushing: Inflated praise leads socially anxious children to blush

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ABSTRACT

Blushing is an involuntary reddening of the face that typically occurs when people are concerned about making negative impressions on others. Although people typically blush for their mishaps or misdeeds, Darwin observed that some people, and especially children, also blush when they are lavished with praise. We theorize that socially anxious children blush when praised in inflated ways because they believe they do not match the inflated image others hold of them. Such praise-induced blushing might be particularly common in late childhood, when children's worries about their social image escalate. In this randomized experiment, 105 children (ages 8–12, 85% Caucasian) sang in front of an audience. Afterwards, children received inflated praise ("You sang *incredibly* well!"), noninflated praise ("You sang well!"), or no praise. Children's physiological blushing was assessed through photoplethysmography and a temperature sensor. As predicted, inflated praise—but not noninflated praise—increased blushing in socially anxious children. This emerged for blood pulse amplitude changes (AC reactivity) and self-reported blushing, not for blood volume (DC reactivity) and temperature changes. Socially anxious children may blush to "apologize" in advance for not being as incredible as others think they are. Thus, blushing may be elicited in situations that seem benign but actually evoke the fear of being evaluated negatively.

1. Introduction

> "Many children, as well as old and sensitive persons blush, when they are much praised" (Darwin, 1872, p. 327, p. 327)

To survive in the everyday social world, people have to attend to the social norms and rules of their social group. When they break these norms and rules, they may blush. Blushing, "the most human of all expressions" (Darwin, 1872, p. 309), is an innate biological response that typically occurs when people are concerned about making negative impressions on others (Leary & Meadows, 1991). That being the case, it is surprising that, as Darwin (1872) observed, some people, and especially children, even blush when there is no indication of wrongdoing, namely when they are lavished with praise. In a randomized experiment using physiological assessments of blushing, we put this possibility to its first empirical test. We focused on the key phase of late childhood (ages 8–12), when blushing becomes especially common.

1.1. Causes and nature of blushing

Blushing involves an instant reddening of the face due to an accumulation of blood in the superficial venous plexus of the facial skin in socially charged situations (Drummond, 1997, 2013; Leary & Meadows, 1991). Darwin (1872) suggested that it is "the thinking what others think of us, which excites a blush" (p. 327). Indeed, a growing body of work shows that people blush when they feel that there is a possibility of making a negative impression on people whose approval they seek (De Jong & Dijk, 2013; Leary, Britt, Cutlip, & Templeton, 1992). For example, people blush when they feel exposed, such as when they are caught tripping over their own feet or wearing the wrong outfit to a formal event (Crozier, 2004; Leary et al., 1992). In these contexts, blushing has a social function: It communicates to others that we share their rules and norms and that we care about their judgments, thereby appeasing others and minimizing their disapproval (Castelfranchi & Poggi, 1990; De Jong, 1999).

The ability to blush arises in early childhood, when children become able to see themselves as an object of social evaluation (Lewis, 1995; 2000). Consequently, they start evaluating themselves through the eyes of others (Leary et al., 1992; Lewis, 2000), which can lead them to blush when they fear that others may evaluate them negatively (Leary et al., 1992). Blushing then becomes especially common in late

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childhood, when children strongly desire to make favorable impressions on others and fear making unfavorable ones (Beidel & Turner, 1988; Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004).

1.2. Blushing and praise

Scholars have speculated that children may blush when they are praised by others (Darwin, 1872; Leary et al., 1992). In Western societies, praise is among the most common types of feedback that children receive (Brummelman, 2018; Dijkstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008). Parents, teachers, and educators often give children overly positive, inflated praise (Brummelman, Crocker, & Bushman, 2016; Brummelman, Thomaes, de Castro, Overbeek, & Bushman, 2014). For example, rather than telling children that they performed well, they may tell them that they performed *incredibly* well. But inflated praise may not affect all children equally. As Darwin (1872) noted, it may be especially consequential for those who are sensitive to other people's opinions: socially anxious children.

Social anxiety refers to the fear of being judged negatively by other people in social situations in which the person is exposed to the scrutiny and evaluations of others (American Psychiatric Association, 2013). Socially anxious children are especially prone to blushing in aversive social settings, such as performing in front of others, because they fear making an unfavorable impression (Nikolić, Colonnesi, de Vente, & Bögels, 2016). According to the cognitive model of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997; Voncken, Bögels, & de Vries, 2003), socially anxious individuals underestimate their own abilities and overestimate others' expectations of them, and therefore fear not being able to meet others' expectations. Because of this fear, they often seek appeasement and blush frequently (Bögels et al., 2010; Stein & Bouwer, 1997).

When socially anxious children are praised in inflated ways, they may feel overwhelmed. They could perceive the praise as undeserved (Castelfranchi & Poggi, 1990; Crozier, 2001, 2004) and may believe that they cannot live up to the inflated image others have of them (Brummelman et al., 2014), and thus fear others' negative evaluations of them (Wallace & Alden, 1997). They may blush to apologize, nonverbally, for not being as incredible as other people think they are. By contrast, when socially anxious children are praised in noninflated ways, they may believe that the praise sets a reasonable standard for them. Thus, they may believe they can live up to the praise, and have no reason to blush. Although this hypothesis has never been tested directly, indirect evidence suggests that being lavished with praise may lead socially anxious individuals to fear social rejection (Alden & Wallace, 1995; Wallace & Alden, 1997; Weeks, Heimberg, Rodebaugh, Goldin, & Gross, 2012).

1.3. Physiological blushing

Existing research has predominantly measured blushing through self-report. However, people often underestimate or overestimate their blushing. Socially anxious individuals, for example, routinely overestimate their actual blushing (Nikolić, Colonnesi, de Vente, Drummond, & Bögels, 2015). Overcoming this limitation of self-report, we measured children's actual, physiological blushing response. Physiological blushing is reflected in cheek blood flow and temperature (Cooper & Gerlach, 2013; Shearn, Bergman, Hill, Abel, & Hinds, 1990). Blood flow can be assessed through photoplethysmography, which has two components: alternating current (AC) and direct current (DC). Its fluctuating AC component reflects blood pulse amplitude (i.e., blood volume change with each heartbeat), which acts quickly (Swain & Grant, 1989). Its DC component reflects the average level of blood volume and represents blood pooling in the arteries, veins, and capillaries, which acts slowly (Allen, 2007). In addition, changes in cheek temperature, which are caused by increases in blood flow and consequent vasodilation and occur later than changes in blood flow, can be assessed through a temperature sensor (Peper, Harvey, Lin, Tylova, & Moss, 2007). Thus, blood pulse amplitude (AC) indexes immediate changes in blushing, whereas blood volume (DC) and temperature changes index slowly emerging changes (Cooper & Gerlach, 2013).

1.4. Present experiment

Here, we report a randomized experiment in which we examined, for the first time, whether inflated praise leads socially anxious children to blush. We focused on the key age of late childhood (ages 8–12). Children and their parents first completed well-established questionnaires of children's social anxiety. Children were then invited to sing a song on stage in front of a small audience. Afterwards, a "professional singer" gave them inflated praise, noninflated praise, or no praise at all. We measured children's blushing by assessing blood pulse amplitude (AC), blood volume (DC), and temperature changes in the cheek. We hypothesized that inflated praise would increase blushing in socially anxious children.

2. Method

2.1. Participants

Participants were 105 children (56% girls) aged 8–12 (Mage = 9.50 years, SD = 1.18 year; 85% Caucasian) recruited through public elementary schools in the low to upper-class neighborhoods in the Netherlands to take part in a larger study about socio-cognitive and physiological indices of social anxiety. They were accompanied by one of their parents (77% mothers) aged 25–60 (Mage = 43.00 years, SD = 6.15 years), who had relatively high educational levels (M = 3.50, SD = 0.65, from: 1 = *primary school degree*, 2 = *secondary school degree*, 3 = *college degree*, to 4 = *university degree or higher*). Parents provided active informed consent for their children and for themselves. The study was approved by the Ethics Review Board of the University of Amsterdam.

We selected our sample size to achieve sufficient statistical power. Based on previous research on contextual effects on blushing in socially anxious individuals (e.g., Drummond et al., 2003), we expected a moderate-sized interaction between praise and social anxiety on blushing. Power analysis showed that our sample size ensured sufficient power (0.89) for detecting a moderate-sized interaction (α = 0.05, two-tailed; Champely, 2015; Cohen, 1988).

2.2. Procedure

Social anxiety. Children visited the Family lab of the University of Amsterdam with one parent. Both the child and the parent completed the Social Phobia Anxiety Inventory, a well-established questionnaire to index child's social anxiety (child report: SPAI-C, Beidel, Turner, & Morris, 1998; Utens, Ferdinand, & Bögels, 2000; parental report: SPAI-C-P, Beidel, Turner, Hamlin, & Morris, 2001). Both versions of the questionnaire consist of 26 items and a 3-point Likert response scale (0 = *never*, 2 = *always*; child report: M = 0.45, SD = 0.32, Cronbach α = 0.96; parental report: M = 0.44, SD = 0.34, Cronbach α = 0.94). Sample items include: "I feel anxious when I am with other girls, boys, or adults and I am in the center of attention (when everyone is looking at me)" in the child report version and "My child feels anxious when she/he is with other girls, boys, or adults and she/he is in the center of attention (everyone is looking at her/him)" in the parent-report version. Because child report and parent report were correlated, r (99) = 0.50, $p < .001$, we standardized the scores and averaged them into a composite. Results remained the same when child-report and parent-reported scores were analyzed separately (see Robustness Analyses).

Praise. After completing the questionnaires, parents were asked to stay in the waiting room while children joined the experimenter to the