After My Own (he)Art: Self-Referential Linguistic Patterns and Well-Being in Art Experience

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Abstract

"After My Own (he)Art" is an experimental study exploring the relationship between psychological well-being (anxiety and depression) and self-referential linguistic patterns (speech content) in art experience. It is pivotal to test the knowledge of neuroaesthetics about the role of the Default Mode Network (DMN) in art experience in a multi-method and mixed-method way and to explore potential practical implications for art therapy. 34 participants, recruited by convenience sampling, participated in pairs and brought personally meaningful artworks. Participants individually experienced both artworks, answered questionnaires (emotional assessment), followed by a dyadic interaction of 20 minutes and questionnaires (emotional assessment and well-being assessment). Considering findings of impairments of the DMN in states of anxiety and depression, this study hypothesizes that adults in lower well-being use more self-referential language about the other person's artwork, and that more negative self-referencing results in more negatively assessed art experiences. Qualitative data analysis, using a self-developed coding scheme, revealed an increased use of first-person singular pronouns and self-references in lower well-being. However, quantitative analysis, including Pearson's correlations between well-being scores and relative frequencies of codes, does not support the hypotheses, which could be explained by the limitations such as coding subjectivity and limited sample generalizability. Nevertheless, this study contributes to art and psychology by using a comprehensive and ecologically valid approach. The study offers potential practical implications for well-being enhancement in art therapy and future recommendations including coding scheme revisions, inclusion of a clinical sample, and incorporating the role of the body by behavioural analysis.

Keywords: art experience, psychological well-being, self-referencing, self-referential linguistic patterns, sense-making

After My Own (he)Art: Self-Referential Linguistic Patterns and Well-Being in Art Experience

When someone encounters a painting in a museum of a human that looks like themselves, or when they hear a piece of music that makes them think of a certain memory in their life, they can experience and make sense of the art item by relating it to themselves. Self-referential processes contribute to the feeling of 'being moved' by art (Pelowski et al., 2017), deepening an art experience's intensity. An art experience is the result of a reconstruction of the artwork of the artist, a process of relating to the environment, using senses, organs, and nervous and muscular systems (Dewey, 1934). Art experience is an embodied (Gallese, 2017; Chatterjee & Vartanian, 2016) and highly socially embedded (Leder et al., 2004; Starr, 2020) kind of phenomenon that can occur with all the existing various forms of art and is not essentially related to the concept of 'beauty' (Wah, 2017; Pelowski et al., 2017).

To this day, no experiment has investigated the role of self-referential processing by combining these crucial components of art experience. Several psychological models included self-referencing as a top-down strategy that determines the depth of processing of an art experience, confirmed by activity of the Default Mode Network (DMN, Vessel et al., 2013). Since the DMN is often impaired in high states of depression and anxiety (Coutinho et al., 2016), mental disorders that have been consistently correlated with psychological well-being (Grant et al., 2013), the current study aims to explore the relationship between well-being and self-referencing in art experience. This innovative multi-method and mixed-method study aims to enhance our understanding of how adults in different well-being states make sense of art through self-referencing. It is pivotal to research the relationship between well-being and self-referencing in art experience, since for example, the findings could have practical implications for improving well-being in art therapy. Theoretical foundation for the research question and following hypotheses, this study will first examine the existing literature on self-

reference and psychological well-being, followed by self-reference and neuroaesthetics and lastly, self-reference and sense-making in art experience.

Self-reference and psychological well-being

Self-referential processes are often disturbed low psychological well-being. In states of depression and anxiety, which are highly comorbid, the Default Mode Network is found to be altered (Sheline et al., 2009; Coutinho et al., 2016). During tasks, patients with depression fail to reduce activity in the DMN, therefore an interference in task performance from internal emotional states is found (Sheline et al., 2009). During resting states, functional connectivity in the anterior parts of the DMN, which are specifically involved in self-referential and emotional processes, correlates positively with anxiety and depression scores (Coutinho et al., 2016). This finding corresponds with the higher levels of persistent, emotionally laden, self-reflective tendencies, such as maladaptive rumination and negative self-attribution in depression, and attentional bias and self-focused attention in anxiety. The posterior areas of the DMN, which are found to be involved with autobiographical memory, social cognition, and visual and sensory processing, are negatively correlated with scores of anxiety and depression (Coutinho et al., 2016). This correlates with the finding that depressed individuals often have an over-general autobiographical memory and an impaired theory of mind.

**Self-reference and neuroaesthetics**

By examining biological bases, the research field of neuroaesthetics advances the understanding of the role of self-reference in art experiences. For example, in the sensory-motor neural system of the brain, the mirror neuron system plays a role in the process of art experience by mirroring the emotions expressed in the artwork (Freedberg & Gallese, 2007). Gallese (2017) argues that this embodied simulation is the vehicle of the self-projective qualities of art experience: it shapes the way how humans relate to an object. Art experiences emerge from the interplay between the sensory-motor (sensation, perception, motor system), emotion-valuation (reward, emotion, wanting/liking), and meaning-knowledge (expertise,

context, culture) neural systems: the aesthetic triad (Chatterjee & Vartanian, 2016). The aesthetic triad model argues that the three neural systems can interact early and simultaneously in the forming of an aesthetic judgement. Aesthetic judgement is broadly defined as an evaluative appraisal of the valence of perceived objects, among which artworks (Chatterjee & Vartanian, 2016). Aesthetic judgement has significant effects on our lives, for example in physical attractiveness and in consumer choices (Chatterjee & Vartanian, 2016).

According to Chamberlain (2022), Leder et al.'s (2004) model in Figure 1 is the most comprehensive and influential model of the experience of modern visual art. The model contains implicit bottom-up or early-stage processing which mainly consists of perceptual analyses and implicit memory integration, followed by explicit top-down processes that focuses on subjective factors that shape the incoming information on a higher cognitive level: cognitive mastering and evaluation (Chamberlain, 2022). The model has two outcomes: aesthetic judgement and aesthetic emotion. Aesthetic emotion is an emotional reaction to the artwork or object of aesthetic interest, which is a by-product of the processing stages of Leder et al.'s (2004), while the aesthetic triad of Chatterjee & Vartanian (2016) argues that it is also possible to have an art experience solely based on aesthetic emotions. In Leder et al.'s (2004) model, aesthetic judgement requires evaluation of the cognitive mastering stage, which involved art-specific and self-related interpretation. In self-related interpretation, the content of the artwork is linked to personal beliefs (Leder et al., 2004). Therefore, self-related interpretation, a self-referential process, is considered as a top-down process in art experience, crucial for aesthetic judgement.

Figure 1

*Leder et al.'s (2004) Model of Aesthetic Experience*
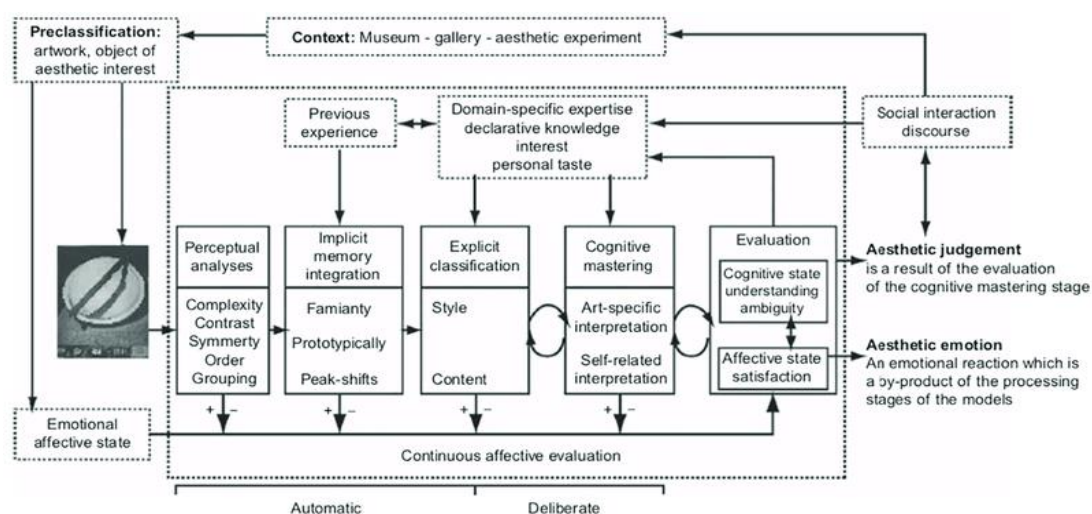
The extent to which information is processed in top-down stages, including self-referential processes, is likely to determine the depth of processing of the artwork (Chatterjee & Vartanian, 2016). In the cognitive mastery stage of the VIMAP model (Pelowski et al., 2017), a model of neuroaesthetics that builds upon Leder et al.'s model (2004), the outcome of art engagement depends on the levels of schema congruency and self-relevance (importance to self, one's expectations, and one's worldview) someone experiences (Chamberlain, 2022). Depending on one's expertise, expectations, worldview, interest and taste, one has 'control', 'do' and 'be' goals when observing art (Pelowski et al., 2017). A high self-relevance, an increased importance or threat to the self, increases the 'be' goals one has, thus to match the artwork with their ideal self. Low self-relevance leads to aesthetic interpretation, focusing on the artwork's form and style. High self-relevance leads to self-related/egotistical interpretation; the observer considers the context and the emotions felt during the art experience (Pelowski et al., 2017). Pelowski et al. (2017) describe three different outcomes when self-relevance is high (Figure 2). One experiences harmony when the artwork resonates with the self and matches one's central schema and goals. In cases of low schema congruency, high self-threat and low coping necessity, one processes the artwork

negatively and wants to stop or leave. However, when one has low schema congruency, high self-threat and high coping necessity, one undergoes a period of metacognitive self-reflection which enables self-change and high level schema change (Pelowski et al., 2017). Therefore, this model suggests that a transformative art experience involves high self-relevance and self-reflection, and thus, has an internal orientation.

Figure 2

Pelowski et al.'s (2017) outcomes of VIMAP model.
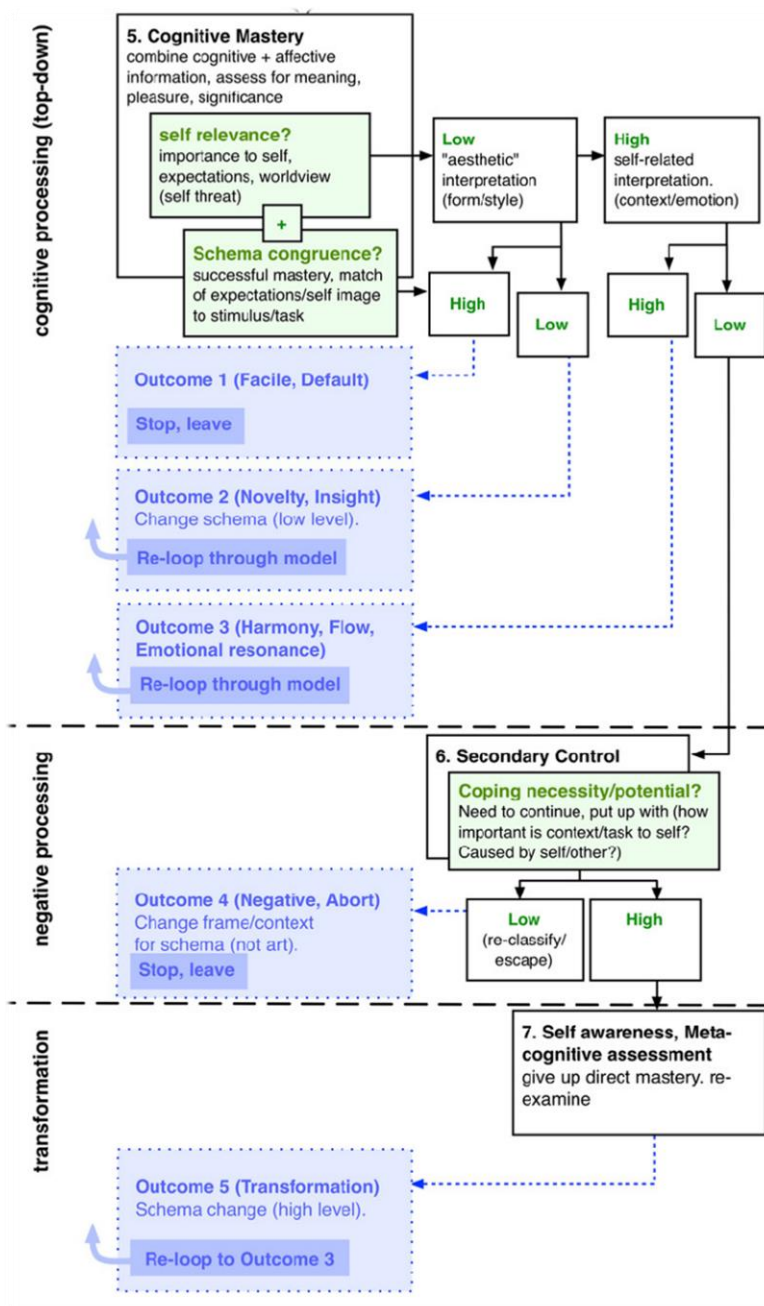
The internal focus of deep art experience has two distinct connotations: interoception, corresponding to activity in the insulae, and self-referential processing of autobiographical and narrative information, represented in the DMN (Chatterjee & Vartanian, 2016). The DMN is a task-negative network, it usually shows neural activity when humans are 'at rest'. However, during intense art experiences, the DMN is nevertheless active due to its role in processing self-referential information (Chatterjee & Vartanian, 2016). These findings suggest that certain artworks, albeit unfamiliar, have access to neural substrates of the DMN concerned with the self, which other external stimuli normally do not get (Vessel et al., 2013), such as activity in the vmPFC region linked to self-relevance, and activity in the right dorsal mPFC and PCC linked to self-reflection (Pelowski et al., 2017). This simultaneous evaluation of the artwork and the self, leading to both self-relevance and self-reflection, mediates a sense of 'being moved' (Vessel et al., 2013). The link between art experience and the self seems to be sustained by the notion that someone's taste in art is linked to someone's sense of who they are, their identity (Lee et al., 2023).

Self-reference and sense-making in art experiences

Art experience is a perceptual experience that is emotionally absorbing, evaluative and engages sense-making processes (Vessel et al., 2019). Sense-making is typically human and is defined as connecting knowledge (stored in memory, based on previous experiences) with information that is perceived in actual interactions with the environment (Jorna & Van Heusden, 2003). Therefore, sense-making includes how people understand, interpret and make sense of life, as well as artworks. Leder et al. (2004) describe the self-referential character of modern art as a search for meaning, that is connected to the self. By associating the content of an artwork with one's own situation and emotional states, which are semantic and autobiographical memory associations, the viewer can gather an understanding of the artwork (Leder et al., 2004). Sense-making is a semiotic activity and comes in four semiotic

strategies: perceptual, imaginative, conceptual, and analytical (Van Heusden, 2022). Due to humans' need for understanding of art and the common use of self-referencing for that reason, in the present study we reckon that it is likely that all four semiotic strategies contain self-referential patterns.

The semiotic strategy of imagination in art highly depends on self-reflecting processes (Wah, 2017). Wah (2017) refers to this strategy as 'reflective imagination'; the underlying cognitive process of art experience. Reflective imagination depends on imagination and self-reflective consciousness, which can be described as mental time travel in one's autobiographical memory (Van Heusden, 2010). Through reflective imagination, humans are able to act out or recreate situations that are not identical to the situations they actually perceive, by building on one's own memories and perceptions. Through art, humans can reflect upon themselves, upon others, and upon their environment (Van Heusden in Van Schaik, 2010). While art experience is commonly considered as entertainment, it is actually about self-engagement (Wah, 2017). As one recognizes oneself or others in a situation during an art experience, for example in the main character of a movie, one may feel the urge to act, take action, or change a behaviour (Wah, 2017). According to this reasoning, imagination is the semiotic strategy most likely to involve self-referential patterns.

The need for the understanding of artworks, might increase the importance of social interaction discourse (Leder et al., 2004). In Leder et al's model (2004), social interaction discourse influences aesthetic judgement and provides feedback to the cognitive mastering stage of art experience. In multiple studies on well-being and art, art is considered as highly social, by facilitating conversation, communication, expression or understanding, and therefore potentially being able to enhance well-being (Starr, 2020). Moreover, art's social embeddedness could be of therapeutic potential, for example by inducing a conversation about artworks. Guided self-referential questions in social interaction, such as 'Where are you

in this painting?' or 'What does this painting say about where you are in this stage of your illness?' (Starr, 2020), could enhance understanding of the artwork, oneself, one's situation and others' points of view. Successful sense-making, such as the feeling of understanding an artwork, is usually psychologically experienced as rewarding (Leder et al., 2004). Based on the distancing-embracing model of Menninghaus et al. (2017), experiencing positive aesthetic emotions is irrespective of the emotional content of an artwork. By adopting a distanced perspective and perceiving safety during art reception, negative content of the artwork can be embraced and may produce pleasure, which could possibly enhance well-being (Mastandrea et al., 2019). Therefore, an art experience within a safe social interaction context, such as with a therapist or a close friend, could improve well-being due to its self-rewarding nature and social embeddedness.

The present study

This research aims to expand neuroaesthetics knowledge on self-referential patterns in art experience, by using a unique experimental method incorporating the embodiment and social embeddedness of art experience. In this experiment, participants bring artworks that are meaningful to them, individually experience them and answer questionnaires about their experiences, followed by engagement in a conversation about the artworks (herein referred to as dyadic interaction) and more questionnaires after the conversation. In line with literature, self-referential patterns are expected to play an important role in the sense-making during the dyadic interactions investigated. Since the other person's item is more likely to have a high need for understanding, which is related to self-referential processing and the need for social discourse (Leder et al., 2004), this study only focuses on the self-referential processing of the other person's item.

Low psychological well-being is associated with DMN impairments, characterized by a high self-focus in anxiety and negative self-attribution in depression (Coutinho et al., 2016). Self-referential language can be used as a linguistic marker of negative emotionality

(Tackman et al., 2019). Therefore, adults in low states of well-being are expected to use more self-referential linguistic patterns during the conversation than adults in high states of well-being. Differences in valence and intensity of self-referential linguistic patterns are anticipated between anxiety (high self-focus) and depression (negative self-attribution). Moreover, more negative self-referential processing in adults in low states of well-being, will lead to a more negatively evaluated art experience after the conversation.

More specifically, the present study aims at answering the following research question: what is the relationship between self-referential linguistic patterns (speech content) and psychological well-being in adults in art experience?

Hypothesis 1: Adults in low states of well-being use more self-referential linguistic patterns than adults in high states of well-being, during the art experience with the other person's item in dyadic interaction.

1a. Adults in higher states of depression will use more negatively valenced self-referential linguistic patterns.

1b. Adults in higher states of anxiety will use more intense self-referential linguistic patterns.

Hypothesis 2: Adults in low states of well-being, evaluate their art experience with the other person's item more negatively than adults in high states of well-being after dyadic interaction, as a consequence of more negative self-referential processing during the art experience.

Methods

For this study on art experience, both qualitative and quantitative methods were used. The purpose of this multi-method and mixed-method research design was to encapsulate the experience of art in a more comprehensive manner, especially since art experience is a social, inherently complex, intuitive, diverse process involving various meanings and interpretations (Starr & Smith, 2023).

Participants

This study consisted of 38 adults (19 dyads) of 18 years or older ($N= 38$, females $n= 23$, males $n= 15$, $M_{age} = 24.21$, $SD_{age} = 7.58$), who voluntarily participated in the study. The only criterion for the participation was to be 18 years old and above. The study took place from May 1st to May 19th, 2023 (3 weeks). However, data from four participants (two dyads) was removed from the analysis due to insufficient data (missing recording and a conversation shorter than 10 minutes), resulting in a final sample of 34 participants (17 dyads). Four dyads talked in Dutch during the conversation, the other 13 dyads participated in English. In qualitative and mixed-method research in social sciences, a minimum sample size of 12 participants is advised for interviews (Onwuegbuzie & Collins, 2007). Moreover, a post-hoc G*Power analysis (version 3.1.9.7, Faul et al., 2007) of the sample size (N=34) and found effect size (f=.25) for the RM-ANOVA analysis, resulted in a power of .807 (>.80). Therefore, the obtained sample size of N=34 is adequate to test the study's hypotheses.

Data was gathered by reaching out to potential participants (18+) in the Netherlands. People were instructed to bring a person of their choice to co-participate in the experiment in the same language, to increase the feeling of safety and intimacy during the experiment. Recruitment took place through 1) targeted advertisement via the research panel website (SONA) aimed at first-year psychology students of the University of Groningen, 2) public advertisement on the internet and social media platforms (e.g., Facebook, Instagram,

LinkedIn, Twitter, Whatsapp group chats), and 3) flyer distribution (for flyer design, see Appendix A1) at leisure, culture and education local centers (e.g., Groninger Museum, Forum, University buildings, Applied university buildings, Vocational education buildings, UG Library, bookstores, literary cafes such as Koffiestation Books & Coffee, Wonderland, Storyworld, Usva, etc.). Since participants had to volunteer and be available for the study, recruitment was based on convenience sampling. Participants were able to choose a type of compensation: SONA credits, a Pimm Solutions gift voucher worth €10, or a donation of €10 to schools for cultural activities. Participants that have read the SONA advertisement, were also informed about the different compensation choices to allow them to choose their preferred option.

The study was approved by the Ethics Committee Psychology of the University of Groningen (research code: PSY-2223-S-0252) and was conducted according to the Dutch ethical standards for scientific research.

Procedure of Data Collection

The entire experiment process for each dyad lasted from 45 to 60 minutes depending on the participants' response time to the questionnaires. The average duration of the dyadic conversation was 18.15 minutes. The information and consent forms were shared through a Qualtrics (https://qualtrics.com) survey digitally via email before the data collection could take place. Data has been collected exclusively upon permission of informed consent by the participant. The experiment was divided into two phases: the preparation phase and the experimental phase.

Preparation Phase

Before the experiment, participants have signed up in pairs with a peer of their choice. Then, participants have been asked to think of a work of art they perceive to be meaningful and bring this item to the experiment location. These items could include paintings,

sculptures, photographs, a song, poetry, videos or pictures one has encountered online, a scene from a movie, or a memento from their life, etc. The participants were asked not to reveal their item of choice with each other before the experiment. Additionally, in case participants chose an item they could not physically bring, like a famous painting or a scene from a movie, they could submit it to the researchers to be digitally displayed on site. For auditive or audiovisual items, headphones and laptops were present during the experiment.

Experimental Phase

Upon arrival, the participants were seated in the same room (see Appendix A2). Following a counterbalance technique for each dyad, they were instructed to experience the items that either they or their peer brought for a minimum of 20 seconds to a maximum of 2,5 minutes, indicated by a countdown timer. After, participants have been asked to fill out Q1a (Figure 3) on a tablet. When both participants were finished, the items were swapped and the participants had to experience the other artwork and have been asked to fill out Q1b (Figure 3). Next, participants were instructed to stand up and start a conversation about both items, using displayed prompts as guidance. At this time, audiovisual recording using a Logitech BRIO camera was started in the control room using AudioCapture, BrainVision, LabRecorder and TeamViewer. One researcher stayed in the room with the participants for assistance. The conversation ended after discussing all the prompts or reaching the time limit of 20 minutes. Then, the recordings were stopped in the control room and the participants were asked to take a seat again and to fill out Q2 (Figure 3). Only data from the GEW, the recorded conversation and depression and anxiety scales were relevant for the hypotheses and conducted analysis in this study. Therefore, the following sections focus on these particular instruments.

Figure 3

Schematic overview of experimental phase.
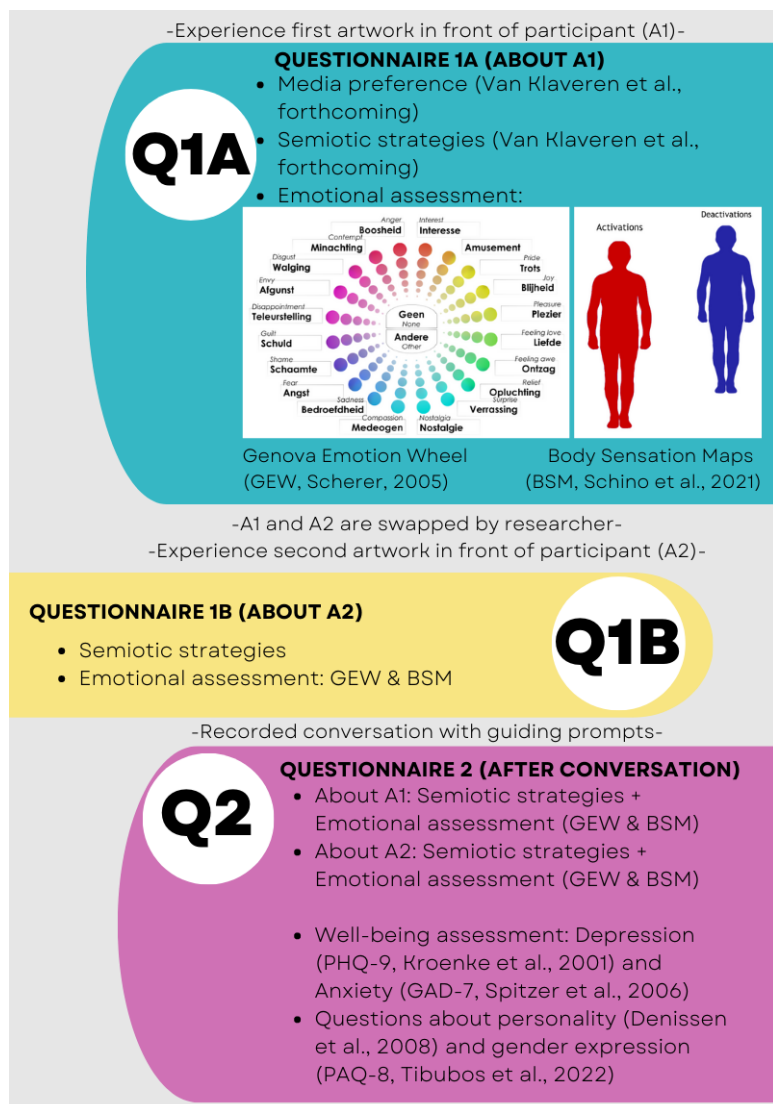
Instruments

Geneva Emotion Wheel (GEW)

The GEW was used to measure emotions in response to art engagement. It consisted of twenty emotion families of interest, amusement, pride, joy, pleasure, feeling love, feeling awe, relief, surprise, nostalgia, compassion, sadness, fear, shame, guilt, disappointment, envy, disgust, contempt, and anger - listed both in English and in Dutch (Scherer, 2005). These emotions were systematically aligned in a circle. Each emotion was based on three

dimensions: valence (positive and negative), control (high and low), and intensity (high and low). In this study, only the valence has been taken into account.

Psychological well-being assessments

To explore the role and impact of art experience on adults who are more prone to experiencing higher levels of trait anxiety and depression, the Generalized Anxiety Disorder – 7 (GAD-7, Spitzer et al., 2006) and Patient Health Questionnaire – 9 (PHQ-9, Kroenke et al., 2001) self-report questionnaires were used, respectively. These traits are highly comorbid and correlate negatively with psychological well-being (Grant et al., 2013). Cronbach's alpha was calculated to assess score comparability. For any potential unintended findings, such as extreme scores or severe deviations in mood tendencies assessed from such questionnaires, they were reported back to the participants of concern immediately.

GAD-7 (Spitzer et al., 2006) was used to measure anxiety in the last two weeks on a 7-item scale. The items ranged from 1 to 4 (1 = not at all, 2 = several days, 3 = more than half the days, 4 = nearly every day). Examples of the statements included, "Feeling nervous, anxious, or on edge" and "Feeling afraid, as if something awful might happen." GAD-7 scores were interpreted as 0-4: minimal anxiety, 5-9: mild anxiety, 10-14: moderate anxiety and 15-21: severe anxiety.

PHQ-9 (Kroenke et al., 2001) was used to measure depression in the last two weeks on a 9-item scale. The items ranged from 1 to 4 (1 = not at all, 2 = several days, 3 = more than half the days, 4 = nearly every day). Examples of statements include, "Feeling down, depressed, or hopeless", "Thoughts that you would be better off dead, or of hurting yourself." PHQ-9 scores were interpreted as 0-4: minimal depression, 5-9: mild depression, 10-14: moderate depression, 15-19: moderately severe depression and 20-27: severe depression.

Conversation prompts

The participants engaged in a guided conversation about their items, for a minimal duration of 10, and maximum duration of 20 minutes. The purpose of the conversation was to qualitatively measure how participants judged, related to, felt about and made sense of the items. During the conversation, eight prompts were presented. The prompts were based on emotions, semiotic strategies and self-referential patterns, to facilitate reflection. Examples of the prompts include, "How does observing, touching, smelling, tasting, or listening to these artworks make you feel?" and "In what ways do you relate to this artwork?".

Data Analysis

Qualitative Data

The audio recordings of the dyadic interactions were transcribed and then coded using the coded analysis of guided interviews by Starr and Smith (2022) and Cognitive Discourse Analysis (CODA, Tenbrink, 2015), using the program Atlas.ti (version 23). Only utterances about the other person's artwork were coded, established by keywords such as 'for your artwork…'. The utterances were coded 'yes' when they contained subjective ("I," "I'm," "I've," "I'll," and "I'd"), objective ("me" and "myself"), and/or possessive ("my" and "mine") first-person singular pronouns (Tackman et al., 2019). The coding scheme for self-referential linguistic patterns was originally based on the work of Pelowski et al. (2017) related to self-relevance and self-reflection in art experience and the three outcomes of the VIMAP model (Appendix B1). To adapt the coding scheme to this specific experiment, it was divided into Intensity and Valence and changed so that it fitted the context of social interaction (Appendix B2). After coding the first transcripts, the coding scheme was supplemented with frequently observed phrases and patterns. To increase interrater reliability, work between a second coder and a first coder was compared, and the coding scheme was adjusted accordingly. Furthermore, the coding scheme was supplemented by quotes from

participants and a Dutch version was developed (Appendix B3). Certain transcripts were also coded by the AI coding function of Atlas.ti, to conduct a final reliability check.

Quantitative Data

The number of utterances that included certain codes, were made relative by comparing to the total amount of utterances about the other object's person of that specific participant. Relative frequencies of the categories of the coding scheme and the relative amount of first person singular pronouns using the function 'Word Frequencies' of Atlas.ti, were correlated with the calculated total scores of GAD-7 and PHQ-9 using Pearson's correlations. Furthermore, a Repeated-Measures Analysis of Variance (RM-ANOVA) has been performed with the GEW scores and the GAD-7 and PHQ-9 scores. Lastly, a Chi-square test has been conducted between the categorical variables.

Results

Data

The final sample size of 34 participants (17 dyads), is >30 and therefore protects against violations of normality assumptions ("Central Limit Theorem", 2008).

Qualitative results

By visual inspection, the usage of first-person singular pronouns seemed to increase when adults were in lower states of well-being, especially for adults in states of depression (Figure 4). Furthermore, it seemed that Intensity 1 and Valence 1 did appear the least in the moderate states of anxiety and depression. For depression, Intensity 2 and Valence 2 seemed to appear the most in the moderate state (Figure 5).
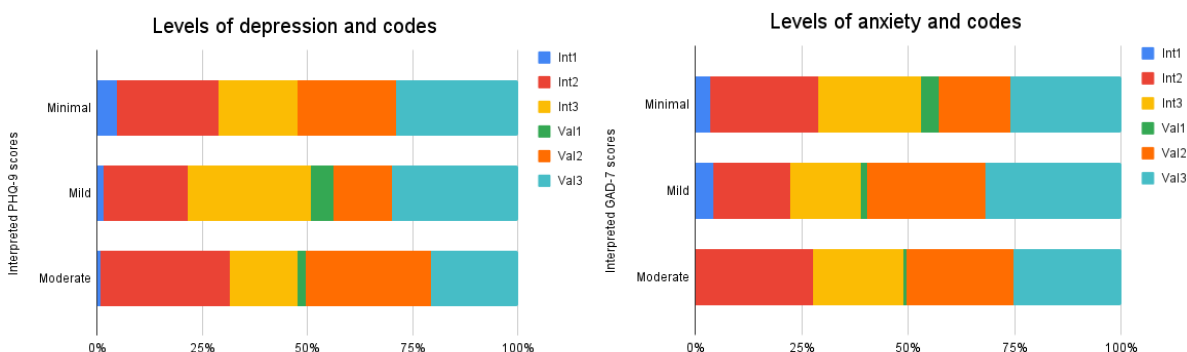
Figure 4

Descriptive charts of the well-being levels and frequencies of utterances containing first-person singular pronouns.
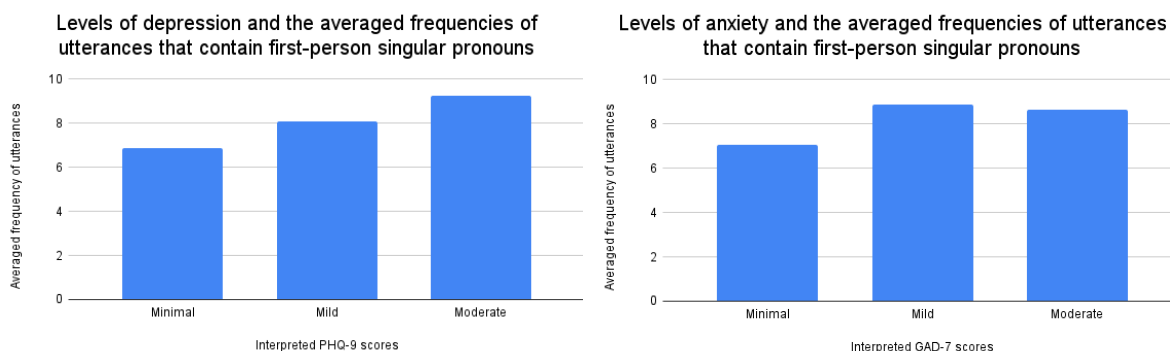
Figure 5

Descriptive 100% stacked bar charts of the well-being levels and frequencies of codes.

Furthermore, the coded transcripts (human coding + AI coding) of the participants with the lowest and highest scores on the anxiety and depression scales were compared and analysed to seek for patterns (Appendix C).

Highest state of well-being

The participant in the highest state of well-being (GAD-7: 0 – minimal anxiety, PHQ-9: 0 – minimal depression) is a male of 51 years old and indicated that his peer is his partner. Before and after the conversation, this participant evaluated the other person's object (a drawing of Escher) as positive (GEW). 2.06% of the words said by this participant about the other person's object, were first-person singular pronouns. In the coded transcript (Appendix C1), many utterances do not include any self-reference or experienced feelings related to the self. The answer to the self-referential prompt (Table 1), is one of the only times that the participant related the object to himself (in a positive way). However, this is only an art-object based interpretation (medium Intensity) with no transcendental or elaborate relation to the self.

Table 1

Utterance of participant in highest well-being to the prompt "In what ways do you relate to these artworks?".

Utterance (Dutch)	Translated English utterance	Human coding	AI coding
"Ehm, ja ik vind die ook mooi. Ik ben ook naar die tentoonstelling geweest, ik weet dat 'ie nog veel meer mooie dingen gemaakt heeft. Ehm.. Ja."	"Uhm, yes I also think that it's beautiful. I also went to that exhibition, I know that he has made many more beautiful things. Uhm.. Yes."	Intensity: 2 Singular pronouns: Yes Valence: 2	Positive evaluation / assessment: positive appreciation Symbolism

Lowest state of well-being

The participant in the lowest state of well-being (GAD-7: 14 – moderate anxiety, PHQ-9: 13 – moderate depression) is a male of 35 years old and indicated that his peer is a friend. Before the conversation, this participant evaluated the other person's object (a book) as positive (GEW). After the conversation, this changed to both a positive and negative evaluation. 8.57% of the words said by this participant about the other person's object, were first-person singular pronouns. In the coded transcript (Appendix C2), many utterances include a self-reference The answer to the self-referential prompt (Table 2), is an experience-based self-referential interpretation (high Intensity), since the participant indicated that he can see a bit of himself in the artwork and he elaborated why. To another prompt about emotions felt during the conversation (Table 2), the participant indicated that he feels fear and guilt, but also curiosity. These negative and positive emotions could be interpreted as an experienced threat to the self, evoked by the artwork.

Table 2

Utterance of participant in lowest well-being to the prompts "In what ways do you relate to these artworks?" and "Could you please name what emotions you are experiencing as you talk about these artworks?".

Utterance	Human coding	AI coding
"Your artwork, uhm, I think I relate uh, because I think uh I'm also moved by passion in my work, and uhm. therefore it's uh, it is- I can see a bit of myself in this uh, and now since I saw, you tell me why it is important for you I can relate to the fact that I have many object in my life, also books, that are maybe given to me by a person, or uh, reminds me of a person	Intensity: 3 Singular pronouns: Yes	Connection Emotion (2) Sentimentality

or something in my life. And sometimes with a book

you can uhm, I mean the meaning of the book ge- gets

enhanced by this connection with the person in your

life, it's not there by you can bring it with you yeah?"

| "Uhm, about uhm talking about your uhm, your artwork uhm, I uhm, I also agree to curiosity of knowing more about it, uhm, and then uhm also some sense- a bit of guilt for the curiosity and like a bit of afraid of intruding into your personal and then not being able to respect the boundaries uhm, so this also came as a feeling I guess." | Intensity: 3 Singular pronouns: Yes Valence: 3 | Boundaries: Personal Boundaries Curiosity Fear Guilt |

Quantitative results

Cronbach's alpha between GAD-7 and PHQ-9 scores was calculated as $\alpha=.913$ with 95%-CI 0.834 - 0.957, indicating a high level of consistency (>.70).

For the correlations between first-person singular pronouns (both the relative amount of coded "Singular Pronouns Yes" as well as the relative amount of used first-person singular pronouns) and the GAD-7 and PHQ-9 scores, no significant results were found. For Intensity, it was hypothesized in Hypothesis 1a that participants with high anxiety would use more intense self-referential linguistic pronouns. Relative High Intensity ($r=-.072$ with 95%-CI -0.400 - 0.273, $p=.688$) and Mean Intensity ($r=-.025$ with 95%-CI -0.360 - 0.316, $p=.889$) were not significant, and therefore Hypothesis 1a has been rejected. For Valence, it was hypothesized in Hypothesis 1b that participants with high depression would use more negatively valenced self-referential linguistic pronouns. Relative negative Valence ($r=.157$ with 95%-CI -0.191 – 0.470, $p=.374$), Relative positive + negative Valence ($r=-.146$ with

95%-CI 0.202 - 0.409, p=.409) and Mean Valence (r=-.176 with 95%-CI -0.485 – 0.172, p=.319) were not significant and therefore, Hypothesis 1b has been rejected.

All other correlations were also found to be insignificant, except for Valence2 with both GAD-7 (r=.388 with 95%-CI 0.057 – 0.642, p=.023) and PHQ-9 (r=.398 with 95%-CI 0.069 – 0.649, p=.020) (Figure 6).

Figure 6

Correlations between PHQ-9 and GAD-7 scores (x) and relative frequencies of Valence 2 (y).
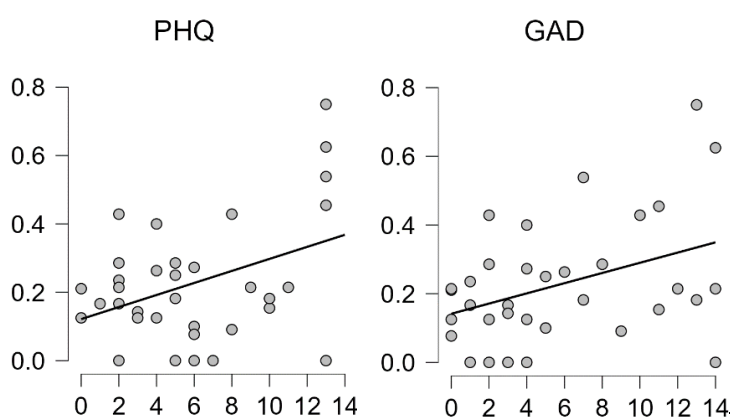

A within-subject RM-ANOVA has been performed between the GEW scores (1-negative, 2-positive, 3-both positive and negative) before and after the conversation, and interpreted GAD-7 scores. As an assumption check for this within-subject RM-ANOVA, Mauchly's test for sphericity is performed for the factors of GAD-7 and PHQ-9. All p-values for Mauchly's W were insignificant (>.05). Therefore, sphericity was not violated and F values did not have to be corrected.

For both GAD-7 and PHQ-9, no significant main effects were found for the valence of emotions reported on the GEW. However, a significant interaction effect has been found for GEW * Depression score PHQ-9 (F(2,14)=5.444, p=.018). For Anxiety, no significant interaction effect for GEW * Anxiety score GAD-7 was found (F(2,12)=1.814, p=.205). When moderating for GEW, the level Moderate of Anxiety score GAD-7 had a significant simple main effect with GEW (F(1)=8.000, p=.030). The level Moderate of Depression score

PHQ-9 had a significant simple main effect with GEW ($F(1)=11.667$, $p=.011$). This effect was a shift from positive emotional evaluations before the conversation towards both positive and negative appraisals after the conversation (Figure 4). However, Hypothesis 2 has been rejected, since no interaction/moderation effect between self-referential linguistic patterns and GAD-7 and PHQ-9 scores has been found for Hypothesis 1.

Figure 7

RM-ANOVA of the means of GEW scores before and after the conversation, divided into levels of anxiety and depression.
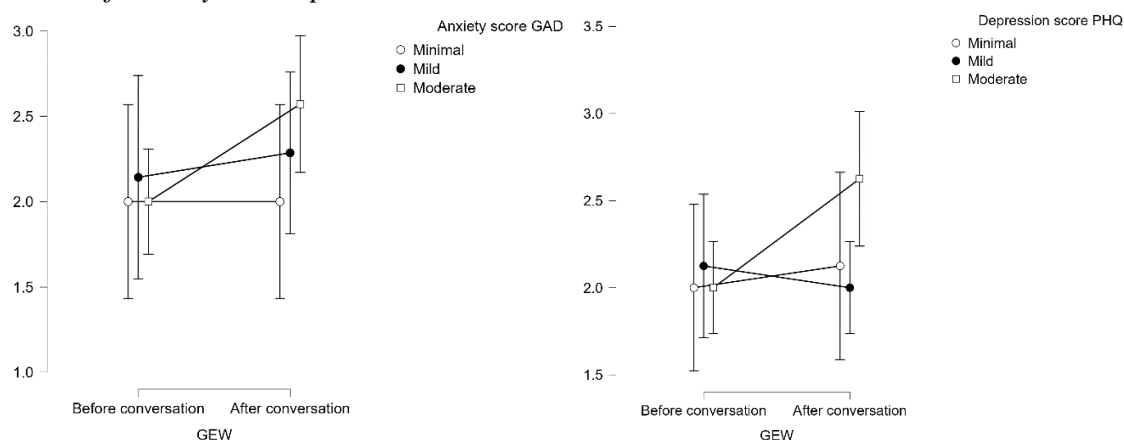
To check for independence, a Chi-square test was conducted between the frequencies of first-person singular pronouns, intensity and valence and frequencies of the GEW after the conversation. No significant p-values were found, and therefore no relationship has been found between these categorical variables.

Discussion

Regarding the investigated relationship between self-referential linguistic patterns and psychological well-being in art experience, mixed results were found in this study. Due to the high Cronbach's alpha between the GAD-7 and PHQ-9, conclusions could be drawn about general psychological well-being. Visual inspection of the qualitative data showed increased usage of first-person singular pronouns in adults with lower well-being, particularly for depression. Intensity and Valence seemed to be evenly distributed across the different levels of well-being, except for low Intensity and negative Valence. In qualitative analysis of the participants with lowest and highest well-being, notable differences were observed in emotional evaluations (GEW), the relative frequencies of first-person singular pronouns and the frequency and intensity of self-references. In quantitative analysis, only the correlations between the GAD-7 and PHQ-9 scores with Valence 2 were found to be significant. In participants with moderate anxiety and depression, a significant change is found in artwork evaluations, from solely positive before the conversation to both positive and negative after the conversation.

The qualitative results support Hypothesis 1 (a and b), indicating that adults in lower states of psychological well-being use more self-referential linguistic patterns about the other person's artwork during art experience. However, quantitative analysis rejected Hypothesis 1, inconsistent with the three VIMAP outcomes of Pelowski et al. (2017) and the work of Vessel et al. (2013) and Coutinho et al. (2016). These mixed results could be explained by the limitations of the self-developed coding scheme based on the three outcomes of Pelowski et al.'s VIMAP model (2017), which assumed a high self-relevance, made no distinctions between implicit and explicit self-references and included artwork appraisals that are not directly related to the self. Despite Hypothesis 2 being rejected due to the rejection of Hypothesis 1, the shift in evaluation valence found in low well-being in both qualitative and quantitative analysis, is interesting and could be alternatively explained by the distancing-

embracing model of aesthetic experience (Menninghaus et al., 2017). Perhaps, the distancing strategy did not eliminate the presence of negative emotions altogether that could have been present in adults with low well-being, which could have led to a more mixed emotional response after the conversation. Moreover, simultaneously employing distancing and embracing strategies during the conversation, could have led to the observation of more pleasure and harmony during the conversation (coded as Valence 2) in lower well-being, since art can be self-rewarding by allowing these individuals to disengage from own distress, irrespective of the emotional content of the artwork (Mastandrea et al., 2019).

The study offers a theoretical framework on the relationship between well-being and the self-referential character in art experience. It is a unique qualitative approach to test neuroaesthetics findings (Vessel et al., 2013; Pelowski et al., 2017). The study has a high ecological validity with the living room setting and a peer, since real-life art experiences take place when personal safety is high (Menninghaus et al., 2017). Moreover, the non-criticizing setting for people with anxiety and depression (Mastandrea et al., 2019), the study's results and incorporation of a social context, are relevant to art therapy. The results suggest that adults in low well-being can have a deep transformative art experience (Pelowski et al., 2017) and can experience harmony and pleasure during the art experience. Consistent with literature (Starr, 2020; Mastandrea et al., 2019), a positive art experience could enhance well-being. In passive art therapies, therapists can apply guided self-referential questions in social interaction, like the prompt used in this study: "In what ways do you relate to this artwork?", to stimulate imagination and self-reflection, and ultimately enhance well-being.

The study's limitations include a relatively small sample size of mainly young adults from the north of the Netherlands, which may not be generalizable. The self-report instruments GAD-7 and PHQ-9 are valid but do not replace clinical diagnosis assessments, limiting generalizability to clinically diagnosed adults with depression and anxiety. The

voluntary participation makes it likely that only art-interested people participated and therefore, the sample is not a true reflection of society. Manual transcription and coding with a self-developed coding scheme, increased the subjectivity of the study which could have influenced the results. Lastly, the nature of the relationship with the conversation partner (e.g., ex-partner) could have influenced the interest and mood towards each other's artworks.

Further multimethod studies are necessary to investigate the relationship between self-referential linguistic patterns and well-being in art experience. Developing a novel coding scheme is recommended, by for example separating linguistic patterns in self-relevance and self-reflection, categorizing implicit and explicit self-references, and negative and positive self-references. Investigating a true clinical sample is needed to improve the comparability to neuroaesthetics studies such as Vessel et al. (2013), and to increase generalizability. Additionally, the practical implications in art therapy, could be explored in a similar experiment with the focus on the improvement of well-being. Furthermore, since art experience is highly embodied (Gallese, 2017; Chatterjee & Vartanian, 2016) which was incorporated in the experiment by asking the participants to stand up during the conversation, it is recommended to analyse this study's data set by including behavioural analysis of the video recordings of the conversation. This way, the relationship between embodiment, self-referential processes and well-being can be explored.

Conclusion

In conclusion, self-referential linguistic patterns and psychological well-being may be interrelated in adults in art experience, but when analysed quantitatively, no clear relationship between these variables has been found. The expected connections between low states of well-being, increased usage of self-referential linguistic patterns and negative evaluations of the other person's object after dyadic interaction, based on neuroaesthetics findings on the role of the DMN, were supported by qualitative analysis using a coding scheme based on

neuroaesthetical models. However, when the codes were analysed quantitatively, the hypotheses were not supported. Therefore, it is suggested to revise and adapt the coding scheme in a follow-up study. Furthermore, future recommendations are to conduct the experiment with a clinical sample to increase generalisability, to investigate the potential enhancement of well-being through art experience and to use behavioural analysis to further incorporate the role of the body in art experience. Nonetheless, this study has made a novel contribution to the fields of art studies and psychology, by examining self-referential processes and psychological well-being in art experience through a comprehensive and ecologically valid multi-method and mixed-method approach.

References

Central Limit Theorem. (2008). In *Springer eBooks* (pp. 66–68). https://doi.org/10.1007/978-0-387-32833-1_50

Chamberlain, R. (2022). Perception and cognition in visual art experience. In Skov, M., & Nadal, M. (2022). *The Routledge International Handbook of Neuroaesthetics*. Taylor & Francis.

Chatterjee, A., & Vartanian, O. (2016). Neuroscience of aesthetics. *Annals of the New York Academy of Sciences*, *1369*(1), 172–194. https://doi.org/10.1111/nyas.13035

Coutinho, J. F., Fernandesl, S. V., Soares, J. M., Maia, L., Gonçalves, Ó. F., & Sampaio, A. (2016). Default mode network dissociation in depressive and anxiety states. *Brain imaging and behavior*, *10*(1), 147–157. https://doi.org/10.1007/s11682-015-9375-7

Denissen, J. J. A., Geenen, R., Van Aken, M. A. G., Gosling, S. D., & Potter, J. (2008). Development and Validation of a Dutch Translation of the Big Five Inventory (BFI). *Journal of Personality Assessment*, *90*(2), 152–157. https://doi.org/10.1080/00223890701845229

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Freedberg, D., & Gallese, V. (2007). Motion, emotion and empathy in esthetic experience. *Trends in cognitive sciences*, *11*(5), 197–203. https://doi.org/10.1016/j.tics.2007.02.003

Gallese, V. (2017). The Empathic Body in Experimental Aesthetics – Embodied Simulation and Art. 10.1057/978-1-137-51299-4_7.

Grant, F., Guille, C., & Sen, S. (2013). Well-being and the risk of depression under stress. *PloS one*, *8*(7), e67395. https://doi.org/10.1371/journal.pone.0067395

Jorna, R.J., & Heusden, B.V. (2003). Why representation(s) will not go away: crisis of concept or crisis of theory? *Semiotica, 143*, 113-134.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Leder, H., Belke, B., Oeberst, A., & Augustin, D. (2004). A model of aesthetic appreciation and aesthetic judgments. *British Journal of Psychology, 95*(4), 489–508. https://doi.org/10.1348/0007126042369811

Lee, H., Jacquot, A., Makowski, D., Arcangeli, M., Dokic, J., Piolino, P., & Sperduti, M. (2023). The beauty and the self: A common mnemonic advantage between aesthetic judgment and self-reference. *Psychology of Consciousness: Theory, Research, and Practice.* Advance online publication. https://doi.org/10.1037/cns0000345

Mastandrea, S., Fagioli, S., & Biasi, V. (2019). Art and Psychological Well-Being: Linking the Brain to the Aesthetic Emotion. *Frontiers in psychology*, *10*, 739. https://doi.org/10.3389/fpsyg.2019.00739

Menninghaus, W., Wagner, V., Hanich, J., Wassiliwizky, E., Jacobsen, T., & Koelsch, S. (2017). The Distancing-Embracing model of the enjoyment of negative emotions in art reception. *The Behavioral and brain sciences*, *40*, e347. https://doi.org/10.1017/S0140525X17000309

Onwuegbuzie, A. J., & Collins, K. M. (2007). A Typology of Mixed Methods Sampling Designs in Social Science Research. *The Qualitative Report*, *12*(2), 281-316. https://doi.org/10.46743/2160-3715/2007.1638

Pelowski, M., Markey, P. M., Forster, M. J., Gerger, G., & Leder, H. (2017). Move me, astonish me. . . delight my eyes and brain: The Vienna Integrated Model of top-down and bottom-up processes in Art Perception (VIMAP) and corresponding affective,
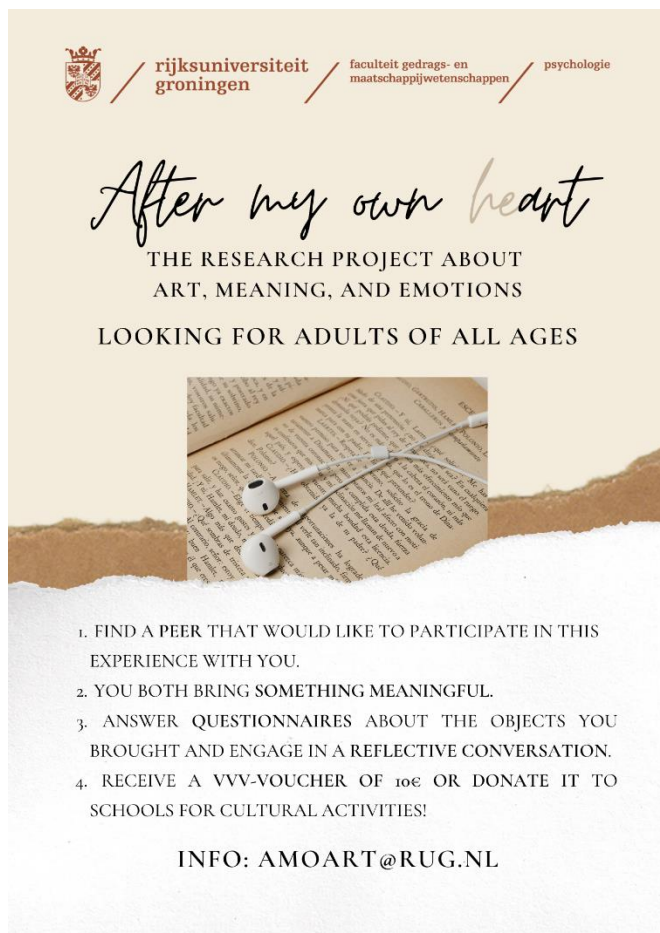
evaluative, and neurophysiological correlates. *Physics of Life Reviews*, *21*, 80–

125. https://doi.org/10.1016/j.plrev.2017.02.003

Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information, 44*(4), 695–729. https://doi.org/10.1177/0539018405058216

Schino, G., van Klaveren, L-M., Gallegos González, H., & Cox, R. F. A. (2021). Applying bodily sensation maps to art-elicited emotions: An explorative study. *Psychology of Aesthetics, Creativity, and the Arts*. https://doi.org/10.1037/aca0000444

Sheline, Y. I., Barch, D. M., Price, J. L., Rundle, M. M., Vaishnavi, S. N., Snyder, A. Z., Mintun, M. A., Wang, S., Coalson, R. S., & Raichle, M. E. (2009). The default mode network and self-referential processes in depression. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(6), 1942–1947. https://doi.org/10.1073/pnas.0812686106

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). Generalized Anxiety Disorder 7 [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t02591-000

Starr, R. & Smith, J. A. (2023) Making sense of an artwork: an Interpretative Phenomenological Analysis of participants' accounts of viewing a well-known painting. *Qualitative Psychology 10*(1), pp. 107-120. ISSN 2326-3598.

Starr, R. (2020). *Apprehending paintings: an interpretative phenomenological analysis of the experience of viewing art.* Doctoral thesis, Birkbeck, University of London.

Tackman, A. M., Sbarra, D. A., Carey, A. L., Donnellan, M. B., Horn, A. B., Holtzman, N. S., Edwards, T. S., Pennebaker, J. W., & Mehl, M. R. (2019). Depression, negative emotionality, and self-referential language: A multi-lab, multi-measure, and multi-language-task research synthesis. *Journal of personality and social psychology*, *116*(5), 817–834. https://doi.org/10.1037/pspp0000187

Tenbrink, T. (2015). Cognitive Discourse Analysis: Accessing cognitive representations and processes through language data. *Language and Cognition, 7*(1), 98-137. doi:10.1017/langcog.2014.19

Tibubos, A. N., Otten, D., Beutel, M. E., & Brähler, E. (2022). Validation of the Personal Attributes Questionnaire-8: Gender Expression and Mental Distress in the German Population in 2006 and 2018. *International Journal of Public Health*, *67*. https://doi.org/10.3389/ijph.2022.1604510

Van Heusden, B. P. (2010). Estrangement and the representation of life in art. In A. van den Oever (Ed.), *Ostrannenie: On 'strangeness' and the moving image: The history, reception, and relevance of a concept* (pp. 157–164). Amsterdam, the Netherlands: Amsterdam University Press.

Van Heusden, B. P. (2022). Perception, Action, and Sense Making: The Three Realms of the Aesthetic. *Biosemiotics*, *15*, 379–383. https://doi.org/10.1007/s12304-022-09482-y

Van Klaveren, L.-M., Van Dorsten, T., & Van Heusden, B. (*forthcoming*). Mapping the Development of Cultural Consciousness: From Theory to Practice. *Forschungsberichte Nr. 32*

Van Schaik, J. (2010, November). Kunst is een gegeven, interview met Barend van Heusden. *Dagblad van het Noorden.*

Vessel, E. A., Starr, G. G., & Rubin, N. (2013). Art reaches within: aesthetic experience, the self and the default mode network. *Frontiers in neuroscience*, *7*, 258. https://doi.org/10.3389/fnins.2013.00258

Wah, A. (2017). Cognitive Processes Underlying the Artistic Experience. *Avant, VIII*(1), 45-58. https://doi.org/10.26913/80102017.0101.0003

Appendix A: study design

Figure A1

Figure A2

Experiment room: two chairs, two tables with two tablets, a long table, a display screen for

the prompts, audiovisual camera and if necessary, a laptop and headphones.
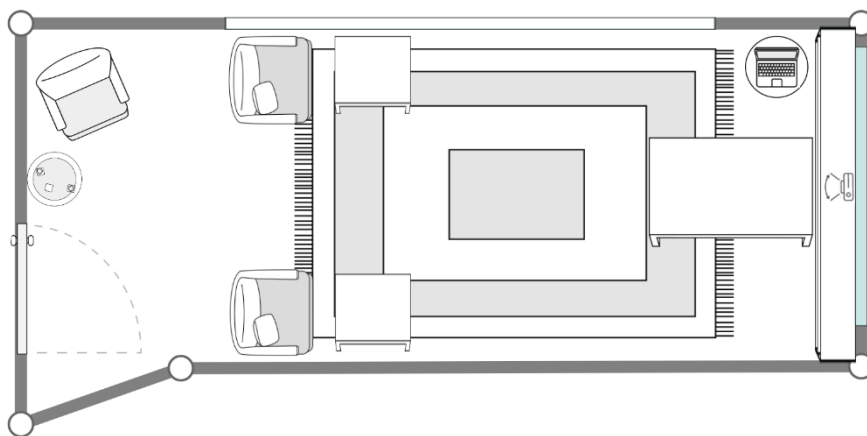
Appendix B: coding schemes

Table B1

Coding scheme self-referential linguistic patterns based on VIMAP model (Pelowski et al., (2017).

Absence of self-relevance (0)	*Self-relevant threat -> negative processing (1)*	*Self-relevant importance -> harmony (2)*	*Self-relevant threat -> transformation (3)*
Aborted self-referential sense-making process	It's not art, it's meaningless, I can't understand (*no meaning-interpretation*)	It reminds me of Y (*art object-based interpretation*) About oneself, one's life, one's expertise/expectations/ worldview/interest and taste Wonder what is it about and a tentative idea	It made me feel X/think about Y (*experience-based interpretation*) About oneself, one's life, one's expertise/expectations/ worldview/interest and taste Need to examine motives, so reflection beyond wondering: imagine yourself in artwork

Low hedonic artwork appraisal (bad, ugly, meaningless)	High hedonic artwork appraisal (good, beautiful, meaningful)	High hedonic artwork appraisal (good, beautiful, meaningful) + novel, profound and personally important
Fight or flight arousal, leaving	Chills	'Feel like crying'
Negative emotion: confusion, anxiety/danger/need to stop or leave	Being moved: harmony. Resonant emotion with artwork	Positive and negative emotions: confusion/anxiety + harmony, personal epiphany/enlightenment, relief, catharsis, thrill, connectedness, wholeness Self-aware: aware of body

Table B2

Coding scheme in English of self-referential linguistic patterns, divided into Intensity and

Valence and supplemented with frequent observed phrases and patterns after coding the first

transcripts, feedback from second coder and quotes from the transcripts (red).

Intensity		
Low - 1	*Medium -2*	*High -3*
No-meaning interpretation	*Art object-based interpretation*	*Experience-based interpretation (self-threat)*
I don't see a meaning	It reminds me of X/it relates to me because X...	It made me feel X…
I don't want to know a meaning	About oneself ('I relate to you'), one's life, traits, one's expertise/expectations (for example: about other person's choice)/worldview/interest/taste	About oneself, one's life ('Nostalgia'), one's expertise/expectations (for example about choice of other person)/worldview/interest/taste
It's not art	I know this artwork because X...	It made me think of X... (transcendental)
	About oneself, one's life, one's expertise/expectations/worldview/interest/taste	About oneself, one's life (memorie*s*), one's expertise/expectations/worldview/interest/taste
I can't understand	I wonder/am interested/curious what it is	It made me imagine myself in artwork/another world
I don't understand		

I cannot think of what the artist means/what the purpose is (and uncurious)	about because X... I have an idea/understand what it's about: X... About oneself, one's life, one's expertise/expectations/world view/interest/taste	evoked by artwork ('It brings you somewhere else'/'It helps transcends where you are'/'I can see a bit of myself in this') I'm very curious (transcendental: need to know) what it is about, because it does not match with X... About oneself, one's life (memories), one's expertise/expectations/world view/interest/taste
	It relates to my own artwork because X... Comparison between artworks because X... About oneself, one's life, one's expertise/expectations/world view/interest/taste	It made me feel X compared to my own artwork Both artworks made me feel like X... About oneself, one's life, one's expertise/expectations/world view/interest/taste

Valence		
Negative -1	*Positive -2*	*Negative + positive - 3*
(Negative processing)	*(Harmony)*	*(Transformation)*
I think it's ugly, bad, meaningless, not beautiful ('I don't like it') (low hedonic artwork appraisal)	I think it's good, beautiful, meaningful ('Interesting'/'Deep') I like it (high hedonic artwork appraisal) Both artworks are beautiful	I think it's good, beautiful, meaningful ('Inspiring'/'Amazing') (profound/transcendental hedonic artwork appraisal) *and/or* novel
I want to stop or leave ('A kind of fight or flight reaction')	I get the chills ('It gives me goosebumps') I'm being moved ('It hit a certain spot')	I feel like crying ('I felt my tears') I am aware of myself and my body ('It hit in the heart and the head')
I'm confused/scared/angry/I'm in danger, dissapointed, nervous, ashamed, embarrassed, sad (and uncurious/indifferent)	I feel *resonant emotion with artwork*/harmony/pleasure/ absorption	I'm confused/scared/I'm in danger/other negative emotions (discrepancy) but curious *and/or* I feel harmony, pleasure (transcendental), personal epiphany/enlightenment,

	insight
	('It inspires me to../'It gives me a different perspective')
	relief, catharsis, thrill, connectedness, sublime, awe, wholeness, closeness with the other person

Table B3

Coding scheme in Dutch of self-referential linguistic patterns, divided into Intensity and

Valence and supplemented with frequent observed phrases and patterns after coding the first

transcripts, feedback from second coder and quotes from the transcripts (red).

Intensiteit		
Laag - 1	*Medium -2*	*Hoog -3*
Geen-betekenis interpretatie	*Kunst-object gebaseerde interpretatie*	*Ervaring-gebaseerde interpretatie*
Ik zie geen betekenis Ik wil geen betekenis zien	Het herinnert me aan X/het relateert aan mij omdat X... Over zichzelf ('Ik relateer me aan jou'), iemands leven, iemands expertise/verwachtingen (bijvoorbeeld over de keuze van de ander) /wereldbeeld/interesse/smaak	Het liet me X voelen... Over zichzelf, iemands leven ('Nostalgie'), iemands expertise/verwachtingen (bijvoorbeeld over keuze van de ander)/wereldbeeld/interesse/smaak
Het is geen kunst	Ik ken dit kunstwerk omdat X... Over zichzelf, iemands leven, iemands expertise/verwachtingen/wereldbeeld /interesse/smaak	Het deed me denken aan X... (overstijgend) Over zichzelf, iemands leven (herinneringen), iemands expertise/verwachtingen/wereldbeeld/interesse/smaak
Dit begrijp ik niet Dit kan ik niet	Ik vraag me af/ben geïnteresseerd/ben nieuwsgierig naar	Het liet me mezelf voorstellen in het kunstwerk/een andere wereld opgeroepen

begrijpen	waar het over gaat omdat X...	door het kunstwerk
Ik kan niet bedenken wat de kunstenaar hiermee bedoelt/wat het doel is (en niet benieuwd)	Ik heb een idee/begrijp waar het over gaat: X...	('Het brengt je ergens anders'/'Het helpt om te overstijgen waar je bent'/'Ik kan een stukje van mezelf hierin zien')
	Over zichzelf, iemands leven, iemands expertise/verwachtingen/wereldbeeld /interesse/smaak	Ik ben heel benieuwd (overstijgend: moet het weten) waar het over gaat, want het matcht niet met X...
		Over zichzelf, iemands leven, iemands expertise/verwachtingen/wereldbeeld/interesse/smaak
	Het relateert aan mijn eigen kunstwerk omdat X...	Het liet me X voelen in vergelijking met mijn eigen kunstwerk
	Vergelijking tussen kunstwerken omdat X...	Beide kunstwerken laten me X voelen
		Over zichzelf, iemands leven, iemands expertise/verwachtingen/wereldbeeld/interesse/smaak
	Over zichzelf, iemands leven, iemands expertise/verwachtingen/wereldbeeld /interesse/smaak	

Valentie

Negatief -1 (Negatieve verwerking)	*Positief -2 (Harmonie)*	*Negatief + positief - 3 (Transformatie)*

Ik vind het lelijk, slecht, betekenisloos, niet mooi, ('Ik vind het niet leuk') (lage hedonistische beoordeling)	Ik vind het mooi, goed, betekenisvol ('Interessant'/'Diep'), ik vind het leuk (hoge hedonistische kunstwerk beoordeling) Beide kunstwerken zijn mooi	Ik vind het mooi, goed, betekenisvol ('Inspirerend'/'Geweldig') (diepgaande/overstijgende hedonistische kunstwerk beoordeling) *en/of* nieuw
Ik wil stoppen of weggaan	Ik krijg er rillingen van ('Het geef me kippenvel') Ik ben geraakt ('Het raakte een bepaalde plek')	Ik voel me alsof ik moet huilen ('Ik voelde m'n tranen') Ik ben bewust van mezelf en mijn lichaam ('Het raakte me in mijn hart en m'n hoofd')
Ik ben in de war/bang/ik ben in gevaar, teleurgesteld, nerveus, ik schaam me, gegeneerd, verdrietig (en onverschillig/niet benieuwd	Ik voel *resonerende emotie met kunstwerk*/harmonie/plezier/ absorptie	Ik ben in de war/bang/ik ben in gevaar/ andere negatieve emoties (discrepantie) maar benieuwd *en/of* Ik voel harmonie (overstijgend), persoonlijke openbaring/verlichting, inzicht ('Het inspireert me om...'/'Het geeft me een ander perspectief'), opluchting, catharsis, opwinding, verbondenheid, ontzag/onder de indruk, heelheid, nabijheid met de andere persoon

Appendix C

Table C1

Transcript example of participant in high state of well-being.

Utterance	Human coding	AI coding
Ik ken het natuurlijk, want het hangt op de wc	Intensity: 2 Singular pronouns: Yes	
Maar, eh, het is ook eh, hartstikke mooi, en het is ook een symbool voor dat we met mekaar altijd maar in rondjes draaien	Intensity: 2 Singular pronouns: No Valence: 2	
Maar het meest interessant is natuurlijk die ene die er dan naar kijkt.	Singular pronouns: No	
Linksonder. Die denkt van nouuu,	Singular pronouns: No	
Die doet er niet aan mee, als het ware.	Singular pronouns: No	
ze zijn allemaal aan het klimmen, maar komen niet boven	Singular pronouns: No	
Als je het voor het eerst ziet, dan zou je in verwarring kunnen raken, ofzo. Maar dat is er op den duur wel af	Singular pronouns: No	Verwarring

Los daarvan, is het ook nog eens ontzettend knap getekend	Singular pronouns: No Valence: 2	
Ook gewoon dat gebouw	Singular pronouns: No	
Ik vind allebei mooi	Singular pronouns: Yes Valence: 2	
Ehm, ja ik vind die ook mooi. Ik ben ook naar die tentoonstelling geweest, ik weet dat 'ie nog veel meer mooie dingen gemaakt heeft. Ehm.. Ja	Intensity: 2 Singular pronouns: Yes Valence: 2	Positive evaluation/assessment: positieve waardering Symbolisme
Ja, verwarring scheppen.	Singular pronouns: No	
De kijker op het verkeerde been zetten.	Singular pronouns: No	
Terwijl dat bij Escher eigenlijk niet per se	Singular pronouns: No	
Nee dat is juist, dat is heel direct. En het spreekt voor zich. Van, nou, laat de kijker daar maar naar kijken, en eh	Singular pronouns: No	
Nee, je hoeft ook niks over meneer Escher te weten ofzo, dat heeft er niks mee te maken in feite.	Singular pronouns: No	

Nouja, het enige is dat Escher ook nog veel meer van dat soort, eh, dat is wel interessant om te vertellen dat er nog veel meer is.	Singular pronouns: No
Voorderest hoef je daar juist eigenlijk niet iets over te weten.	Singular pronouns: No
Op het toilet!	Singular pronouns: No

Table C2

Transcript example of participant in low state of well-being.

Utterance	Human coding	AI coding
right, so I thought when I saw the artwork you brought, that uh, yeah it was something uh, related to your uhm, experience uhm, as a professional, but also part of the profession that really speaks about what you really desire in your life, what you want to uuhm, to do, uuhm, to give meaning to your life trough, okay your profession but also something that speaks deeper into you.	Singular pronouns: Yes	Boundaries: Professional identity Interest Passion: Passion
and uhm, and then I also thought about what could be the title to be the content of this, uuhm, this book. What could be kind of the, what makes biology special, I start thinking about possible - what could be inside this book what made me curious about it.	Intensity: 2 Singular pronouns: Yes	Curiosity Reflection
yeah, so, curious also to hear more from you about it.	Singular pronouns: No	
uhum, uhum. yeah, uhm, also could not touch the book, but also when I saw it, I also got the desire of, uuhm, seeing how the pictures were done	Intensity: 2 Singular pronouns: Yes	Curiosity Passion: Aesthetic enjoyment
or uhm, with the surface. And also I like about books the smell, so even now I couldn't do it, I actually got the desire to get	Intensity: 2 Singular pronouns: Yes	Passion: Appreciation

more in contact with the piece of art then I could just by looking at it.		for physical objects
Smell: Sensory experience (smell)
But to me, uuhm, yeah feelings, I think curiousity for what could be inside and for also, for what, yeah, links uhm, to this artwork and uhm, uhm. And then the picture of the animal and the cowgirl also made me, I don't know, having longing for uhm, to go far away and be free I don't know how to say, [unintelligeble] makes you think about a far away land.	Intensity: 3
Singular pronouns: Yes	Curiosity
Nostalgia
Passion: Longing for Adventure
So for my uhm, so yeah my experience of your artwork, uhm, yeah beautiful I think it's also not uuhm associated, yeah to the- to the book uuhm, I think uuh. I don't know, I-I-I feel attracted to the object in itself, as I said I also like, uhm maybe the composition of the colour and the picture, but uhm yeah, I would not describe this uhm, as uhm, an experience of bea- uhm	Intensity: 2
Singular pronouns: Yes
Valence: 1	Uncertainty
Vagueness
Your artwork, uhm, I think I relate uh, because I think uh I'm also moved by passion in my work, and uhm. therefore it's uh, it is- I can see a bit of myself in this uh, and now since I saw, you tell me why it is important for you I can relate to the fact that I have many object in my life, also books, that are maybe given to me by a person, or uh, reminds me of a person or	Intensity: 3
Singular pronouns: Yes	Connection
Emotion (2)
Sentimentality

something in my life. And sometimes with a book you can uhm, I mean the meaning of the book ge- gets enhanced by this connection with the person in your life, it's not there by you can bring it with you yeah?

uhm, about uhm talking about your uhm, your artwork uhm, I uhm, I also agree to curiosity of knowing more about it, uhm, and then uhm also some sense- a bit of guilt for the curiosity and like a bit of afraid of intruding into your personal and then not being able to respect the boundaries uhm, so this also came as a feeling I guess.	Intensity: 3 Singular pronouns: Yes Valence: 3	Boundaries: Personal Boundaries Curiosity Fear Guilt
What I think, uhm, for your uhm, I don't know I think I just give, uhm not what is your purpose, but I can just say maybe what I think that uhm, what the publisher, or the author wanted with this uhm, book. I think it's uhm, I don't know, I think with a book you can tell a story and you can tell, kind of in some sense you can both bring and describe what biology is and kind of narate it and engage or arouse enthousiasm. You can maybe uhm, read it and get excited about this, uhm, this subject and then you want to go into it. Then I think having a book like this, the author could maybe reach more people than writing a scientific paper.	Intensity: 2 Singular pronouns: Yes	Passion: Intellectual curiosity Respectful: Thoughtful Uncertainty
for me, I think about your artwork, uhm I think I would like to know, uhm, like that other people know that it's also for them. uhm, for everybody and not only like biology enthousiasts. I	Intensity: 2 Singular	Inclusivity Knowledge importance

believe, I think that uhm knowing the world around us should   pronouns: Yes   Passion:

be a part of all of us, uhm, something I want people to know is   Universality

that it's something people should experience and I think the

same also for mine.