It's only embarrassing if you care what people think: A study on the difference in expressing the emotion embarrassment in children and adults

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Master thesis

It’s only embarrassing if you care what people think

A study on the difference in expressing the emotion embarrassment in children and adults

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Abstract

The aim of this thesis is to compare the difference in the facial expressions and skin conductance response associated with the emotion embarrassment between young children, older children, and adults. There have been several studies examining self-conscious emotions in adults, but there is little information about self-conscious emotions in children and the difference in the expression of these emotions in children and adults in the same study, a shortcoming this thesis addresses. In this task, we compared the skin conductance response in young children, older children, and adults. We also compared prototypical facial expressions of embarrassment in young children, older children and adults.

Two measurements were taken during this experiment. The participant had to sing first, this was recorded. Facial expressions were recorded with a webcam while the participant was watching back at his own video. The other measurement was skin conductance. This was measured with electrodermal activity while the participant was watching back his own video. The purpose of the social performance task was to elicit embarrassment in children and adults. A One-Way ANOVA was run to determine if there were differences in skin conductance levels between different age groups and a One-Way ANOVA was run to determine if there were differences in facial expressions between different age groups.

The study revealed that no significant differences had been found between the different age groups and skin conductance levels and different age groups facial expressions. However, limitations were found that may have prevented significant differences from emerging and it would be interesting to conduct further research on the development of the emotion embarrassment.

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Finally, I would like to thank my family and friends for their support during all phases of my study.

I hope you enjoy reading this thesis,

Nina van der Wel

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Sylvan Tomkins is one of the most important pioneers in the field of basic emotions. He distinguished six biologically determined emotions, with mild and strong intensities for each emotion: 1) surprise transitioning to fright (surprise-startle); 2) confusion transitioning to fear (distress-anguish); 3) anger transitioning to rage (anger-rage); 4) happiness transitioning to joy (enjoyment-joy); 5) interest transitioning to excitement (interest-excitement); 6) fear transitioning to panic (fear-terror) (Güldner, 2015). Many modern emotion theories are based on Tomkins' work (Gu et al., 2019).

Research on facial expressions of emotion has been episodic (Ekman & Oster, 1979). Darwin proposed that universal facial expressions of emotion are inherited. He reasoned that at some early time in history certain facial movements were acquired to serve some biologically adaptive function, and that over countless generations their association with emotion became innate. They are now vestiges of once biologically useful movements which do communicate feelings, but which do not have as their primary purpose the “expression” of an inner state to another person (Ekman, 1971).

Research mainly uses the following set of “basic” emotions namely happiness, sadness, fear, anger, surprise disgust (and sometimes contempt) (Ekman, 1971). 'Interest' as used by Tomkins has disappeared from that set and 'disgust' and 'contempt' have been added (Güldner, 2015). A characteristic of the basic emotions is that they have unique and universally recognizable facial expressions that are the same across cultures, as demonstrated by Paul Ekman (2008), among others.

Damasio (2010) considers basic emotions to be complex, largely automated action tendencies that have evolved over the course of evolution. Thus, the world of emotions is largely a world of actions performed in our bodies, from facial expressions and postures to changes in the internal environment and complemented by a variety of ideas and forms of cognitions. Damasio considers emotion and feeling to be the two-connecting links between body and mind (Damasio, 2010).

In everyday language the terms feelings and emotions are often used interchangeably. For neuroscience, emotions are more or less the complex reactions the body has to certain stimuli. For example, when we are afraid of something an emotional reaction occurs automatically and unconsciously; our hearts begin to race, our mouths become dry, our skin and our muscles contract. When we become aware in our brain of the physical changes, feelings occur; we experience the feeling of fear (Lenzen, 2005).

In other words, emotions are actions associated with ideas and ways of thinking, whereas emotional feelings are primarily perceptions of what our body does when we become and perceptions of our state of mind during such a period of emotional feelings (Güldner, 2015).

Ekman suggests that many emotions can come upon us unawares. Emotions can be elicited very quickly, so quickly in fact that our conscious self is not involved (Powell et al., 2013). Emotions can prompt appropriate behaviour but also behaviour that we regret terribly afterwards (Ekman, 2008). Thus, the importance of emotions is not to be overestimated. We try to maximize the experiences of positive emotions and minimize the experiences of negative emotions (Güldner, 2015).

Self-conscious emotions

Self-conscious emotions are another theoretical category of emotions and differ from basic emotions because they require self-awareness and self-representations (Robins & Schriber, 2009).

*"An emotion generated when events reflect on the worth or value of the self in one's own or others' eyes. Self-conscious emotions include shame, pride, guilt, and embarrassment. Also called self-evaluative emotion" (*American Psychological Association, n.d.).

A second distinctive feature of self-conscious emotions is that they develop later than basic emotions (Tracy & Robins, 2004). One explanation that researchers have offered for the

later development of self-conscious emotions is that they require the capacity for self-awareness and the formation of stable self-representations (Tracy & Robins, 2004).

From the developmental psychological perspective, we know that children are not capable of global self-evaluations until halfway through elementary school age (Van Loon & Roebers, 2017). Only then are they consciously concerned with the implications that events and experiences, such as the valuation of one's own competencies and one's position in the group by (social) comparison, have for self-image and self-esteem (Harter, 2006). An important function of self-conscious emotions is to achieve social goals, i.e., to maintain social status or to avoid rejection by the group (Keltner & Buswell, 1997). In this sense, self-conscious emotions also have an implicitly social signalling function (De Hooge et al., 2010). Unlike basic emotions, self-conscious emotions do not have unique and recognizable facial expressions (Hendriks et al., 2021). However, it is possible to describe typical body postures and head movements in combination with facial expressions for some emotions such as pride, shame, or embarrassment (Tracy & Robins, 2007).

We generally experience self-conscious emotions only when we become aware that we have met or fallen short of our real or ideal self-representation (Robins & Schriber, 2009). Events that do not activate the process of self-evaluation lead to basic emotions (Tracy & Robins, 2007). Winning the lottery probably activates happiness (level of basic emotions) in most people while, losing a game triggers self-evaluation in addition to shame: 'where did I fall short and where did I fail?' (level of conscious emotions) (Güldner, 2015).

According to Tracy and Robins through the activation of self-evaluation, self-conscious emotions arise. Of importance is whether an event affects the person someone is or would like to be'. In the absence of this importance for self-representation, self-conscious emotions are absent. However, if the event is important for the image that someone has or would like to have of himself and, moreover, the cause is attributed to himself, then this leads to self-conscious emotions. Depending on this evaluation process, the self-conscious emotions

will be more positive if they are more in line with one's own ideas about oneself and more negative if they deviate too much from "who I am or would like to be" (Tracy & Robins, 2007, pp 10).

Embarrassment, for example, is experienced only in front of others, 'stumbling while dancing' or in the public exposure of one's own incompetence (Lewis, 2000; Tracy & Robins, 2007).

Socio-emotional development in children

A child's social-emotional development includes the experience, expression, and management of emotions and the ability to establish positive and rewarding relationships with others. It includes both intrapersonal and interpersonal processes (Cohen, Onunaku, Clothier, & Poppe, 2005). Interpersonal processes are processes where exchange of ideas and information happens between two or more people by way of any channel, whilst intrapersonal processes are done with oneself. Included are the thoughts, assessments, contemplations, and feelings that are associated with one’s inner communication (Lewison, 2021).

Core characteristics of emotional development include the ability to identify and understand one's feelings, to accurately read and interpret emotional moods in others, to regulate one's own behaviour, to develop empathy for others, and to establish and maintain relationships with others (National Research Council, 2008).

Adults' proclivity to promote, enhance, and manage their own public image in the presence of others has been documented in different studies (e.g., Leary & Allen, 2011; Mead, Baumeister, Stillman, Rawn, & Vohs, 2011; Tennie, Frith, & Frith, 2010). Adult participants, for example, tend to be more generous and perform better in activities when others are observing rather than when they are alone (Kawamura & Kusumi, 2018). Even when a majority judgment or opinion is clearly incorrect or erroneous, strong adherence to that judgment or opinion is common. These well-documented phenomena are inextricably linked to what we call evaluative audience perception (Botto & Rochat, 2018).

Evaluative audience perception captures the basic human proclivity to believe that one's own behaviour or appearance could be, or will be, evaluated positively or negatively by others; and have a general preference for eliciting positive rather than negative evaluations from others (Botto & Rochat, 2018).

While there is evidence that adults manage their reputation only a handful of studies explored what happened when children begin to display reputational concerns. Evidence shows that children aged between 3 and 5 years begin to show reputational tactics that look like those of adults (Botto and Rochat, 2019).

Haun and Tomasello (2011) replicated a classis study from Asch (1956) and showed that 4-year-old children tend to conform to a majority opinion in public, but not in private. When children turn 5 years old, they expect someone who is ostracized and seeking affiliation with a group to strategically engage in strong conformity. The 5-year-old children tend to be more generous and cheat less in the presence of an observer. Studies also suggest that 5-year-olds cooperate more when they believe their actions will be seen by others. Furthermore, 6-year-olds act in ways that appear fair while favouring themselves unfairly. These findings imply that children, like adults, are socially aware and will change their behaviour to manage their reputation in the presence of others (Yazdi et al., 2020).

Between the ages of 6 and 8 years, a miniaturization of emotional expression emerges in situations where someone is alone, but not in situations with someone else present. Miniaturization is toning down expression signs of an emotion by replacing prototypical expression sign with a partial pattern or no expression at all (Holodynski, 2004).

Embarrassment

Embarrassment is a complex feeling that arises when self-awareness allows the concept of "me" to form (Tracy & Robins, 2004). At this point, the child realizes that they are the focus of someone else's attention. The presence of others serves as an embarrassment activator. Complimenting a toddler, for example, may cause the child embarrassment; even

pointing to the toddler and saying his or her name can have the same impact. Empathy emerges at this point because the toddler can now put himself in the shoes of the other (Tracy & Robins, 2004).

At this time children understand different mental states and can attribute them to others. From the age of four children understand that others' perception and feelings about events may differ from their own (Allen & Jones Bartoli, 2018).

The child begins to integrate the standards, rules, and goals of his or her family and peers in the third year of life. A new set of self-conscious evaluative emotions emerges because of this new capability. Guilt, shame, pride, and arrogance are among them. When the child is in the company of others, it causes shame and breaches the culture's standards, rules, and goals. The child's embarrassment can occur at this moment as a result of being the focus of another's attention in and of himself/herself, as well as a result of being the focus of another's attention due to a failure of some standards, rules and goals (Lewis, 2011).

Keltner (1996) stated that embarrassment, shame, and guilt figure prominently in human affairs. They are associated with social and moral transgressions, involve self-awareness, and motivate reparations for transgressions. These ``social-moral emotions'' play critical roles in psychopathology, personality, and such social phenomena as the demarcation of status differences and moral behaviour.

Importantly, embarrassment is also associated with a prototypical expression. In the study from Keltner (1996), he categorized different facial expressions: gaze down, gaze shifts, smile controls, smile, head movements, head turn to side and face touches. He compared the facial expressions of embarrassed participants and amused participants.

The results were as follows; Embarrassed participants looked down more rapidly and for a greater proportion of the rest period and shifted their gaze position more frequently than amused participants; The first sideway gazes were typically left for embarrassed participants and to the right for amused participants; Embarrassed participants more frequently showed

smile controls and showed them in greater number than amused participants; Embarrassed participants more frequently turned their head away from directly facing the camera than amused participants and were more likely to show head movements down and to the left; Embarrassed participants tended to touch their faces more frequently than amused participants.

In addition to a prototypical facial expression, embarrassment is also associated with a specific psychological response. In particular, an increase in skin conductance (Howell et al., 2016). Studies inducing embarrassment in particular report increased heart rate, increased blood pressure and increased skin conductance level. This response of the autonomic nervous system reflects the arousing nature of the embarrassment experience. In one study from Shearn and colleagues (1992) they tested the difference of audience size on the physiological response for the emotion embarrassment. He found that skin conductance responses were significantly correlated with audience size and kind of stimulation. This study was done with adults, so it is not clear if children also are likely to react in a similar way.

The Present Study

The aim of this study is to compare the difference in the facial expressions and skin conductance response associated with the emotion embarrassment between young children (aged 3.5-5 years old), older children (aged 8-10 years old) and adults (18 years and older). The difference between these age groups will be examined, to see if the facial expression and/or physiological expression change across age.

To summarize, previous research (e.g., Tracy & Robins, 2004; Botto and Rochat, 2019) shows that there is evidence that adults manage their reputation, only a handful of studies explored when children begin to display reputational concerns.

There have been several researches about self-conscious emotions in adults (Keltner, 1996; Robins & Schriber, 2009), but there is little information about self-conscious emotions

in children and the difference in the expression of these emotions in children and adults in the one task. As such, two hypotheses have been derived.

Hypothesis 1: It is expected that adults will show a stronger skin conductance response than the group of young children and older children. Additionally, older children are expected to show a stronger skin conductance response than younger children.

Hypothesis 2: It is expected that adults will show more prototypical facial expressions of embarrassment (in seconds) than the group of young children and older children. Additionally, older children are expected to show more embarrassment facial expressions than younger children (in seconds).

This thesis is part of a larger study conducted by Mr. Riddell. His research focuses on the emotions embarrassment and pride, the influence of audience presence on these emotions and includes more physiological components. In this thesis, we only look at the emotion embarrassment and specifically facial expressions and skin conductance belonging to this emotion. Participants who were originally in the "audience" group are excluded within this thesis.

Methods

Participants

Due to the nature of the analyses and time constraints, the participant groups to test each hypothesis were uneven. *N* = 75 participants were included in the SCL analyses. For the group of 3.5 - 5 years old the mean age was 4.04 (SD = .44), for the group of 8 – 10 years old the mean age was 9.02 (SD = .58) and for the group of 18 years and older the mean age was 22.80 (SD = 4.94). For the group of 3.5 – 5 years old, there were 11 females and 10 males who participated. For the group of 8 - 10 years old, there were 9 females and 13 males who participated. For the group of 18 years and older, there were 16 females and 16 males who participated.

N=57 participants were included in the facial expression analyses. For the group of 3.5 - 5 years old the mean age was 3.99 (SD = .48), for the group of 8 – 10 years old the mean age was 9.11 (SD = .60) and for the group of 18 years and older the mean age was 22.59 (SD = 4.44). For the group of 3.5 – 5 years old, there were 7 females and 9 males who participated. For the group of 8 - 10 years old, there were 8 females and 9 males who participated. For the group of 18 years and older, there were 15 females and 9 males who participated.

One selection criterium was the age of the participants; for the group of young children, the participant had to be between 3.5 and 5 years old. For the group of older children, the participant had to be between 8 and 10 years old. For the adults, the participant had to be between 18 and 40 years old. The children needed parental consent to participate in the research. Since the experiment was conducted in Dutch, it was important that the participants spoke Dutch. Other criteria were no current treatment for psychological disorders and no medication for current psychological disorders.

The research project was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Review Committee Social Sciences at Leiden University with the code: *2021-11-05-M.E. Kret-V3-3521*

Procedure

The experiment was always conducted with two researchers. In the case of the child group, one of the researchers gave a tour of the room to the child, while the other researcher prepared the experiment, and the task was explained to the parent(s). For adults the task was simply explained. After signing the consent form(s), the tasks began. The purpose of the social performance task was to elicit embarrassment in children and adults. The task was divided into two situations: the preparation and the performance.

Social Performance Task (3-4 minutes)

The participant stood in the room with the researcher (and their parent). The other researcher waited outside of the room and was thus not visible to the participant during this part of the experiment. The researcher in the room told the participant that he/she had to sing a song of their choice. The participant was asked to stand on the yellow circle on the floor, in front of the camera. The researcher let the participant know that he/she will be filmed during their performance. The contents of the song were unimportant, and the only instruction was that they had to sing for a total of one minute.

The participant was asked to stand on the yellow circle and performed their song. If the participant sang shorter than 1 minute the researcher told him/her to sing another song. When the participant sang for a minute, the researcher told the participant to stop and prepared the next task. The video of the participant was transferred to the computer in an adjacent room as soon as possible. The video was cut so that it was exactly one minute long.

Viewing task

The participant was asked to sit in front of the monitor on the chair. To measure facial expressions, we used a webcam. Before starting to measure the physiology, the researcher had to wash his hands- and put-on disposable gloves. To measure electrodermal activity (EDA), two electrodes had to be placed on the intermediate phalange of the index finger and ring finger. It was important to wash the participants fingers with some water first. The task could

now begin. To record the baseline measures, a video of fish in the ocean was shown before the embarrassment video.

Two measurements were taken during this experiment. Facial expressions were recorded with a webcam, while the participant was watching himself/herself back. The other measurement was skin conductance. This was also measured while the participant was watching himself/herself back.

Materials

The experiment was filmed with a Sony Handycam HDR-CX240. The participants watched their videos back on a Dell Optiplex 3060, with a Phillips 243S monitor (60Hz).

The physiologgical hardware that was used to measure the skin conductance levels was a BIOPAC MP150 with GSR100C (EDA) modules with Ag/Cl disposable isotonic electrodes (BIOPAC).

The software that was used for acquiring the physiology data was Acqknowledge v5.0 (Goleta, California) and the software that was used for pre-processing was PhysioData Toolbox (Sjak-Shie, 2019). A Logitech C270 webcam was used to film the facial expressions from the participants. The software that was used for the viewing task presentation was E-Prime v3.0.

Statistical analyses

The IBM SPSS program (Statistical Package for the Social Sciences) version 28 was used to conduct the statistical analyses. Two one-way ANOVA's were conducted to test the hypotheses, the first looked at the effect of age on the facial expression of embarrassment, in the second looked at the effect of age on skin conductance levels (SCL).

Relative change scores (in percentage) were calculated for SCL data. These change scores were then multiplied by 100 to get a percentage change score. A score thus reflects how much (in %) the SCL increased or decreased from the baseline/recovery video. We

calculated these scores according to the formula: Relative Change = (Final value – Initial value) / Initial value * 100%

Results

In this section, analyses will be presented to investigate the hypotheses about effects of age on Skin Conductance Levels (SCL) and on facial expressions.

Analysis 1: Relationship age and skin conductance levels

A One-Way ANOVA was run to determine if there were differences in *Skin Conductance Levels* between different *Age groups*.

There were no outliers in the data, as assessed by inspection of a means plot. *Skin Conductance Level* scores for each group were normally distributed, as assessed by Shapiro-Willks test ($p > .05$). Homogenity of variances was not violated, as assessed by Levene's Test for Equality of Variances ($p = .311$). There was no significant difference between groups $F(2,72) = .383$, $p = .683$. This finding suggests that *SCL* did not differ for the *Age groups*. The results of the ANOVA are reported in Table 2.

Table 1

Mean SCL per age group

Age group	***N***	**Mean**	**SD**
3.5-5 years old	21	9.66	3.58
8-10 years old	22	11.47	2.43
18 +	32	13.40	2.99
Total	75	11.79	1.76

Table 2

Change in SCL ANOVA

	Sum of Squares	**df**	**Mean square**	**F**	**Sig.**
Between groups	180.75	2	90.37	.38	.68
Within groups	16993.47	72	236.02		
Total	17174.22	74			

Analysis 2: Relationship age and facial expressions

A One-Way ANOVA was run to determine if there were differences in *Facial expressions* between different *Age groups*.

There were no outliers in the data, as assessed by inspection of a means plot. *Facial expression* scores for each group were not normally distributed, as assessed by Shapiro-Willks test ($p < .05$), so a separate non-parametric Kruskall-Wallis test was used instead of a traditional one-way ANOVA. The Kruskal-Wallis test showed that there was no statistically significant difference in facial expressions between the different age groups, $\chi2(2) = 1.765$, $p = 0.414$. As such, the three groups showed similar level of prototypical embarrassment facial expressions.

Discussion

The purpose of this study was to compare the difference in the facial expressions and skin conductance response associated with the emotion embarrassment between young children, older children, and adults.

Results found non-significant associations between age and skin conductance levels, and age and the length of the facial expressions of embarrassment. These results and others are explored in detail in the section below.

In previous research (e.g., Tracy & Robins, 2004; Botto and Rochat, 2019) it has been supported repeatedly that there is evidence that adults manage their reputation, only a handful of studies explored when children begin to display reputational concerns. Additionally, there have been several researches about self-conscious emotions in adults (Keltner, 1996; Robins & Schriber, 2009), but there is little information about self-conscious emotions in children and the difference in the expression of these emotions in children and adults. This study aimed to address this gap in the literature. But found no significant differences between the different age groups and skin conductance levels and different age groups facial expressions

The relationship between Age and SCL during an embarrassment-inducing task

Although studies have found a positive association between embarrassment and skin conductance level in adults (Howell et al., 2016; Shearn et al., 1992) this has not been supported for children. There were no significant differences between skin conductance levels in younger children and older children. Likewise, there were no significant differences in skin conductance levels between younger children and adults, as well as in older children and adults.

These results do not support the hypothesis that adults would show a stronger skin conductance response than the group of young children and older children. Additionally, it does not support that the older children would show stronger skin conductance response than younger children.

It could be that there is no significant difference between the skin conductance levels of children and adults, because skin conductance levels are an indirect measure of sympathetic autonomic activity that is associated with both emotion and attention. In humans, the amplitude of skin conductance levels is related to the level of arousal elicited by visual stimuli with either positive or negative emotional valence (Laine et al., 2009).

In the current study, no parent(s) or friend(s) were allowed to be present during watching the videos back. It was an individual experiment in a setting unknown to the participants. This could cause the participants not to feel completely at ease and experience a different form of arousal, instead of embarrassment. The skin conductance levels results may have been different from what they would have been if the experiment had been conducted in a familiar setting.

Similarly, Shearn's (1996) attempted to do an analysis of the effect of audience on blushing while measuring ear coloration, cheek temperature and skin conductance response. The experiment was conducted over two days. On the first day some of the participants had to sing a song, which was recorded and on the second day they watched their own recording back while physiology was measured. Other participants had to watch a videotape that did not intended to elicit blushing but elicit physiological responses. They found that audience size and kind of stimulation interacted statistically. In the current study, the experiment was conducted on the same day. Some participants indicated that they found the singing itself very embarrassing and the looking back less so. Different results might have emerged if skin conductance levels had already been measured during singing instead of during watching their video.

Another point is that in Shearn's (1996) study, there were equal groups between men and women. In the present study there were no equal groups of men and women. It may be that there are gender differences in SCL and therefore the measurement in the current study were not significant.

The studies by Howell (2016) and Shearn (1992) used only adults as participants, whereas in the current study one of the three groups was adults and the other two groups were children. Despite working with three different groups, these groups were not very large. Perhaps significant differences in skin conductance levels and facial expressions would emerge if there were more participants in each age group.

Relationship between age and prototypical embarrassment facial expressions

It was also hypothesized that adults would show more prototypical facial expressions of embarrassment than the group of young children and older children. Additionally, older children were expected to show more embarrassment facial expressions than younger children. This was not reflected during the facial expression videos of the current study. Not much research has been done on the exact facial expression of the emotion embarrassment. In a study by Keltner (1996), he examined the facial expression of this emotion and categorized different facial expressions: gaze down, gaze shifts, smile controls, smile, head movements, head turn to side and face touches.

These results do not support the hypothesis. An explanation of our lack of findings may be explained by the group of young children often having difficulty sitting still in front of a computer. They often did not have their full interest in watching their own video back and were moving their heads a lot. They also often looked around the room. While encoding the facial expressions, these facial expressions were also included even though they may not have been linked to the emotion embarrassment.

According to Hendriks (2021), self-conscious emotions are difficult to recognize because they do not have unique and recognizable facial expressions, which, for example, basic emotions do. We found reliable patterns of responding across the participants, but especially with the group of youngest children, it remains difficult to encode these facial expressions since they may not yet really experience the emotion embarrassment and show the accompanying facial expressions.

A study by Kawamura and Kusumi (2018) indicates that there is a relationship between reputational concern and altruistic behaviour, that differs according to the type of reputational concern involved and the recipients of altruism. Participants tend to be more generous and perform better in activities when others are observing rather than when they are alone. Haun and Tomasello (2011) did another study where they found that 5-year-old children were already beginning to exhibit these behaviours. In the current study, no significant differences were found between the different groups, this could be because the participants in the adult and older children age groups knew they were being filmed. This was in fact indicated before they started watching their videos back. It may be that they would have reacted differently if they did not know they were being filmed (and therefore observed).

Finally, adults may be better at suppressing their facial expressions. This can lead to non-significant differences, because adults thus did not show their embarrassment facial expression.

Limitations

The current study has several notable limitations. The first limitation (as mentioned earlier) that many of the younger children were not able to sit still well and this may have affected the results.

Another limitation is that the sample consisted of 75 participants only for the skin conductance levels and 57 participants for the facial expressions. Due to the limited time, and the coronavirus, a larger sample was not possible.

Additionally, evidence shows that children aged between 3 and 5 years begin to show reputational tactics that look like those of adults (Botto and Rochat, 2019). Haun and Tomasello (2011) replicated a classis study from Asch (1956) and showed that 4-year-old children tend to conform to a majority opinion in public, but not in private. When children turn 5 years old, they expect someone who is ostracized and seeking affiliation with a group to strategically engage in strong conformity. The 5-year-old children tend to be more

generous and cheat less in the presence of an observer. Studies also suggest that 5-year-olds cooperate more when they believe their actions will be seen by others.

In the current study, three age groups participated. The youngest group is children in the age range of 3.5 to 5 years old. The 3.5 years old did not start elementary school yet, while the 5 years old are already in school. There is a lot of socio-emotional development in children around this age. It might have been better to separate the group from 3.5 to 4 years old into a group of children not yet attending school and a group of children from 4 to 5 years old into a group of children already attending school.

Finally, adults may be better at suppressing their facial expressions. Leading to non-significant differences in this study.

Future Research

To our knowledge, this is the first study to look at differential effects of age on embarrassment. In particular on the effect of age on skin conductance levels and on facial expressions. While few studies have looked at the change in skin conductance levels of adults while embarrassed, no study has looked at it with children. Moreover, very few studies have looked at the facial expressions of embarrassment and no studies have looked at the embarrassment facial expression of children. Therefore, this can be valuable for future research.

Future research should include a lager sample of participants in each group. In doing so, it would be good to have balanced groups with an equal number of participants in each group with an even split between men and women.

Some participants reported that they found the singing itself worse than to look back at themselves singing. In a follow-up study, it might be an idea to measure skin conductance during singing and to measure facial expressions during looking back at their singing.

Additionally, a follow-up study should consider a way in which embarrassment in young children can be examined in a better way. The group of young children found it very

difficult to stay still in front of the computer, sometimes they were scared to be in the room without their parent(s) and sometimes they even tried to stand up. This may have influenced the research results within the current study.

Furthermore, the youngest group of children should be divided into a group of children who are already attending school and those who are not yet attending school. Perhaps interesting differences will emerge from this.

Finally, it should be indicated by the researcher that it is important for the participant not to suppress their facial expressions while watching back their video.

Conclusions

This research aimed to compare the difference in the facial expressions and skin conductance response associated with the emotion embarrassment between young children, older children and adults. Based on qualitative analysis of the relationship between age and Skin Conductance Levels during an embarrassment-inducing task and the relationship between age and prototypical embarrassment facial expressions, it can be concluded that there are no statistically significant differences in Skin Conductance Levels and Facial Expressions between the different age groups. In conclusion, no significant differences were found within this study between the different age groups and the expression of the emotion embarrassment. However, limitations were found that may have prevented significant differences from emerging and it would be interesting to conduct further research on the development of the emotion embarrassment.

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