The Impact of Emotional Responses on Aesthetic Judgments of Artworks in Children and Teenagers: A pilot study

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Abstract

The field of neuroaesthetics seeks to understand how aesthetic judgment is formed and what influences it. The present study aimed to investigate how emotional responses to artworks influence its aesthetic judgment in children and teenagers by using a mixed-method approach. It was hypothesized that a) the intensity of the emotions and b) the valence of the emotions felt during art appreciation would influence the final aesthetic judgment of the artwork. An experiment was conducted with dyads of children ages 6-17 (N=12) who completed questionnaires and discussed the artworks they had brought that were meaningful to them. The results were not significant for both hypotheses. Participants experienced negative emotions and still made positive aesthetic judgments, and the intensity of the emotion had no significant effect on the judgment. We conclude that the valence of the emotion felt during art experience does not influence the valence of the aesthetic judgment. The intensity of the emotion is not an indicator of the valence of the aesthetic judgment.

Keywords: Aesthetic Judgment, Art, Emotional Response, Children

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Take a moment to recall a painting or concert you think was very beautiful or that you liked a lot. How do you decide which ones you consider beautiful and what makes you like them? This answer seems to be very subjective and depends on the "taste" someone has. The field of neuroaesthetics aims to understand the cognitive processes and brain activations that underlie the understanding of the beauty of works of art from a scientific perspective.

Aesthetic Experience

The process of appreciating and experiencing an artwork with all our senses while focusing on its beauty is called aesthetic experience. Chatterjee and Vartanian (2014) have developed a model ("The Aesthetic Triad") to provide a systematic framework for visual aesthetic experience in general. Three interacting systems contribute to the experience: knowledge-meaning (e.g., expertise, context, culture, etc.), sensory–motor (e.g., sensation, perception, motor system, etc.), and emotion–valuation (e.g., emotion, reward, wanting/liking, etc.). Depending on the artwork, these systems are weighted differently. Therefore, based on what we experience during the appreciation of an artwork we evaluate the beauty of this object. Pelowski and Akiba (2011) developed a five-stage model which breaks down the cognitive process of building an aesthetic judgment of visual art. The model starts with the *Pre-encounter* phase which happens even before engaging in art. It is characterized by the self-image, conceptual schema one has, and how the person encounters the environment. Then, in the *Cognitive mastery* stage, the viewer assesses the artist's motive and meaning of the artwork and makes a classification by including the pre-expectations from the first stage, which can result in a discrepancy between these. After that, a stage of *Secondary-control* takes place. As a self-protective mechanism, the viewer either declares the

art as meaningless or ugly, or changes the pre-expectations, such as the schema, in order to overcome the discrepancy. Then the next stage is entered: *Meta-cognitive assessment.* If the discrepancy was still not overcome the viewer starts to reassess the schema and expectations as well as altering the self-image. The final stage, the *Aesthetic outcome,* follows and is characterized by the evaluation of the artwork based on the previous self-reflection stages, resulting in a new self-image or schema. This model shows the dynamic process of developing an aesthetic judgment (Pelowski & Akiba 2011). Still, this model is reduced to visual art, which is why it would be useful to have a look at other models that focus also on nonvisual arts in order to keep the type of art as broad as possible. The model by Brattico et al. (2013) displays the cognitive processes that take place during the aesthetic experience of music. The experience starts after the stimulus was presented and a stage of *Feature analysis and integration* is entered in which the listener senses the music with one's ears. After that, the *Early emotional reactions* take place, first emotional responses such as arousal can be sensed. After that, the stage of *Cognitive processing of rules and stylistic standards* is reached, and the listener tries to understand the formal structure of the music including unexpected sound violations. Then, *Discrete emotions* are perceived by the listener or induced by the music (e.g., sadness and joy). After this stage, *Aesthetic judgment* (which will be explained in more detail below) is going to be formed as well as perceiving *Aesthetic emotions.* These two stages interact with each other. The result is the final stage, the *Conscious liking* of the music piece, which can be liking or disliking of the music depending on the previous evaluation. All the stages are influenced by the external context (e.g., environment) and internal context (e.g., mood, expertise, etc.) (Brattico et al. 2013). This model shows that aesthetic experience can have even more factors that influence that have to be taken into account when exploring aesthetic experience in general.

Aesthetic judgment

As mentioned above, one key factor of aesthetic experience is the aesthetic judgement (Brattico et al., 2013; Pelowski & Akiba 2011). Describing an object as "beautiful" or "ugly" can be defined as the aesthetic judgment of it. It is seen as the end evaluation of an aesthetic experience (Skov, 2019; Leder, 2013) and has several components that influence the outcome which will be discussed in the following paragraph. Neuroimaging studies have found that aesthetic judgments of beauty rely on neural networks that are also involved in the processing of social and moral cues such as the medial wall and bilateral ventral prefrontal cortex (Jacobsen et al., 2006). This outcome is related to the *knowledge-meaning* system of the "Aesthetic Triad" from Chatterjee and Vartanian (2014). Therefore, the decision that is made, the aesthetic judgment of an artwork, can be evaluated by the social context or moral cues.

A study by Skov (2019) found that processing positive aesthetic experiences activates the same neural network as receiving a reward, such as money. The reward circuitry involves the striatum, orbitofrontal cortex, anterior cingulate cortex insula, and amygdala and is activated during the encoding of hedonic values (Skov, 2019). The reward system is consistent with the *emotion-valuation* system of the "Aesthetic Triad". During an aesthetic experience, therefore, the evaluation of the beauty of an object is influenced by its perceived reward. Additionally, Vessel et al. (2019) found that parts of the medial prefrontal cortex (dorsomedial and anterior) were positively activated during a positive aesthetic experience. These regions are part of the default mode network (DMN), which is usually activated during resting or passive viewing. It can be activated during rest if a spontaneous self-referencing process takes place. This is further evidence that aesthetic judgment is a process that involves introspection, an inner evaluation of what is beautiful. All these studies find support in a

study by Chen et al. (2023). Their results suggest the interaction between several networks during a positive aesthetic experience.

When thinking about what you liked to wear when you were younger compared to what you might wear now, you might see a change in taste. Cox et al. (2023) evaluated the stability of aesthetic experience. They found that aesthetic experience is a dynamic process that is continually changing and therefore the aesthetic judgment too.

Aesthetic Emotions and Aesthetic Judgment

One recurring pattern during the aesthetic experience is the role emotions play (Brattico et al., 2013; Pelowski & Akiba 2011). So far researchers have tried to understand what role emotions play in forming an aesthetic judgment. Emotions, in general, refer to conscious mental responses or a strong feeling towards an object which can result in physical and behavioural changes (American Psychological Association, n.d). Due to the significance of the core representation of the body's physiological condition in emotional experience, somatosensation and interoception play crucial roles in emotion, and emotions are frequently thought of as embodied processes (Nummenmaa & Hari, 2023). Emotions are often represented in artworks and previous studies found that it is possible the emotions represented by the artist are also able to induce similar emotions or can even be able to change emotions in the consumer (Juslin & Laukka, 2004). Juslin and Västfjäll (2008) found evidence that music can evoke emotions. Researchers in the field of neuroaesthetics are arguing that there might be emotions only related to aesthetic experience, called "aesthetic emotions" (Beermann et al., 2021). These emotions are characterized by an aesthetic evaluation, associated with a feeling of pleasure/unpleasure, predict liking/disliking and predict aesthetic appeal (Menninghaus et al., 2019). Studies suggest that the emotions felt in a survival situation, for example, activate different regions of the brain to those that feel the

same "scary" emotions when watching a movie (Putkinen et al., 2021). When investigating the influence of emotions on aesthetic judgment, a study by Egermann and Reuben (2020) found that the aesthetic judgment of music was dependent on the subjective physiological response to music. It was shown that the intensity of the experienced emotions was in relation to the aesthetic judgment of the music piece which was in line with the study by Juslin and Västfjäll (2008) as mentioned above. Contradicting these findings is a study by Conwell et al. (2022), who studied aesthetic judgment with the help of machine vision systems. These systems are missing higher-order cognitive processes (e.g., creativity) and emotion. The findings suggest that aesthetic judgment and aesthetic experience are predominant based on the multi-sensory system. Based on the research that has been done so far on the role emotions play in the process of aesthetic judgment, there is still no clear answer to if and how emotional responses influence aesthetic judgment.

The Development of Aesthetic Judgment

Developmental Theories

Children also make aesthetic judgments despite their different development stages of understanding emotions. For example, "Theory of Mind " can be understood as the ability to understand thoughts, feelings, mental states, and actions of others. Older studies suggested it is fully developed already at the age of around 4 to 5 (Pesch et al., 2020), but more recent studies show that children fail to understand for example false beliefs and therefore suggest a full development of it later in life. A study by Osterhaus and Koerber (2021) evaluated the advanced theory of mind (AToM) which includes scientific reasoning. They found that AToM develops even through elementary school (ages 5 to 10). These skills such as understanding the feelings, the mental state or being able to take the perspective of others, as

well as scientific reasoning as part of the cognitive process are part of the process of developing an aesthetic judgment (Leder, 2013, Pelowski & Akiba, 2011).

Carothers and Gardner (1979) explored if age influences the possibility to perceive or produce aesthetic characteristics. They found that children in first grade (6/7 years old) only showed a little understanding of aesthetic examination whereas from 5th grade and above (age 10/11) the level of sensitivity to aesthetic characteristics was almost fully developed as in adults. This shows that aesthetic judgment and the ability to judge might differ between different age groups. Based on the model by Pelowski and Akiba (2011), self-image plays a significant role in the process of developing aesthetic judgment. The development of the self-image was found to be related to chronological age and intelligence (Katz & Ziegler, 1967), meaning that it also develops over time and can influence the ability of someone to be able to form an aesthetic judgment.

Developmental Research on Aesthetic Judgment

Taking this into account gives a perspective that has not been taken so far. Only a small number of studies have been done with participants other than adults in the research of aesthetic judgment itself of children. There is a need to investigate the range, type, intensity, and meta-understanding of emotions provoked by arts in children as mentioned by Goldstein (2022). In their study, they investigated art appreciation by children. The results suggest that emotions in artwork - abstract or not - can be recognized by children, but the cues they are using are still unexplored. Additionally, it is not known if and how children have emotional responses to artistic stimuli.

The present study

The present study evaluates how emotional responses influence the aesthetic judgment of an artwork in children and teenagers. We hypothesize that a) the higher the

strength of emotion, the higher the aesthetic judgment will be, and b) the more positive the emotions are, the more positive the aesthetic judgment will be in the end. By conducting the study with children and teenagers as well as using different types of art (audio, visual, literary, etc.) we fill in a gap in the research of aesthetic judgment. This research provides new insights into the cognitive processes underlying aesthetic judgment, and how it is formed and communicated across different developmental stages.

Methods

Ethical approval was granted by the Ethics Committee Behavioural and Social Sciences of the University of Groningen to conduct the study (research code: PSY-2223-S-0252). The experiment was conducted following Dutch ethical standards for scientific research.

Participants

We recruited participants for non-probability sampling by spreading flyers in Dutch and English around Groningen, Drachten, and Rijssen in the Netherlands and contacting mainly primary and secondary schools throughout the Netherlands. The participants were selected based on their age, which was between 6 and 17 years of age, and independent of their sex. Participants were asked to bring a buddy that wanted to co-participate in the study with them. The inclusion criteria were being able to speak Dutch or English fluently. No exclusion criteria were made. Twelve people participated in the experiment. Two participants were excluded from the analysis as their data file was damaged due to technical problems. The final sample consisted of ten (N=10) participants between the ages of 6 and 17 years old (M_{age} = 12, SD = 4.0824, n= 5 male, n=5 female).

Procedure and Materials

Prior to the experiment, the participants had to fill out a registration form. They had to read the information form with details about the experiment and thus give informed consent to participate in the study (see Appendix A). Upon consent, they indicated a preferred date and location for participation, and the language they wanted to take the experiment in. For children under 16, their parents had to give consent. The registration form was created using Qualtrics (https://www.qualtrics.com). Three locations were offered for the participants to do the experiment: at the lab (see Figure 1), at the schools of the participants, or at the participants' homes. The procedure of the experiment itself remained the same, and the experimental setting was replicated as close as possible to the one in the lab by adapting the locations of the participants and objects as well as controlling for noise and other distractions such as family members, etc.

The participants were asked to bring their buddy, which could be a friend or relative, and each of them to bring an artwork that is meaningful to them to the experiment. Additionally, they were asked to send a photo of it or in the case of a video or audio, the link to it to an email address, that was created only for the study, prior to the experiment. When the participants arrived at the location, they were asked to sit down at a table in the experimental room and to put their artwork on the table. Depending on which group they are in, their artwork was first in front of them or one of their buddies. On each of the tables, there were already tablets, and in case of an artwork chosen by the participants was a video or an audio file, a laptop and headphones were available to play it. At the beginning of the experiment, the participants had to observe the object in front of them for at least 30 seconds and then fill out a pre-questionnaire. They were created using Qualtrics. Then, they had to change the objects and fill out the same questionnaire again, but regarding their experience of the other object. After completing the pre-questionnaires, the participants had to bring the

objects to another table at the end of the room and take a seat or stand in front of this table.

Behind this table was a camera (2- Logitech BRIO) positioned facing both of the participants.

Next to the camera was a monitor to provide participants with prompts to structure the

conversation. These prompts addressed the aesthetic judgment (e.g., "What do you like or

dislike about the objects?") for the artworks. When the conversation started, we started

recording the audio and video captured by the software AudioCapture

(https://github.com/labstreaminglayer/App-AudioCapture) and SyncVideo

(https://github.com/markspan/VideoCapture) respectively installed on an experimental

laptop. We used "LabRecorder" (https://github.com/labstreaminglayer/App-LabRecorder) to

save audio and video streams to disk in XDF file format through LabStreamingLayer (LSL,

https://labstreaminglayer.org) open-source technology. During the conversation, 6 different

prompts occurred on the monitor, supported by the researcher, and each lasted around 4

minutes. The recording ended when the conversation ended. After the conversation, which

lasted no more than 15 minutes (Mean = 12.25 min), the participants were asked to sit down

again and fill out a post-questionnaire, again for both objects.

Figure 1

Experimental setting
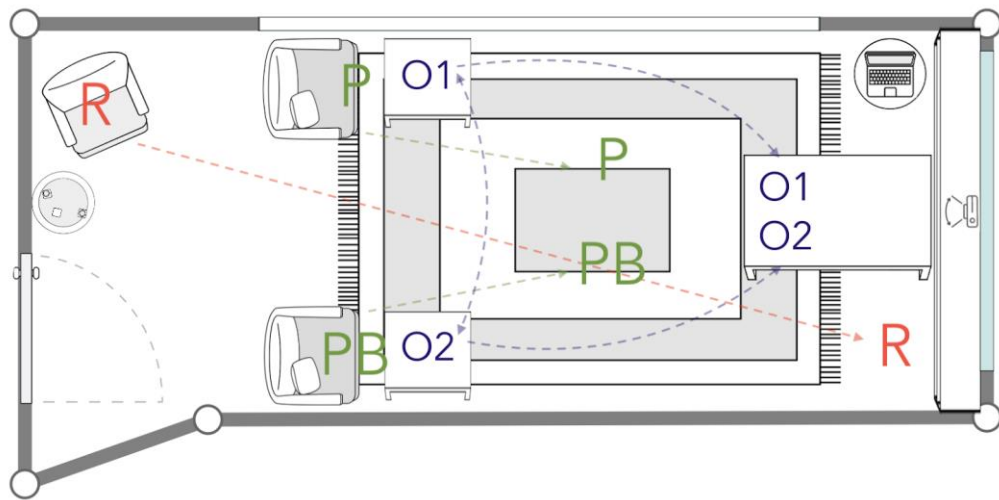
Note. The figure depicts a schematic representation of the laboratory setting. "P" indicates the positions of participant 1 and "PB" indicates the possible positions of participant 2. The position of the researcher is coded as "R" and the positions of the artworks of the participants are illustrated as "O1" and "O2". The arrows demonstrate the different directions of movement.

Measurements

The pre-questionnaire assessed the emotional experience of the participants while appreciating the artworks in a modified version of the *Geneva Emotion Wheel* (GEW) (Saccharin et al., 2012; see Appendix B). In order to make it easier to understand for our younger participants, the number of emotions was reduced from 20 to 8, and emojis were used to define the intensity and type of the emotions as per adaptation from De Angeli, Kelly, and O'Neill (2020) who, in their study, used emoji to measure museum visitors' emotional experience. However, the discrete emotions (e.g., anger, happiness, etc.) and the level of intensity associated with them, from high to low (towards the centre of the wheel), remain the same as in the original version. By using this tool, we aimed to identify which emotions

corresponded to the artwork experience and their intensity (strength). We also accessed bodily sensations by making use of *Bodily sensation maps* (Nummenmaa & Hari, 2023), media preferences, and age. Additionally, we accessed gender by using questions from the *Personal Attributes Questionnaire* for teens (Tibubos et al., 2022) and the *Children Personal Attributes Questionnaire* for children (Hall & Halberstadt, 1980), and personality by using the *Big-Five Questionnaire for Children* (Muris et al., 2005). In order to assess their aesthetic judgment, we transcribed the recordings.

Analysis

Aesthetic judgment

Cognitive Discourse Analysis (CODA) (Tenbrink, 2015) was used to analyze the language data to get an understanding of higher cognitive processes, such as liking, during an artwork experience. This gives us a better understanding of how the aesthetic judgment developed or might have changed during the conversation. First, we transcribe the recording, including hesitation markers (e.g., "mhm", "ehm", etc.) and punctuation markers (e.g., "!", "?", etc.), as they have meaning relevant to communicative and cognitive processes. Then we segmented the text into smaller units, called *Turn-Constructional Units* (TCUs). These are the smallest relevant parts of sentences including the most semantic information. The next step was the annotation, which was based on words or word groups related to aesthetic judgment (see Appendix D). After listening and transcribing the conversations, the researchers conducted back-translation or reverse-translation to ensure reliability (Tyupa, 2011). The main coder identified statements or comments related to the aesthetic qualities of the artworks brought by the participants and coded each instance according to the relevant coding category. The two relevant categories were" positive aesthetic judgment" and "negative aesthetic judgment" based on the definitions for aesthetic judgment (Budd, 2008)

and reducing it into two basic types (positive and negative) in order to prevent overcomplication. To maintain consistency and ensure consistent application of the coding scheme throughout the analysis, a coding manual has been stimulated (see Appendix C) and informal reliability checks were run with the other coders in the research team to assess inter-coder agreement.

Emotional responses

The emotions chosen on the Geneva emotion wheel were categorized into their valence and intensity. Negative emotions were *Anger, Disgust, Fear,* and *Sadness.* Positive emotions were *Interest, Joy, Feeling love,* and *Surprise.* The strength of each emotion was low to high related to their position from the inner to the outer circle. We included *None* in the low group. The arousal, intensity, and valence of the emotions were processed and quantified using Coyne and colleagues' protocol (2020).

Aesthetic Judgment Based on the Valence of Emotion

In order to assess the influence of emotion valence on aesthetic judgment, we compared within each subject the counts of words that describe positive and negative aesthetic judgment from the CODA analysis with the valence of emotions (counts of positive and negative emotions) from the Geneva emotion wheel using a Chi-square test.

Aesthetic Judgment Based on the Intensity of Emotion

In order to analyze how the intensity of an emotion that was felt during the aesthetic experience and how it influenced the aesthetic judgment, we compared within each subject the counts of the occurrence of positive and negative aesthetic judgment from the CODA analysis with the calculated values of intensity of the emotions from the Geneva emotion wheel and compared them by using logistic regression analysis.

Exploratory Analysis

For the purpose of understanding the results of the analysis before, a more exploratory analysis of the data was done. A calculation of the relative frequencies of positive and negative emotions in the context of positive and negative judgment was done, respectively. Additionally, we reported a case study of participants 17 and 18 by using a timeline chart to outline the development of aesthetic judgment over time. This analysis refers to the point Cox et al., (2023) made, as mentioned before, aesthetic judgment as a continuously changing process.

To find explanations of how participants came to aesthetic judgments. Some examples of discourses are provided that describe the process of aesthetic judgment or the reasons for it to get a better understanding of the non-significant results. Furthermore, we analyzed the relation between emotional responses and aesthetic judgment across different developmental stages by comparing the youngest and the oldest dyad.

Results

The final analysis only included 10 of the 12 participants because of data loss from one dyad and we were unable to assess the audio and video recordings of them.

Aesthetic judgment

During the conversions, participants used different words to articulate their aesthetic judgment. In the table below are some examples (see Table 1).

Table 1

The valence of Aesthetic Judgment

Category of aesthetic judgment	Example quote (original)	Example quote (translation)

Positive judgment	"Jouwnes is *heel mooi* omdat er roze glitters bij zitten"	"Yours is *very pretty* because it has pink glitter in it."
Negative judgment	"En ik vind de sterren *niet mooi,* ja de sterren op die bal zijn *niet mooi*."	"And I *don't like* the stars, yes the stars on that ball are *not pretty."*

Note. This table shows examples of sentences that were used in the CODA analysis indicating either a positive or negative judgment.

Aesthetic Judgment Based on the Valence of Emotion

A Chi-square test of independence was used to test the hypothesis that the valence of the emotions felt during art experience is related to the valence of aesthetic judgment. By comparing the frequency of the valence of the emotions as the independent variable with the valence of the corresponding aesthetic judgment of the object as the dependent variable. No significant relationship was found between the two for the first object (χ^2 (1,10) = .277, p = .598) (see table 2) and the second object (χ^2 (1,8) = .380, p = .537) (see Table 3).

Table 2

Emotion Valence and Aesthetic Judgment of Object 1

	Aesthetic judgment

Emotion valence	Positive	Negative
Positive	7	2
Negative	1	0

Note. In the contingency table, each cell represents the counts of words falling into the corresponding categories (valence of emotion, valence of aesthetic judgment) for object 1. χ^2 (1) = .277, p = .598, N =10

Table 3

Emotion Valence and Aesthetic Judgment of Object 2

	Aesthetic judgment	
Emotion valence	Positive	Negative
Positive	5	1
Negative	2	0

Note. In the contingency table, each cell represents the counts of words falling into the corresponding categories (valence of emotion, valence of aesthetic judgment) for object 2. χ^2 (1) = .380, p = .537, N= 8

Aesthetic Judgment Based on the Intensity of Emotion

A single logistic regression was performed to test the second hypothesis stating that the intensity of an emotion can predicts aesthetic judgment. The valence of the aesthetic judgment was the dependent variable and the intensity of the emotions. No significant results were found for object 1 χ^2 (1, N= 10) =.983, p > .05) and object 2(χ^2 (1, N= 10) =5.741, p>.05) (see Table 2). Indicating that the valence of emotions felt during art experience cannot predict aesthetic judgment. For object 1, the model described 15% (Nagelkerke R2) of the

variance in the aesthetic judgment. For object 2, the model described 10% (Nagelkerke R2) of the variance in aesthetic judgment.

Table 4

Regression Coefficients of Emotion Valence and Aesthetic Judgment of Objects 1 and 2

	Object 1			Object 2		
Variable	Estimate	SE	p	Estimate	SE	p
Intercept	-2.548	4.049	.529	-27.746	134593.893	.999
Intensity Emotion 1	3.240	3.974	.414	-5.522	223242.163	.999
Intensity Emotion 2	4.265	4.822	.376	145.165	327995.767	.999

Note. N= 10. Participants could choose two emotions they felt during the art appreciation phase for each object. *Intensity of Emotion 1* indicates the first emotion they chose, and *Intensity of Emotion 2* is the second one.

Explorative analysis of a case study

Taking both objects together, for positive aesthetic judgments, the relative frequency of positive emotions is around 67%, while the relative frequency of negative emotions is approximately 17 %. For the negative aesthetic judgments, the relative frequency of positive emotions is approximately 17%, and for negative emotions 0% (see Figure 2).

The overall distribution of emotions chosen by the participants on the Geneva Emotion Wheel during the art judgment phase for the two objects they described with a positive aesthetic judgment is shown in Figure 3.

In the case study of participants 17 (P17) and 18 (P18), at minute 1:46 P18 said "Stone" to answer the question about what they think about the artworks. The aesthetic judgment becomes negative afterward. At minute 3:38 the researcher tried to reassure and asked P17:" But what do you really think about it? Ff serious, not dirty but?". After that, the aesthetic judgment becomes positive which was negative before that.

The case study which compares two different age groups (age 6 and 17) displays individually the valence of the emotion and the related aesthetic judgment showing that participants from both age groups reported positive and negative emotions and had in the end a positive aesthetic judgment (see Figure 5).

Figure 2

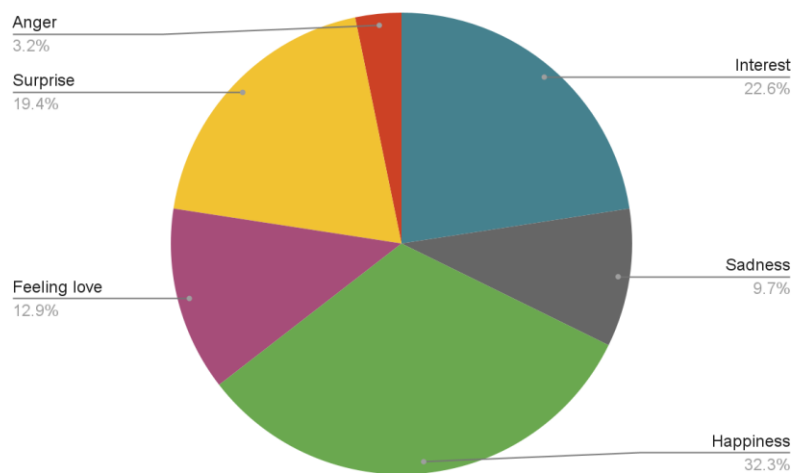*Emotion Valence and Aesthetic Judgment of Objects 1 and 2*
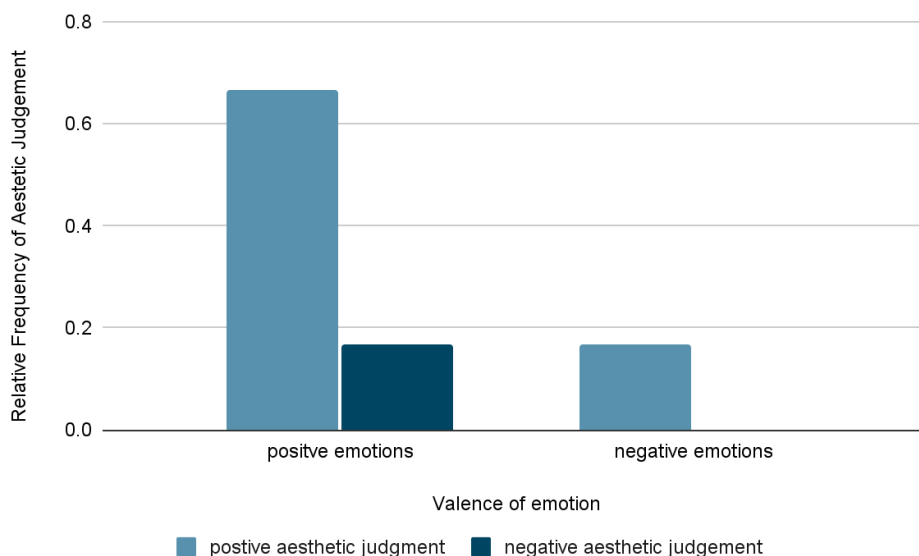
Note. Relative frequencies in Total of Objects 1 and 2. Bars indicate the type of judgment related to the experienced emotions.

Figure 3

*Percentage Distribution of Types of Emotions for Objects 1 and 2*

Note. This pie chart shows the percentage distribution of the emotions chosen by the participants on the Geneva emotion wheel who gave the object a positive aesthetic judgment in the end. Each slice represents one emotion and the related percentage.

Figure 4

Case study: The development of aesthetic judgment over time during the conversation
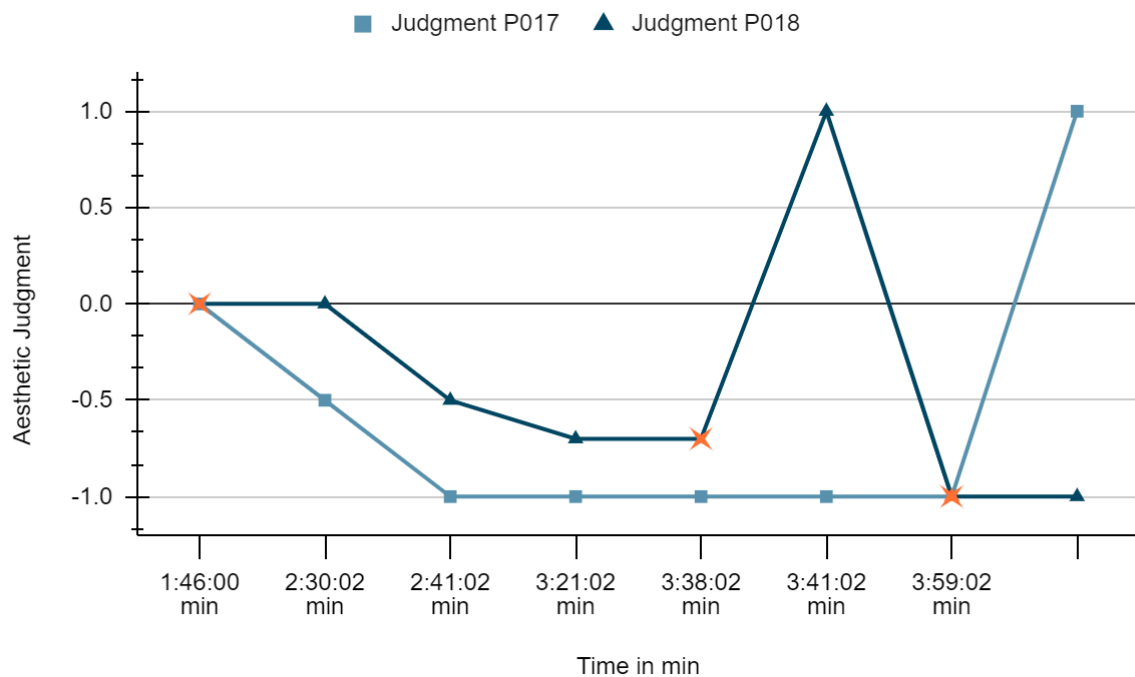
Note. This timeline chart represents the first 4 minutes of the conversation between participants 17 and 18. The aesthetic judgment described is about the artwork of the other one (not about their own). The time points on the horizontal axis represent the moment an aesthetic judgment was articulated. The vertical axis represents the valence of aesthetic judgments. The values are made based on the interpretation of the words used for the judgment. The orange stars illustrate time points in which either the researcher or one of the participants said something that might have influenced the judgment of a participant.

Figure 5

Case study: Comparing the Emotional Responses and the Related Aesthetic Judgment Between Two Age Groups
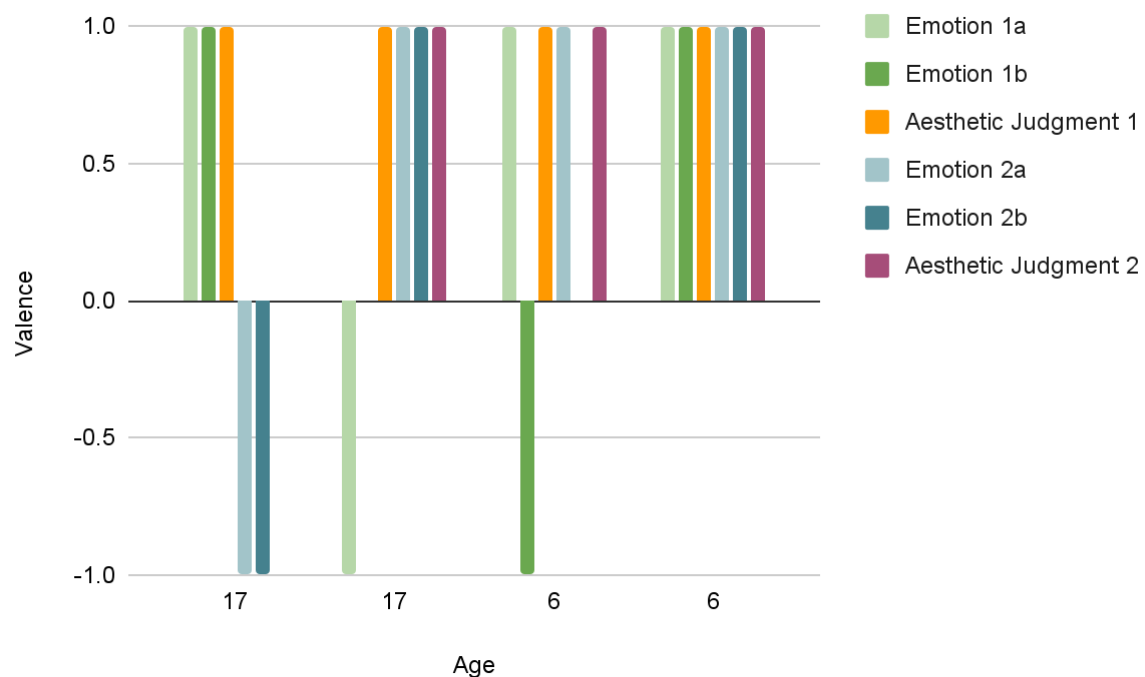
Note. This histogram compares the valence of the emotional responses with the related aesthetic judgment of two dyads. The participants in the first dyad were 17 and in the other one 6. The bars illustrate the valence of the reported emotions (from the *Geneva Emotion Wheel*) and the valence of the aesthetic judgments from the conversions. The y-axis ranges from -1 to 1, where -1 indicates a negative valence and 1 indicates positive valence. *Aesthetic Judgment 1* is the judgment of the first object and *Aesthetic Judgment 2* is for object 2. *Emotion 1a* and *1b* are the two emotions chosen related to object 1 and *Emotion 2a* and *2b* are related to object 2.

Discussion

The aim of our study was to figure out how emotional responses to an artwork influences its aesthetic judgment.

Aesthetic Judgment Based on the Valence of Emotion

Our first hypothesis was that the more positive the emotion felt during the art appreciation phase, the more positive the aesthetic judgment would be. The results were not significant. This demonstrates that one can feel a negative emotion during the appraisal phase but still give a positive judgment at the end or vice versa. These results align with the *Distancing-Embracing Model* by Menninghaus et al. (2017). It states that due to psychological distancing mechanisms, such as implying personal safety, people are able to separate the negative emotion from the art experience itself and are still able to build a positive aesthetic judgment in the end. Artists also use this to catch attention or create emotional involvement in the art. For example, horror movies can elicit fear, but many people love this kind of movie despite getting scared. When looking at the relative frequency of the valence of emotions and the valence of the aesthetic judgment (see Figure 2) it can be noticed that most of the participants who felt a positive emotion also described a positive aesthetic judgment. But what also can be seen is that participants who experienced a negative emotion still concluded a positive judgment (see Figure 2, the light blue bar on the right). Additionally, some participants who experienced positive emotions gave a negative aesthetic judgment. This visualizes the insignificant results and the idea that no matter what type one's emotion is, its aesthetic judgment is not influenced by it. In Figure 3 it can be seen that the type of emotions chosen on the *Geneva Emotion Wheel* by the participants who gave a positive aesthetic judgment ranged from happiness to sadness, therefore including positive and negative emotions which also shows that a positive aesthetic judgment can result from even someone feeling sad or angry (Cooper & Silvia, 2009). Taking the developmental aspect into account, as seen in Figure 5, for both age groups, which were the oldest (17) and the youngest (6) the same effect occurred: Negative emotions were reported and still resulted in a positive aesthetic judgment. This shows that the previously mentioned studies (Menninghaus

et al., 2017, Cooper & Silvia, 2009) might also apply to younger people. Taking the study by Carothers and Gardner (1979) into account, it shows that children aged 6 are able to understand aesthetic characteristics that can evoke negative emotions but are still pleasant to perceive.

Aesthetic Judgment Based on the Intensity of Emotion

When looking at the second hypothesis, evaluating if the more intense an emotion is felt during an art experience, the higher the aesthetic judgment will be. The results were insignificant as well, stating that it did not matter to the participants how intense the emotion they felt during the art appraisal phase was, the aesthetic judgment was not influenced by it. There is a small difference between objects 1 and 2. One reason for this could be that one of the objects was their own and most of them had their own object as the first one. This would mean that if the object was your own, the intensity of the emotion played a little bit more of a role, even though the results were insignificant for both objects, the model was slightly better for their own object. There, the meaning one has for the object can influence one's aesthetic judgment. This is in line with the model by Vartanian and Chatterjee (2022) including the knowledge-meaning aspect as an influential point in aesthetic judgment. This might prove that the different systems are weighted differently in some cases. For example, one participant had an object with high value to them, remembering a dead pet. There the emotions felt were very intense, but the meaning and value were high which made the emotional experience stronger. Comparing that to the emotional reaction to one of the objects from the buddy, they were less strong because they had no meaning to it yet. It can be seen that the meaning an object has to a person might influence the emotional responses to an artwork and therefore the aesthetic judgment.

Emotional Response and Aesthetic Judgment

The nonsignificant results for both hypotheses may suggest that there might be other variables that are more prominent in influencing aesthetic judgment. During the conversation, it was noticeable that the participants referred to an object as beautiful when it represents the object it is supposed to be. For example, one participant said (translated):" You can also see right away that it is family" and later referred to it and described it as pretty. This could refer to imitationalism which is an aesthetic theory referring to the quality of visual art focusing on how realistic an artwork is, therefore, how good the artist was able to recreate an object from real life (Sandell, 2022). On the other hand, the same effect occurred for negative aesthetic judgment. If the participants were not able to understand what it is supposed to be or that it does not look like what it is supposed to be, they described it as not so pretty. This might be in line with the study by van Heusden (2022) stating the importance of perceptual understanding of an object and the influence of atheistic judgment. When looking at the case study (Figure 4) the first time point was when P18 started describing the object with more negative words. You could also see in the face of P17 that it might have hurt him because when it was his turn, he started with a lot of negative words describing the object. This might be a reaction to what P18 said. When the researcher asked what he really thought of the object he said it looked good. At this point, two things could be a reason for the drastic change in the valence of aesthetic judgment. The first one would be that P17 actually thought the object was pretty but because the brother said something bad about his own, he wanted revenge and also called his object ugly. Therefore, aesthetic judgment and its fluctuations are adapted to the social situation (Jacobsen et al., 2006). The other reason could be that because the researcher had a lead in his question of the object not being dirty, it might be that P17 adapted his judgment to the one from the researcher. The conformity bias (Moscovici, 2000) could have happened there, adapting the opinion to the one of authority. Although during the

rest of the conversation, the aesthetic judgment was continuously negative, therefore P17 might have just adapted to the situation. This reflects the influence of social cues related to aesthetic judgment as mentioned earlier in the study of Jacobsen et al. (2006). Altogether it has to be considered that we used a non-probability sample, which might result in a sampling bias and lead to unreliable outcomes in the case that some had similar backgrounds related to art, they were on a similar level of art experts (Leder et al., 2014) and therefore focused on the similar points when making the aesthetic judgment. A study by Müller et al. 2010 found that the aesthetic evaluation of music differs between experts and laypersons, which can be adapted to our study. Furthermore, the sample only had a size of 10, which resulted in low statistical power of 0.05 (Faul et al., 2009) for the logistic regression analysis (quantitative analysis), which could be a reason for the non-significant results as well as the fact that a sample of at least 12 is required for data saturation in qualitative analysis (Braun & Clarke, 2013). Therefore, the statistical analysis might not be representative at all, which can be solved in future research using a bigger sample. Additionally, the CODA analysis, despite doing reliability checks, can be biased and lead to wrong interpretations of what has been said. Making use of a more detailed coding scheme, for example, basing the scheme on the model by Pelowski and Akiba (2011) can be useful for more structure as well as conducting a study only based on the wording used for aesthetic judgments. The prominent measurement used for analyzing emotional response was self-reported, which can also be biased and might not be representative at all. For example, we had to read aloud everything to the younger participants because they were unable to read. In some cases, it seemed like they sometimes adapted the answers they heard from their buddy. Therefore, the reported emotions might not align with what they actually felt. Especially with the youngest dyad (age 6), we realized the questions were sometimes too difficult to understand, too abstract, and

they were not able to concentrate that long. This led us to the conclusion that participants 6 and younger might be too young for this study. On the other hand, Parsons and colleagues (1978) also did a study analyzing the aesthetic judgment of children and used participants aged 6/7 (grade 1) and were able to get a reliable judgment from them indicating that children of that age can be able to understand the question. Since we only had two children aged 6, it might not be representative and in future studies interesting to see different outcomes taking into account that the development of theory of mind is in some cases already finished at that age (Pesch et al., 2020) influencing the capability to make an aesthetic judgment. Although the sample was small and some measurements might have been biased, this study was a first step in the right direction, a perfect pilot study. We included children and teenagers and covered several developmental stages by including all ages between 6 and 17. This gives insights into possible differences based on age. In our study, we used a mixed-method approach which gave us different perspectives and enhanced the reliability of the measurement by assessing self-reported and observed measurements (Johnson et al., 2007). Additionally, we adapted some items to the age of the participants to make it easier for them to understand the question. For example, using the adapted version of the Geneva Emotion Wheel (Sacharin et al., 2012), we also used smaller silhouettes for the Bodily Sensation Maps (BSMs, Nuumenmaa et al., 2014; Schino et al., 2021; Hari & Nuumenmaa, 2023) and even used several types of questionnaires (adapted to children or teenagers). This increases reliability and takes into account that people of different ages have different abilities and understanding of certain things. Even though the results are not significant they open up more questions that lead us better into understanding how aesthetic judgment is created. Further research could evaluate if there is any type of emotion that influences aesthetic judgment the most or what threshold intensity an emotion needs to have in order to influence aesthetic

judgment. Furthermore, what role does the meaning of an artwork have to someone influencing the aesthetic judgment and the stability of it when exposed to social cues? By conducting this study with a bigger sample size some of the questions might already be able to be answered or just strengthen our results with a higher reliability. We suggest controlling for noise like the adapted answers from their buddies, by separating the children during filling out the questionnaires. Additionally, future research can base the coding scheme for the analysis of the speech on the model by Pelowski and Akiba (2011) which can explore if the model can be adapted to non-visual art.

Conclusions

To conclude, our research found that aesthetic judgment might not be as much influenced by the emotional response as hypothesized and gives proof of the theory of Menninghaus et al. (2017), stating that a positive aesthetic judgment can result also after a negative emotional experience during the artwork appraisal is applicable to children from age 6 to 17 too and it is not laminated to the use of institutional art but the meaningful personal selection of artworks too. By conducting a cross-sectional study, we got a snapshot of the aesthetic judgment of children and teenagers at one moment in time. This allowed us to compare differences between age groups and capture one's aesthetic judgment which is continuously changing (Cox et al., 2023). This study proved a beginning of a new path toward understanding aesthetic judgments and their influential factors including different developmental stages.

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Appendices

Appendix A

Figure 6

Consent Form for Parents

You showed interest in participating in the experiment:
"Let's Get SM-ART".
The research project about sense-making, art and emotions.

What is the research about?
The research question is about the feelings and thoughts children experience
regarding things they consider meaningful.

How will it be conducted?
1. Your child will choose a friend to do the study with. Both children will bring
something very meaningful to them to our experiment.

2. On that day, they will answer some questions about themselves and their
feelings toward the objects they brought.

3. Then, they will talk with each other about why they chose to bring that
specific object. The conversation is going to be audio and video recorded.

4. Lastly, we will ask the same questions again about their feelings toward the
objects to see whether the conversation changed their thoughts or feelings.
The length of the trial will depend on their response time, but we expect it
to take about 60 minutes.

**Upon participation, you can decide to receive a €10 voucher or donate the
€10 to your school for cultural activities.**

Please, carefully read the Information form parents (caretakers) **for further
details.**
You can download and keep a copy of the Information Form.

Your child can stop participating without any consequences at any time. Also,
you can ask to have your child's data erased until 30/06/2024.

Do you consent for your child to participate in the research project?

Yes, I consent that my child can participate; this
consent is valid until 31-01-2024.   No, I do not consent that my child can participate.
                    ○   ○

Note. Consent form parents had to fill out for their children if they were younger than 16

years old.

Figure 7

Consent Form for Teenager

EMOTIONAL RESPONSES & AESTHETIC JUDGMENTS ACROSS DEVELOPMENT

You showed interest in participating in the experiment:
"Let's Get SM-ART".
The research project about sense-making, art and emotions.

What is the research about?
The research question is about the feelings and thoughts you experience
regarding an artwork you consider meaningful.

How will it be conducted?
1. You will have to choose a buddy to do the study with. Each of you will
bring something very meaningful to you to our experiment.

2. On that day, we will ask you some questions about yourselves and your
feelings toward the artworks you brought.

3. Then, you will talk with each other about why you chose to bring that
specific artwork. The conversation is going to be audio and video recorded.

4. Lastly, we will ask again some questions about your feelings toward the
artworks to see whether the conversation changed your thoughts or
feelings.
The length of the trial will depend on your response time, but we expect it
to take about 60 minutes.

**Upon participation, you can decide to receive a €10 voucher or donate the
€10 to your school for cultural activities.**

Please, carefully read the information form for teens for further details.
You can download and keep a copy of the Information Form.

You can stop participating without any consequences at any time. Also, you can
ask to have your data erased until 30/06/2024.

Do you consent to participate in the research project?

Yes, I consent to participate; this consent is valid until
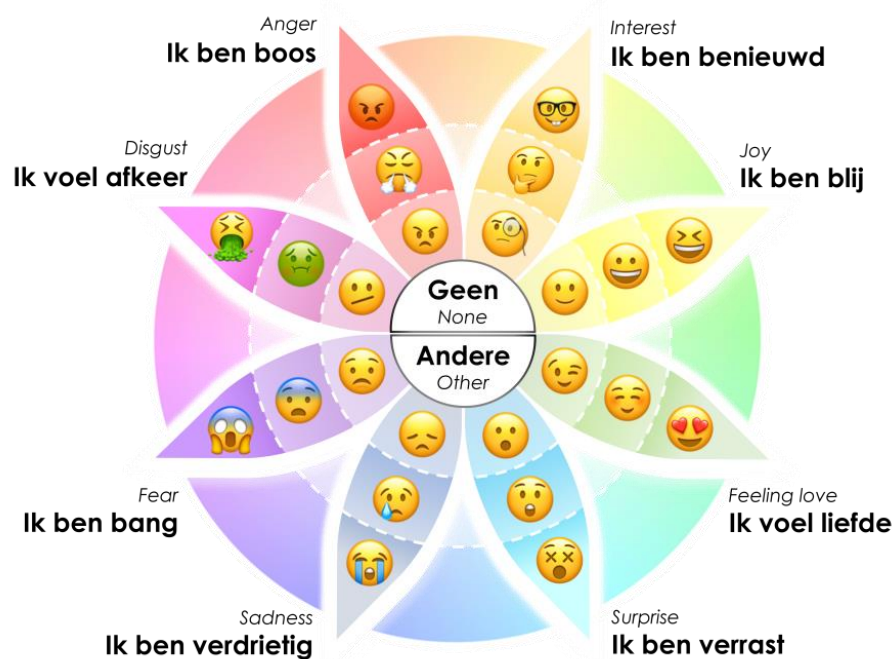31-01-2024.   No, I do not consent to participate.
          ○   ○

Note. Consent form participants who were older than 16 had to fill out.

Appendix B

Figure 8

Geneva Emotion Wheel

Note. Each emoji represents an emotion and from the inner circle towards the outer, the intensity of the emotions increases. If none of the emoji represented the emotion they felt, they clicked on "None" or "Other" in the centre of the wheel.

Appendix C

Coding manual

In order to objectively analyze the conversation, the analysis was based on certain types of words or formulations to differentiate if it is an aesthetic judgment and if the judgment is positive or negative.

Aesthetic judgment

Based on the definition from Budd (2008) formulations that were used to describe the objects were sought, especially how the participants answered the questions (prompts): "How do you like the object" or "Do you like the object" and "what do you think about the object". Sentences that started with "I think it is…," etc. were looked out for.

Positive aesthetic judgment

Based on the research done on aesthetic judgment (Budd, 2008; Jacobsen et al., 2006; Leder, 2013; Skov, 2019; Vessel et al., 2019), a search was undertaken for words (especially adjectives) that were mentioned in the literature for a positive judgment such as "beautiful" or "I like". Furthermore, the logic of using positively connotated words such as "good" and "nice" was also applied. Given that the experiment was conducted in Dutch and the analysis relied on the Dutch transcript to avoid any loss of information due to translation, Dutch words like "leuk", "mooi" and "lief" were looked out for.

Negative aesthetic judgment

The same literature as mentioned above was used (Budd, 2008; Jacobsen et al., 2006; Leder, 2013; Skov, 2019; Vessel et al., 2019) in order to have types of wording used to describe a negative aesthetic judgment. The focus was on negatively connotated words such as "bad", "not nice", "do not like", "ugly", etc. Additionally, attention was given to adverbs like "not" before a positive description (e.g., "It is NOT pretty"). Therefore, the relevant Dutch words were "niet leuk","lelijk" or "slecht".