universität wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„The Vertical Dimension in Art and Face Perception:

Metaphors, Embodiment, and Viewing Angle"

verfasst von / submitted by

Lars-Michael Schöpper, BSc

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien, 2017 / Vienna 2017

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	A 066 840
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Psychologie
Betreut von / Supervisor:	Univ.-Prof. Dipl.-Psych. Dr. Helmut Leder
Mitbetreut von / Co-Supervisor:	-

Danksagung

Zunächst gilt mein besonderer Dank meinem Betreuer Univ.-Prof. Dr. Helmut Leder für die Betreuung und Begutachtung meiner Masterarbeit, sowie für die Unterstützung während dieser Zeit. Er gab mit seiner Expertise viele Ideen und Vorschläge zur Umsetzung der Studie und zur Interpretation der Studienergebnisse. Daneben gilt mein Dank auch Prof. Dr. Norbert Schwarz für Ideen zum Thema und Feedback zum Untersuchungsdesign. Ich danke beiden für die Ideen, die den Startpunkt meiner Untersuchungsfragen gaben.

Mein besonderer Dank gilt Mag. Jürgen Goller, der mich bei der statistischen Auswertung unterstützt hat, für viele Rückfragen Zeit fand und hilfreiche Tipps zum wissenschaftlichen Schreiben gab. Ein Dank gilt Mag. Dr. Gernot Gerger für Tipps und Hinweise zu verschiedenen Aspekten meiner Studie, sowie für die Geduld während ich das Durchgangszimmer zu seinem Büro als Testraum für meine Studie nutzte. Daneben möchte ich auch DI Mag. Andreas Gartus, BA, für die Beantwortung etwaiger auftauchender Fragen zur Auswertung danken. Generell möchte ich den Mitgliedern des Empirical-Visual-Aesthetics-Labs (EVA-Lab), sowie meinen StudienkollegInnen im Masterseminar für Anregungen, Feedback und Diskussionen bezüglich meiner Arbeit danken. Ebenso möchte ich Imani Rameses für das Korrekturlesen meiner englischen Ausdrucksweise, sowie für die hilfreichen Kommentare dazu, danken.

Daneben gilt mein Dank auch meinen StudienkollegInnen mit denen ich das letzte Jahr an der Uni verbracht habe für die schöne und lustige Zeit. Während der Planungs- und Durchführungsphase der Studie waren dies u.a. Bastian Auer, Christian Büsel, Vanessa Mitschke und Marit Petzka. Die Liste könnte ich noch weiterführen; ein Dank daher an alle weiteren Leute, die mich im letzten Jahr begleitet haben. Ebenso danke ich meinen StudienassistenzkollegInnen Barbara Hollunder, Elisabeth Kliem, Patrick Smela und Elena Vaporova. Des Weiteren möchte ich Alexander Maier und Frederik Weber für die langjährige Freundschaft und die schöne Zeit als Mitbewohner während meines Studiums danken.

Last but not least möchte ich meiner Mutter, Dr. Rosemarie Schöpper, und meinem Vater, Dr. Michael Schöpper, danken, die mir dieses Studium ermöglicht haben. Daneben danke ich ihnen und meiner Schwester, Dr. Malin Schöpper, für die Unterstützung während meines Studiums.

Wien, 2017

Table of Contents

The Vertical Dimension in Art and Face Perception: Metaphors, Embodiment, and Viewing Angle

Humans encounter the world from an individual perspective. A basic difference comes from the height, from which they perceive their environment. For example, one individual may view a sign at eye level, another one might see it from below or a third from above. Does this affect how we perceive the target of our attention? The current study investigated if a change in viewing angle influences how artworks and faces are perceived.

The Vertical Dimension and Artworks

Although not always in an explicit and obvious way, metaphors are used in everyday life. For example, a sad person might be described as "feeling down", or a happy or prideful person as "feeling uplifted", with similar metaphors in German: "niedergeschlagen fühlen", or "erhoben fühlen". Some of these refer to an emotional state or affect being represented on a vertical dimension. Roughly stated, a positive state can be described through a high vertical position, whereas a low vertical position resembles a more negative state. The Conceptual Metaphor Theory (CMT) by Lakoff and Johnson (1980) proposes, that metaphors can be seen as a mapping of an understood (physical) source concept onto a more abstract target concept (for a brief introduction see Landau, Robinson, & Meier, 2014). Here, the source concept resembles a spatial position in a vertical dimension, to understand the more abstract target concept of affect. According to CMT, such conceptual metaphors originate from our physical body, from which we experience and perceive the world. While we develop during young age, we physically experience situations, which in turn are transcribed into metaphorical concepts, "loaded" with the meaning of the physical experience. Regarding the metaphorical link of affect and the vertical dimension, this might originate from the body postures that accompany affective states, like an erect posture while being proud, or a sunken head while being sad. In turn, "up" becomes associated with positive affect, whereas "down" becomes associated with negative affect. This link is called a *conceptual metaphor*, and in our case links positive affect with a high position and negative affect with a low position. Throughout this thesis, we will use the acronym PU/ND to describe the concept of "**P**ositive is **U**p/ **N**egative is **D**own".

Accordingly, metaphors can be used to investigate cognitive embodiment (see Krishna & Schwarz, 2014, pp. 164). When we experience a situation, our body reacts accordingly. A simulation of the bodily experiences might trigger how we would experience the situation—even if the original situation or cause is not there. This re-experience of bodily states that lead to a simulation of an experience, which was originally accompanied by those bodily states, is

termed embodied cognition or embodied emotion (Niedenthal, 2007). Grounded cognition is a related term and describes that cognition can be grounded in bodily states, but also in other ways, like, for example, situated action (Barsalou, 2008). However, since the current study focuses on the metaphorical link, as well as the body, the term *cognitive embodiment* will be used. An often-cited example is the study by Strack, Martin, and Stepper (1988), in which holding a pen between the teeth led participants to rate cartoons to be funnier compared to participants who held that pen between their lips. With holding the pen between the teeth, muscle regions that are active during smiling were not inhibited, in contrast to holding a pen between the lips. Following the hypothesis, this led to a "facial feedback" and in turn to experiencing the cartoons to be funnier. Although this is a prominent example of how the body is used as a source of information, it should be noted that a recent registered replication report by Wagenmakers et al. (2016) could not replicate the results of Strack et al. (1988).

During the last years, cognitive embodiment has gained more attention and led to many studies that gave evidence for the influence of bodily experiences on perception (for reviews see Barsalou, 2010; Meier, Schnall, Schwarz, & Bargh, 2012; Krishna & Schwarz, 2014). For example, in a study by Chandler & Schwarz (2009), participants read a story that described ambiguous behaviour—which could be interpreted as aggressive or assertive—by a fictional character called "Donald". While doing this, they had to extend their middle finger (as a hostile movement; study 1) or an upward-raised thumb (as an approving movement; study 2), or the index finger when in the control group. Those who raised the middle finger rated Donald to be more hostile, compared to the control group; those who raised their thumb rated Donald to be less hostile compared to the control group. It seems, that motor movement was used to interpret the ambiguous behaviour. In the English language, if something like a situation or someone's behaviour raises suspicion, it is considered to be "fishy". Congruent with that, dispensing fishy smells in the test room led participants to be more suspicious in trust games (Lee & Schwarz, 2012).

One metaphorical concept links the vertical dimension and affect, with "positive" or "good" associated with "up", and "negative" or "bad" associated with "down" (for reviews see Crawford, 2009; Meier & Robinson, 2005). Congruent with Lakoff and Johnson (1980) that such metaphors exist, because we experience them with our physical body, this link can be found in research investigating bodily posture. In one study participants felt more pride while receiving positive feedback for a task when they sat in an upright compared to a slumped posture (Stepper and Strack, 1993). An upright sitting posture eases the generation of positive thoughts (Wilson and Peper, 2004). Importantly, the body postures mentioned here

are roughly stated on the vertical dimension: in line with the conceptual metaphor of PU/ND, an upright posture resembles more positive affect, whereas a slumped/down posture is connected to negative affect.

Individual differences, specifically those related to symptoms of mood disorders, also affect how bodily states influence cognition. Peper and Lin (2012) found that slouched walking reduced subjectively reported energy-levels while skip-walking increased subjectively reported energy-levels. Using a screening for depression, the authors created two extreme groups: those scoring high (highest 20% of participants) had a significantly reduced energy level after the slouched walking compared to the participants with a low depression score (lowest 20% of participants). This is in line with research on patients with a diagnosed major depression: in a memory task, depressive participants who sat in an upright posture could recall positive and negative words to the same extent. However, those participants who sat in a slumped posture recalled more negative than positive words (Michalak, Mischnat, & Teismann, 2014). Higher neuroticism and higher depression scores, systematically influence selective spatial attention that low stimuli are attended faster (Meier & Robinson, 2006). As the authors conclude, it seems that "'feeling down' means seeing down" (Meier & Robinson, 2006, p. 460). These studies show the interconnection between body posture and affect; furthermore, they give evidence for the concept of mapping affect in a vertical dimension.

This congruency of vertical dimension and affect can also be found by investigating head movements. In one study, participants had to imitate happy and angry facial expressions or an upward and downward looking face. Those images were paired with a low or high tone. A low tone led to faster imitation of an angry facial expression, as well as a faster downward movement of the head; the opposite was found for a high tone, which led to faster imitation of a happy facial expression and a faster upward movement of the head (Horstman & Ansorge, 2011). Livingstone and Palmer (2016) found that singers changed their head positions and tilt in accordance with the valence of the sung or spoken passage. Happy and neutral passages were accompanied by an upward movement of the head, whereas sad passages were accompanied by a downward movement of the head. Furthermore, happy passages led to an upward tilt of the head, and sad vocalizations led to a downward tilt. All those movements started before the vocalizations of the passages, suggesting that they were not a simple by-product of sound vocalization but were initiated with the to-be-communicated emotion (Livingstone & Palmer, 2016). In a second study, the authors showed videos of singers (without sound and with occluded faces) to participants; participants could identify the valence of the vocalizations (neutral, happy, sad) above chance. These results suggest, that head movements in the

vertical dimension might be, even implicitly, used to embody and/or communicate affect. Similarly, in one study, faces were presented tilted up- and downward. Faces were perceived as sad when tilted downward, whereas faces were perceived as happy when tilted upward (Mignault and Chaudhuri, 2003; it should be noted that female faces were also perceived as happy when tilted downward). This is remarkable, because all faces showed the same neutral facial expression; only the different angles changed the perception.

The mentioned theories of metaphors and embodiment, propose that such a conceptual link might manifest in how we organize our cognition. And indeed, the conceptual metaphor of PU/ND can be found without directly looking at body posture. Meier and Robinson (2004) found that positive and negative words were evaluated faster, when they were shown in a position congruent with the PU/ND metaphor. It was also found, that evaluations of positive and negative words prime spatial attention congruent with the metaphor (Study 2), but not the other way around (Study 3; a spatial prime followed by a word which had to be evaluated). These results give evidence, that the concept of locating affect on a vertical dimension facilitated processing. This automatic association is supported by a study that used a modified version of an implicit association task (IAT; Greenwald, McGhee, & Schwartz, 1998, cited by Ansorge & Bohner, 2013). With spatial words, as up and down targets, and affective words, as positive and negative targets, participants showed a better performance in metaphor-congruent trials (Ansorge & Bohner, 2013).

Such a facilitation might be explained by an automatic association of affect and the vertical dimension. If such an automatic connection exists, people might organize or think of affect in a metaphor-congruent way. Mahieu, Corneille and Yzerbyt (2014) investigated in several experiments, if participants would locate happiness and sadness in a vertical dimension according to the conceptual metaphor. Participants wrote down a happy and a sad word in a frame on a piece of paper. Congruent with the conceptual metaphor of PU/ND, the happy words were written further up on the paper than the sad words. In a second study, participants had to position a happy and a sad face on printed bodies. Those bodies appeared at different vertical locations on a piece of paper. Again, happy faces were positioned significantly more often on the upper body, whereas sad faces on the lower body. In a third experiment, it was investigated if mild facial emotions would be detected faster, if congruent with their vertical location. Women detected sad facial expressions faster in the lower position and happy facial expressions faster in the upper position. Men showed no difference between happy and sad facial expressions in interaction with their vertical position. This difference between women and men was also found in a fourth experiment and was partially explained by the authors by

differences in emotional expression and the communicative importance of emotions (Mahieu et al., 2014).

Thus, it seems that positive affect "fits" in a high vertical position, whereas negative affect "fits" in a low vertical position. This even biases memory of emotionally valent stimuli congruent with this concept. In two studies, Crawford, Margolies, Drake and Murphy (2006) showed participants emotion evoking images, which were either positive or negative in their valence. In the first study, the images were presented individually, and appeared in various locations on the screen. Afterwards, each picture was presented again and participants' task was to move it to its first presentation location. Memory for the location of positive images was biased upward compared to negative images, suggesting a memory bias for affective stimuli. In a second study, the design was similar, however, memory for location of pictures was tested immediately after the presentation of each image (with a mask in between). Again, a memory bias for affective stimuli was found, with memory for the location of negative images being biased downward compared to positive images. In a third study, positive or negative characterizations/ descriptions were followed by yearbook photos of female high school students. The corresponding images were presented on different possible locations on the screen. Afterwards, as in study 1, participants saw each image in the center of the screen and were asked to shift it to the remembered location, and rate how they felt about that person. Using the latter ratings of the participants, but not the predefined valence of characterizations, showed an upward shift for positively rated photos, as well as a downward shift for negatively rated photos. All three experiments revealed a difference in memory bias for affective stimuli, which was congruent with the concept of PU/ND. Importantly, this metaphor-congruent effect was found using non-linguistic stimuli in a non-linguistic task (Crawford et al., 2006, p. 1166), giving further support for a metaphor-congruent conceptualization of affect in a vertical dimension.

In summary, a link that is equivalent to the conceptual metaphor of PU/ND has been found in several studies. Some manipulated body posture, some looked at body movements and some used more abstract tasks that showed cognition to be likely influenced by bodily experiences. It is especially remarkable, that the conceptual metaphor can be used to investigate non-linguistic stimuli. Thus, in the current study we investigated if such a metaphorical link can be found when viewing art.

Artworks can elicit various emotions (see e.g. Leder, Belke, Oeberst, & Augustin, 2004). It has been argued that aesthetic responses can arise from embodied simulation of the

emotional properties shown in the artwork (Freedberg & Gallese, 2007). Additionally, embodiment has become a topic in psychological aesthetics and neuro-aesthetics (Kirsch, Urgesi, & Cross, 2016). Thus, if there is a conceptual link between affect and vertical dimension, with "positive = up" and "negative = down", artworks that elicit certain emotions might be perceived differently when presented at different heights.

There is some research on orientation of artworks and how this affects the perception of artworks. For example, orientation of modern artworks (Mather, 2012), left-right orientation/mirroring of images (Bennett, Latto, Bertamini, Bianchi, & Minshull, 2010) or the effect of order of three emotionally valent paintings presented in a row (Kreplin, Thoma, & Rodway, 2014) have been investigated. However, to our knowledge, none has focussed on the interaction of affect and the vertical dimension. While visiting a classical art exhibition, artworks are usually presented on a wall. The question arises, if the perception of emotionally valent artworks changes with the position on a vertical dimension. Speaking in terms of CMT, the height in which artworks are displayed might be used to give information, as the source concept, about the experienced affect, as the abstract concept, while viewing the artworks. If the viewing angle from which we perceive objects like artworks changes the perception of those, this could have major implications on daily life. On the one hand, it would show that the body would be included in the processing of information; on the other hand, it could further explain individual preferences for objects, like artworks.

Therefore, we proposed that the height in which artworks are hung influences the perception of artworks. This interaction of height with the emotional valence of the artworks, should be congruent with the conceptual metaphor of PU/ND. If a smaller person looks up at artworks, he or she might experience these artworks different compared to a taller person who looks down on those artworks. This "looking up" might embody a positive state, whereas "looking down" might embody a negative state. Therefore, since people differ in their body height, the resulting viewing angles from which artworks are perceived, should support an embodied effect. Positive artworks looked up at/ in a high vertically position and negative artworks looked down at/ hung in a vertically low position—so congruent with the metaphor of PU/ND—might be seen more fitting. An artwork that "fits" its location might be processed easier and could in turn lead to higher liking (Reber, Schwarz & Winkielman, 2004). Following the idea of Freedberg and Gallese (2007), emotionally valent artworks hung accordingly might elicit stronger emotions in the viewer, as some sort of strengthened embodied experience. Emotionally valent artworks that "fit" their vertical dimension congruent with the metaphor, might be experienced to be of higher quality.

We hypothesized, that artworks' height congruent with the conceptual metaphor, leads to higher familiarity and liking, stronger emotions, as well as higher perceived art quality. In the current study, participants rated artworks hanging in a low (center at 138.50 cm) and high position (center at 178.50 cm) for liking, valence, familiarity, and art quality. Not the mere vertical position (138.50 cm or 178.60 cm), but the individual viewing angle towards each artwork was of importance. An artwork might be hanging high for a shorter person, but might be hanging low for a taller person. Therefore, the height difference towards each artwork was defined as the distance from individual eye height to the center of each artwork—resulting in individual viewing angles towards the artworks. In summary, we proposed that looking up or down at an emotionally valent artwork would result in metaphor-congruent ratings. Additionally, since power seems to be conceptually linked to a higher vertical position (Giessner, Ryan, Schubert, & van Quaquebeke, 2011), looking up to an artwork might make it more powerful or impressive, resulting in a possible effect for a preference of those. This was not our main research question, however, it might interfere with a metaphor-congruent interaction.

The Vertical Dimension and Faces

The vertical dimension also plays a systematic role in face perception. As mentioned, vertical head movement might be used to communicate emotional content (Livingstone and Palmer, 2016). However, vertical movement of faces can have diverse interpretations. Next to neutral faces appearing happy when tilted upward and sad when tilted downward, an upward tilt also makes those faces appear more dominant (Mignault and Chaudhuri, 2003). This is in line with findings that powerful people are usually presented as seen from below and powerless people from above (Giessner et al., 2011).

Related to a link between power and the vertical dimension, Meier and Dionne (2009) investigated if male and female faces presented either at the top or at the bottom of a screen would change the perception of these faces. Meier and Dionne (2009, p. 885) built their hypotheses up on evolutionary theories regarding female preferences for men with resources and male preferences for young women, suggesting that females would prefer males in a high vertical position (more power) and males would prefer females in a low vertical position (less power). Participants rated faces appearing at the bottom or the top of a computer screen regarding attractiveness. The authors found – congruent with their hypothesis – that men rated female faces more attractive in the low vertical position, and women rated male faces more attractive in the high vertical position.

In Germany, the average height for men is 178.00 cm and for women 165.00 cm (Statistisches Bundesamt, 2014; data of the german population was used because it was more easily available and for our research question comparable to Austria). Therefore, the average man looks down on the average woman and vice versa. The influence of body height can be also found in heterosexual relationships: roughly stated, women prefer men that are taller than them and men prefer women that are smaller than them (e.g. Salska et al., 2008; Swami et al., 2008). Meier and Dionne (2009, p. 890) shortly discuss this preference for the height difference, but argue—in accordance with the evolutionary theories they are building on—that it might be due to those preferences for power.

This height difference between men and women results in different viewing angles of how other people are perceived. Burke and Sulikowski (2010) investigated if the viewing angles resulting from such a height difference might affect perception of attractiveness. In this study, male and female faces differing in tilt were shown, therefore simulating different viewing angles: A face tilted forward/down was "seen" as from above, a face tilted backward/ up as from below. As the authors expected, female faces were experienced to be more feminine and more attractive when tilted downward, which is as seen from above. Male faces were perceived as more masculine when seen from below. The authors argue, that this is in line with the typical male and female viewing positions (Burke & Sulikowski, 2010, p. 582). It should be mentioned that since this effect was also found for same sex ratings (e.g. women rating female faces as more attractive when tilted forward/ down), the authors discuss other explanations, like the role of head tilt on the perception of dominance as investigated by Mignault and Chaudhuri (2003) (Burke & Sulikowski, 2010, p. 583). However, giving further evidence of an effect, pictures of women during their fertile phase were rated as more attractive when also being tilted downward (Sulikowski, Burke, Havlíček, & Roberts, 2015). In conclusion, there seems to be an influence of viewing angle on face perception. Several explanations might be possible, an evolutionary approach or an influence of a typical perspective towards other faces (Burke & Sulikowski, 2010; Meier & Dionne, 2009).

In everyday life, people see other people from their individual viewing point. A smaller person sees other faces mostly from below, but a taller person sees people from above. A person in-between might see faces from below, above or in frontal view. Geldart (2008, 2011) investigated how individual viewing points—and possibly consequential experiences—affect our perception of attractiveness. In Geldart (2008), participants (male and female university students) were presented several pictures. These showed simplified black-and-white female heads, in which the internal features—eyes, eyebrows, nose and mouth—were removed. Par-

ticipants put those internal features (as one entity) back into each face, so that it appears to them as most attractive. Afterwards, a ratio was calculated between the forehead and chin lengths, which was correlated with each participant's individual height. Additional regression analyses revealed that the larger a participant was, the larger was the average forehead size of the attractive face. In other words: tall people, that usually see other people from above with a prominent forehead, found faces with a large forehead to be most attractive. As the author discusses (Geldart, 2008, p. 153) this might be due to the individual's usual viewing point.

Geldart (2011) further investigated how individual exposure to other people influences our perception of what we perceive as attractive. The idea: adolescents with younger siblings and mothers of young children tend to interact with humans on which they look down to; university students, who usually interact mostly with their peers, are not that used to (extremely) shorter individuals. Using the same task as in Geldart (2008), the author tested female adolescents, female university students, as well as mothers of young children. Adolescents and mothers created faces with a larger forehead compared to university students, which the author discusses in line with research that those groups are more familiar with young faces and therefore might prefer such facial configurations (Geldart, 2011, pp. 304). As in the first study, for university students there was a positive correlation of forehead size of most attractive faces and individual height.

Both studies show that our height—with our viewing angle—might influence what we perceive as attractive, which might be due to the familiarity of viewing faces from our point of view. However, Geldart (2008, 2011) used only female faces as stimuli. There might be a different outcome for male and female faces, since men and women differ in average body height. This was done by Burke and Sulikowski (2010), who investigated and discussed such typical male and female viewing angles. However, the current study further investigated the impact of the "real" viewing angles on face perception. Looking up at men and down at women might be the usual experience for people. Specifically, the average woman looks up at the average man and the average man looks down at the average woman. Such viewing angles as consequence of different body height might result in preferences for typical faces, specifically men in a high vertical position and women in a low vertical position.

In the current study, we further investigated such an interactive effect of male and female faces looked down or up to. We presented photographs of male and female faces at low and high positions in vertical dimension. Participants had to rate them regarding attractiveness, familiarity and the willingness to get to know the person. It was hypothesized, that male

faces would be preferred by women when looked up at, compared to female faces being preferred by men when looked down at. Viewing angle was calculated as the relative distance from participant's eye height to the center of each presented face, being either low (138.50 cm) or high (178.50 cm). Additionally, we hypothesized that the viewing angle itself, so not necessarily linked to participant's sex, might account for the preference of men presented high and women presented low. Looking up to a male person or down to a female person might be found for any individuals with differing body height, without necessarily being bound to being male or female. Therefore, next to a three-way interaction of viewing angle, sex of participant and sex of the presented face, an interaction of viewing angle and sex of presented face was proposed.

Participants rated the faces for attractiveness to find the effect of preference. We also included familiarity, to find out if men in the high and women in the low position would be rated to be more familiar. A third question asked for willingness to get to know the person, as some sort of scale for wanting or incentive value, which might co-occur with liking of faces (Dai, Brendl, & Ariely, 2010).

Method

Participants

In this study, 96 undergraduate psychology students (55 women, 41 men, M_{age} = 21.59 years, SD_{age} = 4.23, age range 17 – 44 years) participated for course-credit as part of the curriculum. However, nine participants were excluded because they partially realized height to be the study goal, which was measured by a post-questionnaire. This resulted in a sample of 87 participants used for analysis (51 women, 36 men, M_{age} = 21.74 years, SD_{age} = 4.41, age range 17 – 44 years). Body height and eye height of that sample are shown in Table 1. Participants were slightly taller than the average height for men (178.00 cm) and women (165.00 cm) in Germany (Statistisches Bundesamt, 2014). Participants indicated to have not studied art or any related studies and had German as a native language or were very proficient in it. All participants gave written informed consent and the study got approved by the Ethics Committee of the University of Vienna.

In a post-questionnaire, participants were asked to indicate anything that struck their attention and what the presumed study goal might be. Seventeen (17.7%) out of the 96 participants mentioned the different height in which the stimuli were presented. Of those, nine participants (9.3 % in total) assumed the height or the resulting viewing angles to be a possible or likely goal of the study. For example, one participant indicated, that the research question could be that looking down to faces might make them appear more sympathetic or attractive. Therefore, those nine participants were excluded from all further analysis. After the experiment, some participants were asked on a random basis if they would have assumed that height has something to do with the study's hidden aims. Many of them showed surprise, followed by statements like: "now that you say it, it is pretty obvious". A few participants mentioned, to have noticed the stimuli hanging in different heights; however, they did not pay much attention to it, assuming to be of no importance.

To control for possible confounding effects, we also included an item for sexual orientation and an item for relationship status. Seventy-eight participants (89.70 %) indicated to be heterosexual, and nine participants (10.30 %) to be bisexual. Previous studies suggest that bisexual individuals find men and women both attractive, compared to men preferring women and women preferring men (Lippa, 2013). However, there was no indication to assume that effects of viewing angle towards faces would be largely affected by sexual orientation. Therefore, regardless of sexual orientation, data of all participants were used for the analyses. We used an item for relationship status, because it might have influenced the ratings of the partic-

ipants (e.g. Madey et al., 1996); 51 (58.60%) reported to be single and 36 (41.40%) to be in a relationship.

Table 1

Mean Values for Body Height and Eye Height in cm

	Body height		Eye height	
Sample	M	SD	M	SD
Total (*N* = 87)	175.72	8.95	164.79	9.00
Men (n = 36)	182.42	7.15	171.66	7.08
Women (n = 51)	170.99	6.86	159.94	6.80

Stimuli

Printouts of four artworks and eight photographs of faces were used as stimuli. The printouts were presented in black and simple picture frames of a size of 300 mm x 400 mm (outer frame size 330 mm x 430 mm). Passe-partouts were used, resulting in a presentation space of 200 mm x 290 mm. The passe-partouts did not fit the pictures completely, resulting in blank white space to the left and right for the artworks, as well as blank white space above and below the faces.

Artworks. The four artworks were chosen from the database of a prior study, in which 1000 artworks (in six subsets) were rated by 120 participants. Participants were asked to rate artworks regarding emotional valence, liking, arousal, complexity, and familiarity on 7-point Likert-scales. Based on the valence ratings, we selected two artworks of negative emotional valence and two of positive emotional valence. To avoid floor or ceiling effects, the artworks did not have the most extreme ratings; to achieve that, we decided that each artwork's mean for valence should not be smaller than $M_{\text{pre-rated valence}} = 2.00$, or larger than $M_{\text{pre-rated valence}} = 6.00$. Matched artworks were chosen, in that the two positive artworks had similar ratings in the other four scales of pre-rated variables. This was done for the two negative stimuli, respectively (see Table 2). All four artworks were unfamiliar, derived from each familiarity rating of $M \leq 2.20$. Besides emotional valence, the positive artworks also differed from the negative artworks in liking and slightly in the other three ratings. However, since the analysis focused on the comparison within valence presented in two different heights, the differences between the two valence groups were tolerable. Therefore, we expected a similar pattern of higher liking and more positive valence for the chosen pre-rated positive artworks. Table 2 shows the title, artist, and epoch/style of the artworks and the mean values of the prior study.

Table 2

List of the Four Artworks with Mean Ratings

		Positive Artworks		Negative Artworks	
		Artwork ID		Artwork ID	
		Positive 1	Positive 2	Negative 1	Negative 2
Artist		Pissarro, Camille	Macke, August	de Ribera, Jusepe	Beckmann, Max
Title		Apple Picking at Eragny-sur-Epte	Zoological Garden I	Martyrdom of Saint Philip	Scene from the Destruction of Messina
Year		1888	1912	1639	1909
Epoch/Style		Pointillism	Expressionism	Baroque	Expressionism
Valence	*M*	5.10	5.25	2.20	2.15
	SD	0.97	1.21	0.83	0.99
Liking	*M*	5.25	4.70	3.40	3.45
	SD	1.12	1.46	1.50	1.57
Arousal	*M*	4.10	4.75	4.60	4.90
	SD	1.41	1.55	1.10	0.97
Complexity	*M*	4.85	4.25	4.65	5.00
	SD	1.04	1.33	0.99	1.03
Familiarity	*M*	1.85	2.20	1.25	1.40
	SD	1.14	1.77	0.79	0.99

Note. The ratings of the four artworks coming from the database. Every variable was rated on a 7-point Likert-scale. For valence, low ratings resemble a negative, high ratings a positive valence. For liking, arousal, complexity and familiarity, the scale was increasing, which means 1=low to 7=high (e.g. complexity: “very simple” to “very complex”).

One of the artworks was of a nearly quadratic shape. In turn, the other three artworks were also cut down to a nearly quadratic shape, to avoid that participants’ ratings would be influenced by the size of the presented artwork. Since every painting had a somehow repre-sentational content, a uniform frame (i.e. a fixed template) might have cut details and figures

off or interfered with the content. Therefore, artworks were cut down individually. In turn, the width of every artwork differed slightly; however, the height of each was the same. Through this, every artwork had nearly the same size, but did not look like a cutout. The four paintings were printed in color on photo paper with the approximate size of 210 mm x 297 mm (DIN A4) and frames were hung horizontally.

Faces. Stimuli were obtained from the stimulus set of Schacht, Werheid and Sommer (2008), showing faces in frontal view, without makeup or accessories (see Schacht, Werheid, & Sommer, 2008, p.133). From that, four male and four female faces were chosen, using attractiveness ratings of a previous study (see Table 3). In the dataset, attractive females were rated to be more attractive than attractive males. To control for that, stimuli similar in rank order were chosen when comparing both sexes, resulting in slightly lower scores (= higher attractiveness ratings) for attractive female stimuli. Less attractive faces were more similar to each other. We therefore expected that female faces would be rated more attractive in our study. We chose attractive and less attractive faces to have a broader range of responses. To avoid floor or ceiling effects, we did not choose faces with the lowest or highest ratings. Faces were printed in color on photo paper in DIN A4 and frames were presented vertically.

Table 3.

List of the Eight Faces with Mean Ratings of Attractiveness

	Attractiveness	
Face	M	SD
Attractive male 1	3.08	0.79
Attractive male 2	3.16	0.60
Attractive female 1	2.68	0.64
Attractive female 2	2.37	0.89
Less attractive male 1	4.67	1.03
Less attractive male 2	5.00	0.65
Less attractive female 1	4.56	1.02
Less attractive female 2	4.92	0.67

Note. Ratings of attractiveness of the chosen photographs. Attractiveness was rated on a 7-point Likert-scale. Lower ratings indicate higher attractiveness-scores.

Arrangement of the stimuli in the room. The artworks and photographs were presented in two different heights. Coming from an average height of 172.00 cm in Germany (Statistisches Bundesamt, 2014), the low position was set to 150.00 cm, the high position was set to 190.00 cm. The resulting height difference should be—rather implicitly—experienced as low or high by participants. Hanging images at extreme heights might become too obvious. Since the pictures were looked at, not the body size as such, but the height of the eyes relative to the pictures was of importance. From data summarized in Lange and Windel (2013) (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin/ Federal Institute for Occupational Safety and Health), the average distance between body and eye height was calculated, resulting in an average distance of 11.50 cm. Subtracting these 11.50 cm from the original heights, the finalized low and high positions were set to 138.50 cm and 178.50 cm, respectively. This means, that every stimulus' center was in either one of those heights (because of irregularities of the wall, slight deviations of a few mm were tolerated). The distance between body height and eye height in our sample was M = 10.92 cm (SD = 1.16) and close to the distance used to choose the low and high positions.

One positive and one negative artwork were hung high, as well as one positive and one negative artwork low. The photographs were hung so that there was always one attractive male, one attractive female, one less attractive male, and one less attractive female in each height condition.

The room in which the pictures were presented had the approximate size of 6.3 m x 3.8 m x 4.5 m (length x width x height). Due to the interior (coat hook, etc.) as well as the door, this led to a useable space of 5.2 m (long wall) and 2.0 m (short wall). The photographs were presented at the long side, the artworks on the short wall opposite to the large windows. To ensure that participants would not notice that the height in which the pictures were hung differed, tables stood below the "high" positions at the long wall, covering a length of 2.4 m usable space, as well as a smaller table, covering a length of 0.8 m useable space, at the short wall. This was done to give the impression, that the height difference—caused by the interior—looked natural or plausible to the participants. Since the room is usually not used for experiments, it might not be expected to be a perfect laboratory setting. The goal was to make the height difference inconspicuous. The tables measured roughly 80.00 cm in depth; a line of tape in front of the low positions "extended" this table line. This was done to ensure that all participants looked at the artworks in the low and high conditions, as well as between subjects, from roughly the same minimum distance.

Because the room gets used for meetings, etc., it included a large table and chairs. The chairs were stapled in the corner opposite to the walls were the stimuli were shown. The large table, at which participants filled out the questionnaires, was positioned in that same opposite corner. Otherwise, the room looked presentable and the surroundings were kept simple. To avoid that differing weather conditions—like strong sunlight—influenced the experiment, grey roller blinds covered the windows. Two large ceiling lights provided adequate illumination during testing. See Figure 1 for examples of the setting.

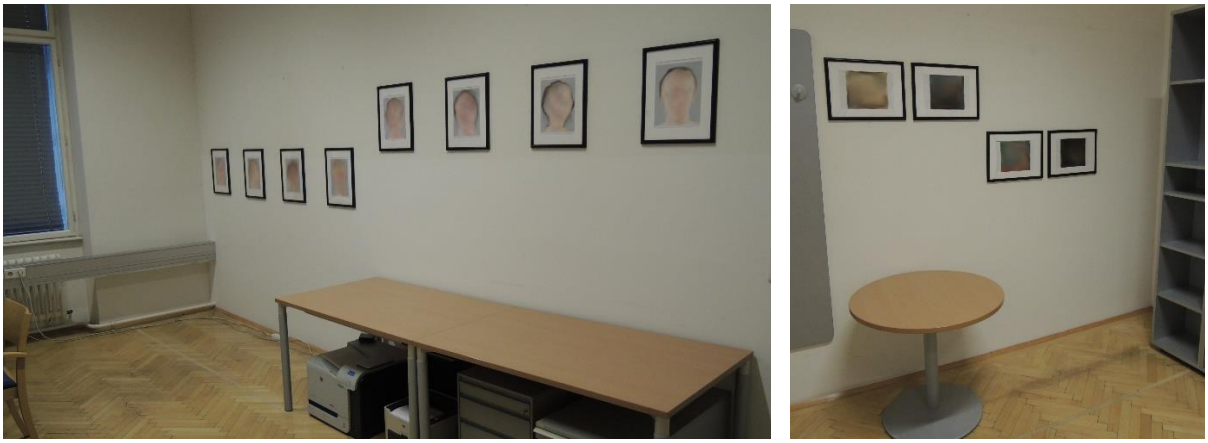

Figure 1. Experimental setting showing the faces (left) and artworks (right). When the "slots" of the vertical position at each wall changed (e.g. "left pictures up" to "left pictures down"), the tables underneath were moved in the room with them. Note the beige tape on the ground, which marks the minimum distance to the wall for the participants, and the grey roller blinds covering the outer window (in between a second or "inner" window, a type of window which is typical for Viennese old buildings). In this figure, faces and artworks were made unrecognizable due to copyright reasons.

Balancing of the stimuli. A Latin square design was used to change the order in which pictures were presented. A letter was assigned to every artwork and every face. With every new condition, this set shifted to the left. As an example, for the artworks, condition 1 had the order of A, B, C and D, in condition 2 the order was B, C, D and A. This resulted in a total of four different conditions for the artworks, as well as eight different conditions for the faces (see appendices A1 and A2). Additionally, there were two factors that enriched the balance of the design: first, half of the participants rated the artworks followed by the photographs, the other half of the participants the other way around. This factor was included to

control for possible transfer effects of one group of stimuli to the other. Second, during the first half of testing (participants 1-48) the left half of the faces, as well as the right half of the artworks were presented in the high position; in the second half of testing (participants 49-96), those were presented in the reverse (i.e. the left half of the faces, as well as the right half of the artworks hung in the low position). This balancing condition was included to avoid that mere position in the room—for example, next to the door, window or cabinet—was a confounding variable. Overall, this resulted in 16 possible conditions for the artworks and 32 possible conditions for the faces.

Materials

The study was conducted in German, therefore all the materials and instructions were in German. Questionnaires were printed on paper. For the artworks, the questionnaire asked on 7-point Likert-scales for

1. liking: "I like this artwork…": "not at all"… "neither nor"…"very much" („Dieses Kunstwerk gefällt mir…": „überhaupt nicht"… „weder noch"… „sehr gut"),
2. emotional valence: "When I see this artwork, it makes me feel": "very negative"… "neutral"… "very positive" („Wenn ich dieses Kunstwerk betrachte, fühle ich mich…": „sehr negativ"… „neutral"… „sehr positiv"),
3. familiarity: "This artwork is": "completely unfamiliar"… "vaguely familiar"… "definitely familiar" („Dieses Kunstwerk ist mir…": „völlig unbekannt"… „vage bekannt"… „sicher bekannt") and
4. art quality: "I think this is a pretty well manufactured artwork.": "strongly disagree"… "neutral"…"completely agree" („Ich glaube, dass dies ein richtig gut gemachtes Kunstwerk ist.": „Stimme überhaupt nicht zu"… „neutral"… „Stimme voll und ganz zu" (minor typo on the printed questionnaires: "Stimm voll und ganz zu")).

The scales of liking, valence and familiarity geared to those used in the previous study the artworks were chosen from. For the faces, the questionnaire asked for

1. attractiveness: "I think the person shown is…": "very unattractive"… "average attractive"… "very attractive" ("Ich finde die gezeigte Person…": "sehr unattraktiv"… "durchschnittlich attraktiv"… "sehr attraktiv"),

2. familiarity: “The shown person appears to me as…”: “completely unfamiliar”… “vaguely familiar”… “definitely familiar” (“Die gezeigte Person erscheint mir…”: “völlig unbekannt”… “vage bekannt”… “sicher bekannt”) and
3. willingness to approach: “I could imagine, that I would like to get to know this person better.”: “never”… “neutral”… “very good” (“Ich könnte mir … vorstellen, die gezeigte Person näher kennenlernen zu wollen.”: “überhaupt nicht“… „neutral“… „sehr gut“).

To measure possible influences of current mood, a german translation of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was given to the participants prior to the ratings. Through a post-questionnaire it was assessed, if participants had identified artworks or faces as previously known. For the artworks, participants were asked, if they could name the artist(s) of the presumably known artwork(s). The post-questionnaire also assessed if the participants were blind to the purpose of the study, by asking them if they noted something during testing and what the study goal(s) might be.

An art questionnaire (“Kunstinteresse-Fragebogen”, KIF; unpublished) assessed general interest in and knowledge of art. This questionnaire consists of several parts: 1) a questionnaire, that asks for interest in art, how often one visits exhibitions, etc., resulting in a score for art interest, 2) multiple-choice question about art history and artwork-identification-tasks, resulting in a score for art knowledge and 3) a short sociodemographic questionnaire. A second post-questionnaire asked for sexual orientation, sex, and relationship status, and the body height and eye height were noted on it.

To measure body height and eye-height, participants stood with their back against the side of a closet. A clipboard was positioned at the participant’s highest point of the head, as well as at the approximate midline of the eye. The board was held at a 90° angle towards the side of the closet, on which the height was measured with a tape measure. Participants were measured with their shoes on. One could argue that this is an inaccurate measure, because shoe sole height differs between participants and the “pure” height cannot be determined. However, importantly, it resembled the situation the participants were in while viewing the stimuli.

Procedure

Participants were welcomed and entered the room. They filled out an informed consent form, as well as the PANAS asking for their current mood. Afterwards they were handed a clipboard with the rating scales printed on paper and had to rate the presented artworks and faces (or faces and then artworks), one after the other and for each stimulus set from left to right. After finishing the ratings, they received the first post questionnaire (study goals, etc.), followed by the art questionnaire (KIF). The second post-questionnaire concluded the session; the body height, as well as the eye height were measured by the study conductor. A majority was debriefed directly after testing and a more detailled debriefing was sent out to all participants by email afterwards. Figure 2 depicts the author reenacting a participant.

Figure 2. Reenacted scene of a participant looking at the faces in the testing room, with the artworks in the background. The faces and artworks are blurred for this figure.

Results

A few people indicated in the post-questionnaire to have known some of the artworks. However, because they could not indicate the artist, none of those trials were excluded. One participant could name the artist of one painting; therefore, that specific trial was excluded (artworks were included conditionwise in the linear mixed models, see below). Additionally, regarding the artworks for the dependent variables liking and valence, there was one missing value (= one observation less) each. There were also people, who indicated to have known some of the faces from movies, in the streets, or faculty; none of those trials were excluded, because it was unlikely, that the models of those faces were famous or worked at the university (models of the photographs were recruited through model agencies several years ago; see Schacht, Werheid, & Sommer, 2008). A minority indicated to have known some of the faces from other studies conducted at the University of Vienna; although this is possible, it is unlikely that they remembered exactly those faces, but were more familiar with the format, or style of the photographs, thus those trials were not excluded. Because of a mistake in documentation for one participant, resulting in uncertainty about the correct condition of the faces, the face data (but not the artwork data) of that participant was excluded from analysis.

Since the hypotheses of the artworks and faces were not (directly) connected, they were analysed separately. However, we checked if order of presentation (artworks or faces first) influenced ratings. We expected no difference. Looking at the histograms and Q-Q-plots of the dependent variables (see appendices B1-B7) suggested that all variables were approximately normally distributed, with only familiarity (for artworks and faces) being non-normally distributed. Performing independent sample t-tests with balancing order as the grouping variable on liking, valence and art quality resulted in no differences across balancing order (all $p \geq .64$); for attractiveness and willingness to approach, balancing order had also no effect on ratings (all $p \geq .68$). Regarding familiarity, non-parametric Mann-Whitney-U tests for independent samples with balancing order as the grouping variable were used. For artworks, there was a significant effect of order for familiarity ratings ($p < .01$): artworks were experienced to be more familiar when rated after the faces ($M = 2.25$, $SD = 1.61$) than before ($M = 1.73$, $SD = 1.22$). An effect of order for familiarity was also significant for faces ($p = .01$), in that faces were rated to be more familiar when rated before the artworks ($M = 2.40$, $SD = 1.09$) than after ($M = 2.17$, $SD = 1.27$). There were no other effects of order (artworks or faces first) for the other dependent variables.

Artworks

For descriptive results, see Table 4. For the analysis, eye height was included as a continuous factor calculated as height of the artwork (138.5 cm or 178.5 cm) subtracted by eye height (e.g. “eye height = 150 cm” minus “artwork height = 138.5 cm” equals “height difference = 11.5 cm”). Thus, the height positions of low and high are included in the continuous variable and not named as a dichotomous factor. Therefore, Table 4 only shows the descriptive results of pre-rated valence, in total and for men and women. For the distribution of height difference, see Figure 3.

Table 4.

Descriptive Results for the Artworks showing Mean Ratings of the Variables

		Total		Men		Women	
Scales	Pre-rated valence	M	SD	M	SD	M	SD
	Overall	4.26	1.84	4.44	1.70	4.14	1.93
Liking	Positive	4.99	1.52	4.89	1.49	5.07	1.54
	Negative	3.53	1.84	3.99	1.79	3.22	1.83
	Overall	3.86	1.74	3.96	1.59	3.78	1.83
Valence	Positive	5.20	1.11	5.15	1.04	5.24	1.16
	Negative	2.49	1.06	2.73	1.01	2.33	1.08
	Overall	1.98	1.44	1.80	1.25	2.11	1.55
Familiarity	Positive	2.13	1.53	1.96	1.37	2.25	1.64
	Negative	1.83	1.33	1.63	1.11	1.97	1.45
	Overall	5.22	1.32	5.14	1.38	5.27	1.27
Art quality	Positive	5.14	1.38	5.04	1.45	5.22	1.33
	Negative	5.29	1.25	5.24	1.30	5.32	1.21

Note. Ratings were averaged across valence, therefore, for example, the values for “Positive” include the ratings from the positive artwork in the “up”, as well as in the “down” position. Ratings were made on 7-point Likert-scales (see previous section).

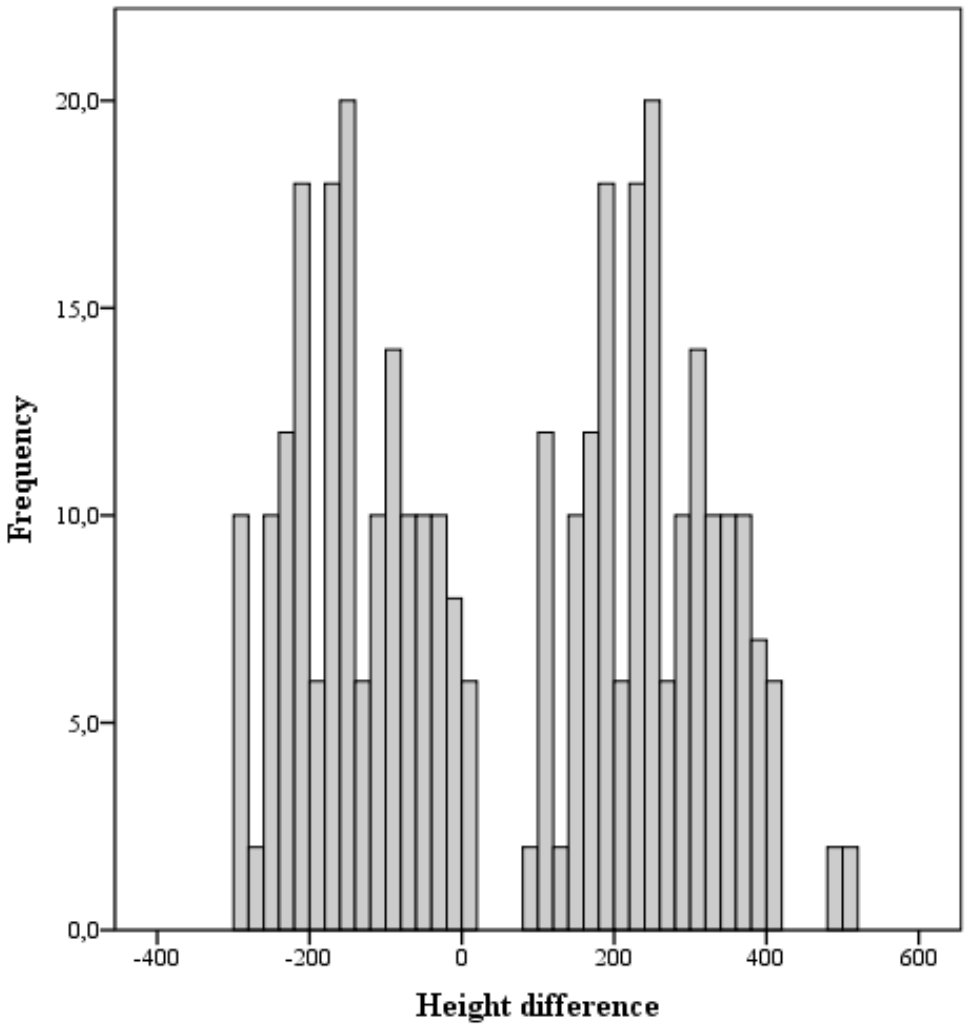

Figure 3. Height difference (*M* = 62.01, *SD* = 219.06) was calculated as eye height (in mm) minus hanging height of each artwork (in mm). This histogram shows the height difference of all 347 observations/ cases (86 subjects rated four artworks, one subject rated three artworks, because one of the artworks got excluded, see text) in mm. As an example, a value of 400 mm means that that participant's eye height was 400 mm or 40 cm above the center of the artwork. For the analysis, the height difference was centered to its mean and transformed from mm into m, to get more clear estimates.

Looking at the distribution and the QQ-Plot for familiarity revealed that familiarity was far from being normally distributed. The question asked could have been interpreted differently, for example, as knowing exactly that artwork, as the artwork being similar to others or as a typical example of an artwork of that kind. We decided, that an interpretation of the full scale of familiarity ratings would be biased or unclear. Therefore, we decided, to code every occasion where an artwork was unfamiliar (response = 1) as "0" and any other occasion (response = 2-7) as "1". Therefore, any artwork that was familiar—due to any reason—was in

the same category, contrasted to not being familiar. Of all cases of observation, 202 artworks were rated as unfamiliar, compared to 145 cases of artworks rated to be known. Familiarity was included as a predictor, and not as a dependent variable, in additional linear mixed models (see below), to see if familiarity interacted with height difference and pre-rated valence. For all significant effects, the standardized effect size β is reported. This effect size coefficient was achieved by z-transforming all continuous (dependent and independent) variables and recalculating all models, resulting in a new estimate that resembled a standardized effect.

For each of the other three scales (liking, valence, and art quality), we ran a linear mixed model (LMM) using the lme4 package (Version 1.1-13; Bates, Maechler, Bolker, & Walker, 2015) in R (Version 3.2.0; R Development Core Team, 2008) applying Satterthwaite approximation for p-values (lmerTest, version 2.0-33; Kuznetsova, Brockhoff, & Christensen, 2016). We included a contrast for pre-rated valence of the artworks (positive minus negative) as a fixed factor and the difference in meter (!) between the eye-height and the height of each artwork as a continuous, centered fixed factor. We also included random by-participants intercepts with a random slope for pre-rated valence.

For liking (Intercept: *Est.* = 4.26, *SE* = 0.10), we found no main effect of height difference, *Est.* = -0.29, *SE* = 0.39, *t*(212.80) = -0.75, *p* = .45, but – as expected – a main effect of pre-rated valence, β = 0.79, *Est.* = 1.46, *SE* = 0.19, *t*(86.03) = 7.78, *p* < .001, in that positive artworks, *Est.* = 4.99, 95% CI [4.76, 5.23], were liked more than negative artworks, *Est.* = 3.53, 95 % CI [3.22, 3.85] (the Estimate *Est.* = 1.46 can be read as: if the pre-rated valence switches from negative to positive, the score of liking will increase by 1.46 on the scale. This will be analogous for all used contrasts and not further described.) (see Figure 4). We found no Height difference × Pre-rated valence interaction, *Est.* = 1.15, *SE* = 0.77, *t*(219.45) = 1.50, *p* = .14. A significant interaction would have supported the hypothesis.

For valence (Intercept: *Est.* = 3.85, *SE* = 0.07), we found no main effect of height difference, *Est.* = 0.11, *SE* = 0.24, *t*(209.44) = 0.44, *p* = .66, and – again as expected – a main effect of pre-rated valence, β = 1.56, *Est.* = 2.71, *SE* = 0.13, *t*(85.61) = 21.38, *p* < .001, in that (pre-rated) positive artworks, *Est.* = 5.20, 95% CI [5.02, 5.38], were rated to be more positive than (pre-rated) negative artworks, *Est.* = 2.49, 95% CI [2.31, 2.68] (see Figure 5). Again, we found no Height difference × Pre-rated valence interaction, *Est.* = 0.39, *SE* = 0.49, *t*(212.56) = 0.81, *p* = .42.

For art quality (Intercept: *Est.* = 5.22, *SE* = 0.10), we found a main effect of height difference, β = 0.10, *Est.* = 0.63, *SE* = 0.29, *t*(197.98) = 2.17, *p* = .03, in that becoming larger

relative to an artwork, or in other words, looking down on at, increased its perceived quality (see Figure 6) (the Estimate *Est.* = 0.63 can be read as: if the height difference increases by one meter, the score of art quality will increase by 0.63 on the scale. This will be analogous for all used continuous factors and not further described). There was no main effect of pre-rated valence, *Est.* = -0.15, *SE* = 0.12, *t*(86.26) = -1.22, *p* = .23. We found no Height difference × Pre-rated valence interaction, *Est.* = 0.05, *SE* = 0.55, *t*(228.64) = 0.09, *p* = .93.

Regarding the assumptions of LMMs, residual plots for the three dependent variables indicated linearity and homoscedasticity (although there was a pattern of pre-rated positive and negative artworks visible for valence; see Appendices C1-C3 for residual plots), fixed effects were not correlated (in LMM for liking: all r < .01; in LMM for valence: all r < .01; in LMM for art quality: all r < .01), and residuals were normal.

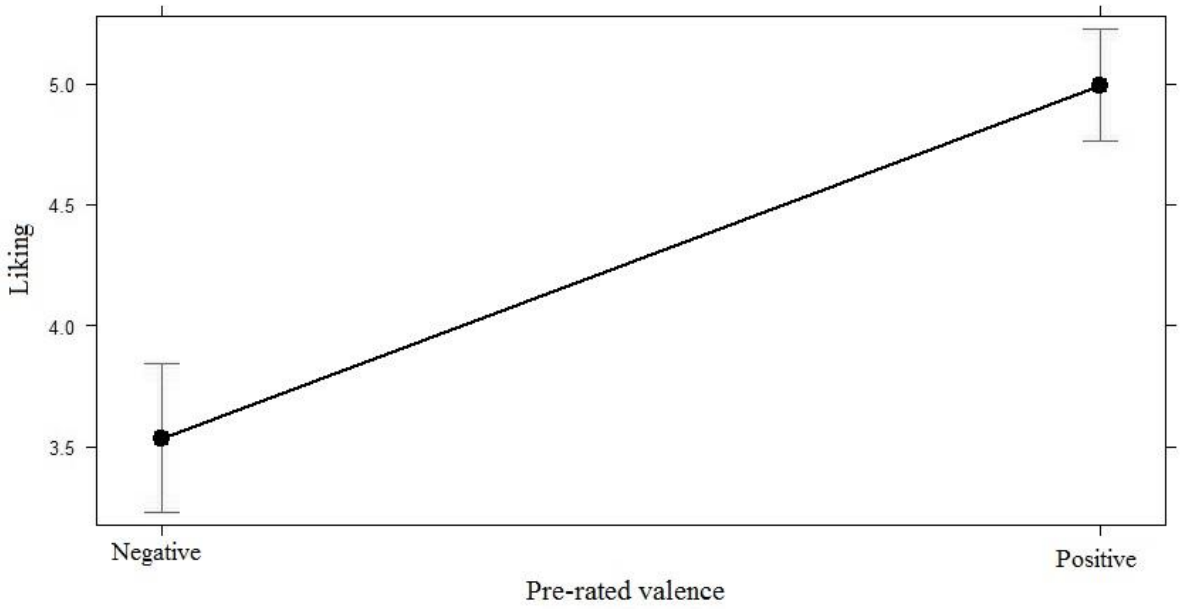

Figure 4. Main effect of pre-rated valence on liking. Liking was measured on a 7-point Likert-scale, and a higher rating indicates higher liking.

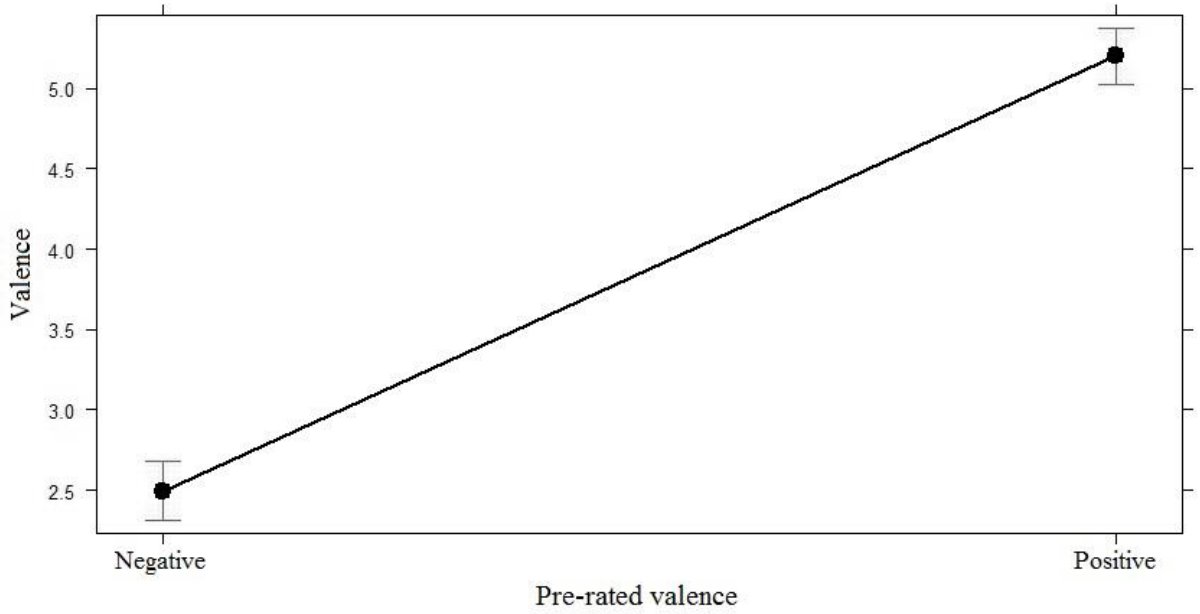

Figure 5. Main effect of pre-rated valence on valence. Valence was measured on a 7-point Likert-scale, and a higher rating indicates positively perceived, whereas a low rating indicates a negatively perceived valence.

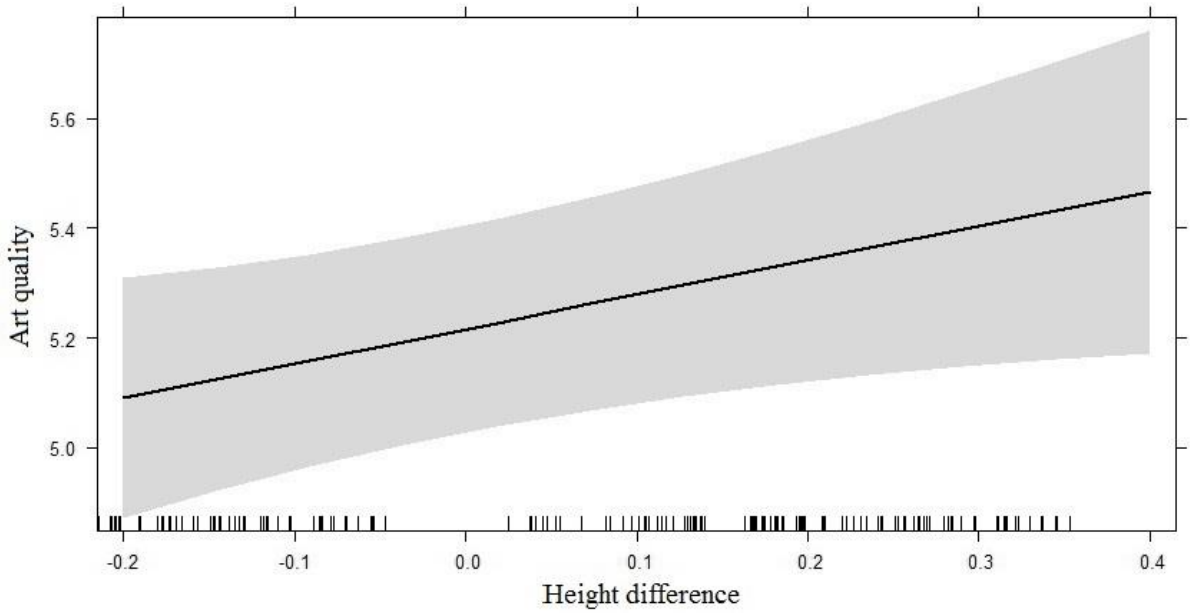

Figure 6. Plot of the main effect of height difference (centered and in m) on perceived art quality. Art quality was rated on a 7-point Likert-scale and a higher rating indicates higher perceived art quality.

Post-hoc analysis of familiarity. Familiarity was included as a contrast-coded fixed factor in three LMMs for liking, valence and art quality. For liking (Intercept: *Est.* = 4.30, *SE* = 0.10) there was, next to the already found main effect of pre-rated valence, β = 0.81, *Est.* = 1.49, *SE* = 0.19, *t*(103.30) = 7.81, *p* < .001, a main effect of familiarity, β = 0.23, *Est.* = 0.42, *SE* = 0.18, *t*(292.00) = 2.27, *p* = .02, in that familiar artworks, *Est.* = 4.51, 95% CI [4.22, 4.80], were liked more than unfamiliar artworks, *Est.* = 4.10, 95% CI [3.85, 4.34] (see Figure 7). The interaction of Height difference × Pre-rated valence turned significant when adding familiarity as a fixed factor to the model, β = 0.18, *Est.* = 1.51, *SE* = 0.77, *t*(269.00) = 1.97, *p* = .05. Contrary to our hypothesis, negative artworks were liked less, the more they were seen from above, but there was a marginal increase of liking of positive artworks the more they were seen from above (see Figure 8). Additionally, there was a significant three-way interaction of Familiarity × Height difference × Pre-rated valence, β = 0.45, *Est.* = 3.76, *SE* = 1.59, *t*(317.50) = 2.37, *p* = .02: the found interaction of height difference and pre-rated valence was mostly for familiar artworks (see Figure 9). There were no other main effects or interactions (all $p \geq .36$).

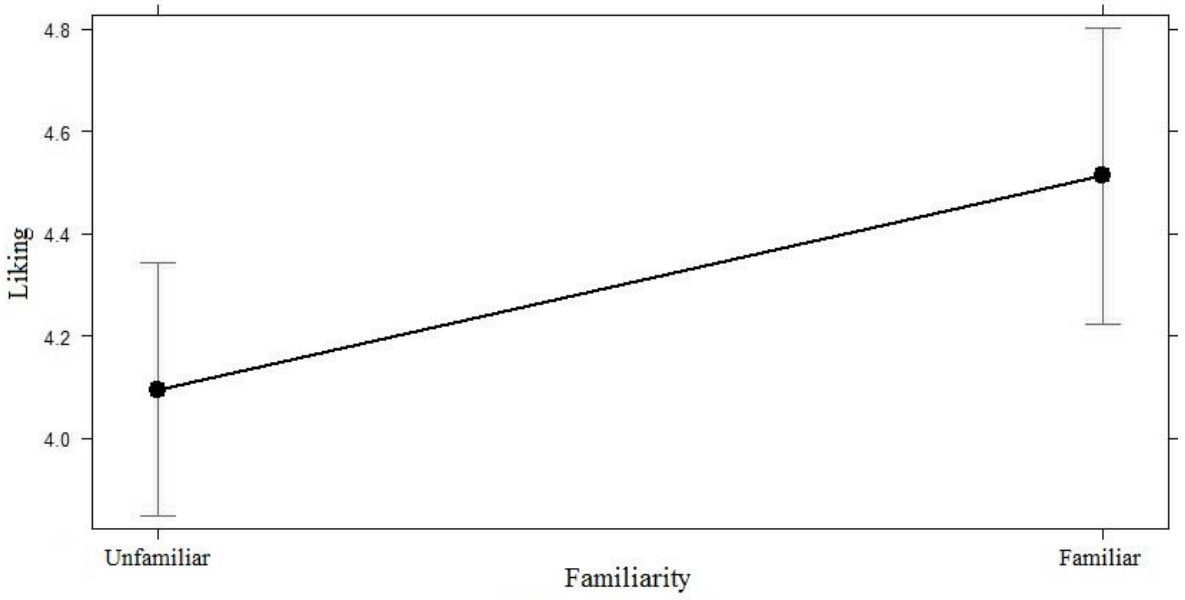

Figure 7. Main effect of familiarity on liking.

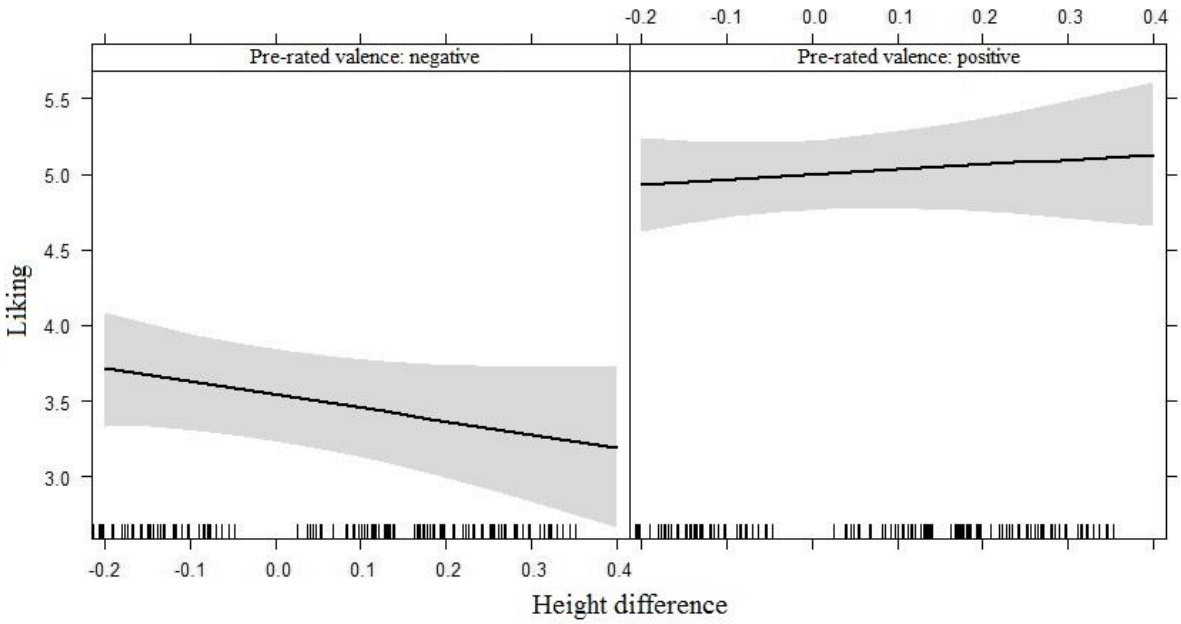

Figure 8. Interaction of pre-rated valence and height difference on liking.

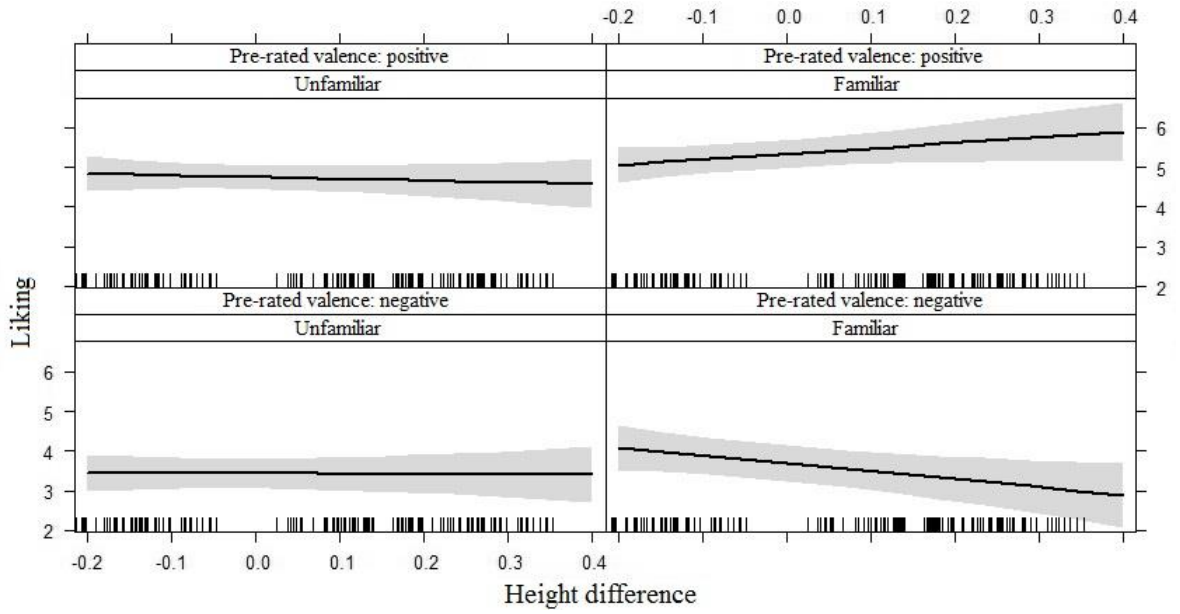

Figure 9. Interaction of familiarity, pre-rated valence and height difference on liking.

For valence (Intercept: *Est.* = 3.86, *SE* = 0.07), there was the expected main effect of pre-rated valence, β = 1.58, *Est.* = 2.74, *SE* = 0.13, *t*(88.35) = 21.32, *p* < .001. The three-way interaction of Familiarity × Height difference × Pre-rated valence approached, but did not reach, significance, *Est.* = 1.89, *SE* = 1.03, *t*(291.47) = 1.84, *p* = .07. There were no other main effects or interactions (all *p* ≥ .21). For art quality (Intercept: *Est.* = 5.25, *SE* = 0.10), as

in the main analysis, the main effect of height difference was significant, β = 0.11, *Est.* = 0.65, *SE* = 0.29, *t*(195.80) = 2.28, *p* = .02. Additionally, there was a main effect of familiarity, β = 0.31, *Est.* = 0.41, *SE* = 0.14, *t*(335.00) = 2.84, *p* < .01, in that familiar artworks, *Est.* = 5.45, 95% CI [5.20, 5.70], were perceived to be of higher quality than unfamiliar artworks, *Est.* = 5.04, 95% CI [4.82, 5.27] (see Figure 10). There were no other main effects or interactions (all $p \geq .22$). The assumptions for LMM were met as with the main analysis.

Although we found effects, it should be mentioned, that familiarity was originally planned as a dependent variable. Therefore, the effects found here should be interpreted carefully in light of our original research question.

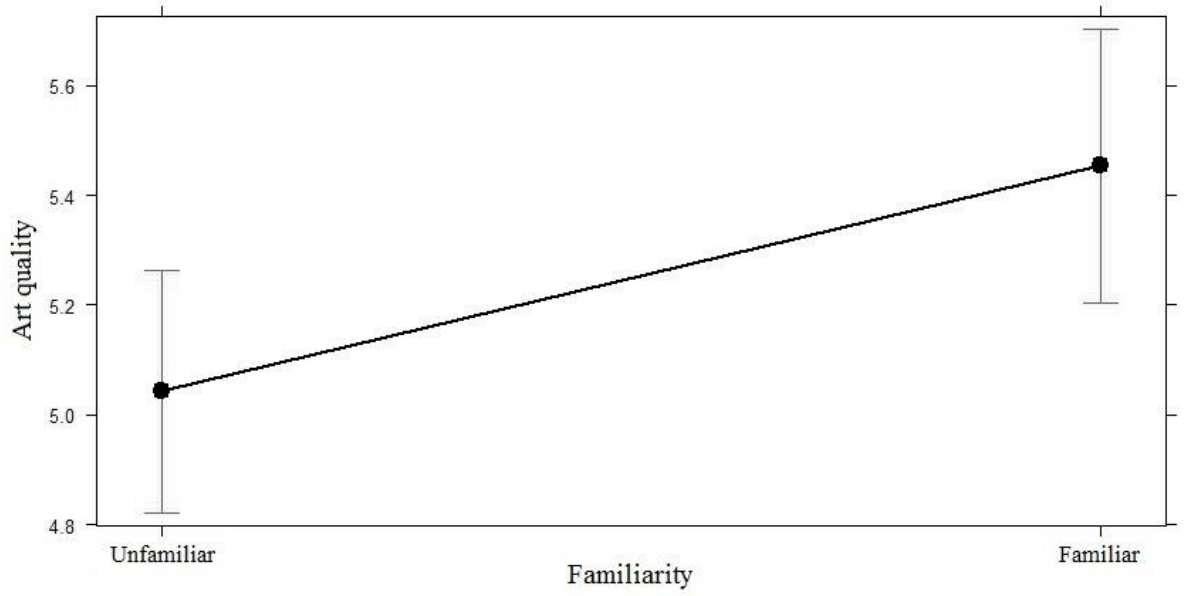

Figure 10. Main effect of familiarity on art quality.

Exploratory analyses. After conducting the main analysis, we included additional variables into each linear mixed model to explore possible effects. It should be noted that the following calculations—although there was evidence to do them—were explorative, which means we had no clear hypotheses of how exactly they would influence the outcome. Additionally, as we did several analyses, all the following results might be prone to type-1-errors (false-positives), possibly unstable and should be therefore interpreted carefully.

Influence of sex of participants. In this sample, men were slightly taller than women (see Table 1). Although this difference was reduced by the transformation of height into a height difference, there was the possibility of height difference relative towards artworks being influenced by participants' sex. Additionally, Mahieu et al. (2014) found a gender effect in their experiments of investigating "Positive = up/ Negative = down", with females showing a stronger effect of this concept. As can be seen in Table 4, there were differences between men and women regarding the ratings of negative artworks. Therefore, sex of the participants was included as a contrast (female minus male) as a fixed factor in each LMM. (To stay uniform during the method section, we keep the term "sex of participants" as used for the faces, instead of gender.)

For liking (Intercept: *Est.* = 4.32, *SE* = 0.11), we found no main effect of sex of the participant, *Est.* = -0.35, *SE* = 0.21, $t(93.18) = -1.66$, $p = .10$, and no main effect of height difference, *Est.* = -0.45, *SE* = 0.40, $t(195.32) = -1.14$, $p < .26$. As with the prior analysis, there was a main effect of pre-rated valence, $\beta = 0.68$, *Est.* = 1.25, *SE* = 0.19, $t(96.30) = 6.62$, $p < .001$, in that positive artworks, *Est.* = 4.94, 95% CI [4.69, 5.19], were liked more than negative artworks, *Est.* = 3.69, 95 % CI [3.38, 4.01]. We found no Sex of participant × Height difference interaction, *Est.* = 0.89, *SE* = 0.80, $t(195.32) = 1.12$, $p = .26$, but a Sex of participant × Pre-rated valence interaction, $\beta = 0.66$, *Est.* = 1.22, *SE* = 0.38, $t(96.30) = 3.23$, $p < .01$, in that men, *Est.* = 4.18, 95% CI [3.69, 4.66], liked negative artworks more than women, *Est.* = 3.21, 95% CI [2.81, 3.61], whereas women, *Est.* = 5.07, 95% CI [4.76, 5.39], liked positive artworks slightly more than men, *Est.* = 4.82, 95% CI [4.43, 5.20] (see Figure 11).

Again, in contrast to the main analysis above, the interaction of Height difference × Pre-rated valence turned significant when adding sex of participant as a fixed factor to the model, $\beta = 0.24$, *Est.* = 1.98, *SE* = 0.79, $t(201.35) = 2.52$, $p = .01$. The interaction looked like the one found when including familiarity as a fixed factor (see Figure 12). Interestingly, there was also a three-way interaction of Sex of participant × Height difference × Pre-rated valence, $\beta = -0.44$, *Est.* = -3.67, *SE* = 1.58, $t(201.35) = -2.33$, $p < .02$: for men, liking of positive artworks slightly increased the more they were seen from above, whereas negative artworks were clearly disliked the more they were seen from above. For women there was nearly no influence of height difference on the perception of the artworks, regardless of pre-rated valence (see Figure 13).

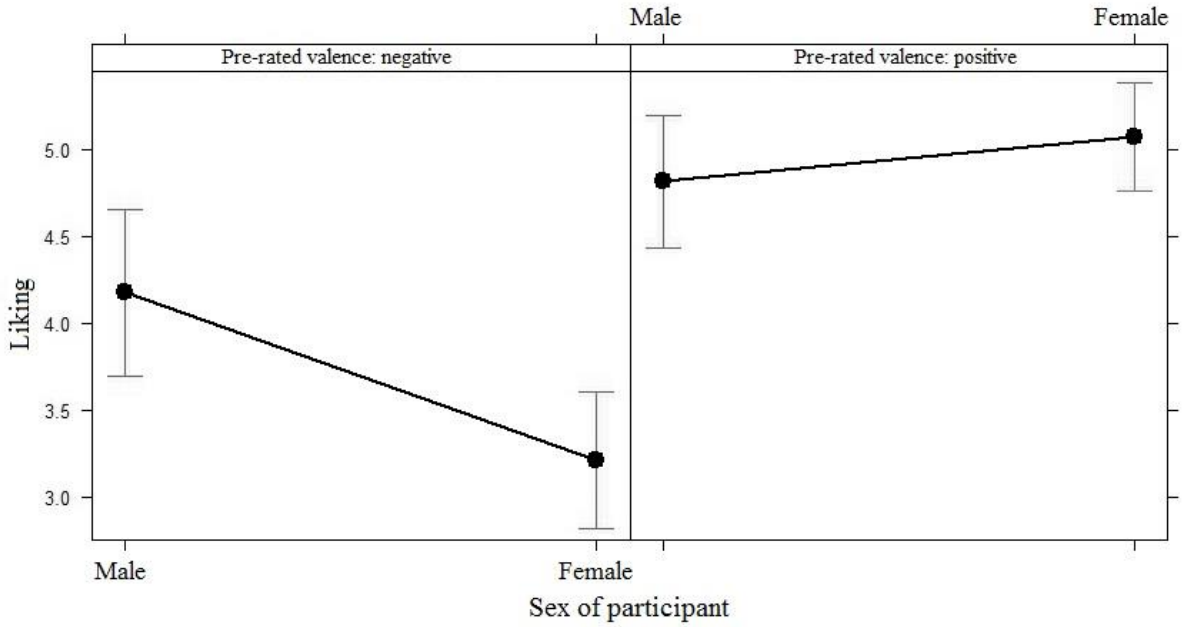

Figure 11. Interaction of sex of participant and pre-rated valence on liking.

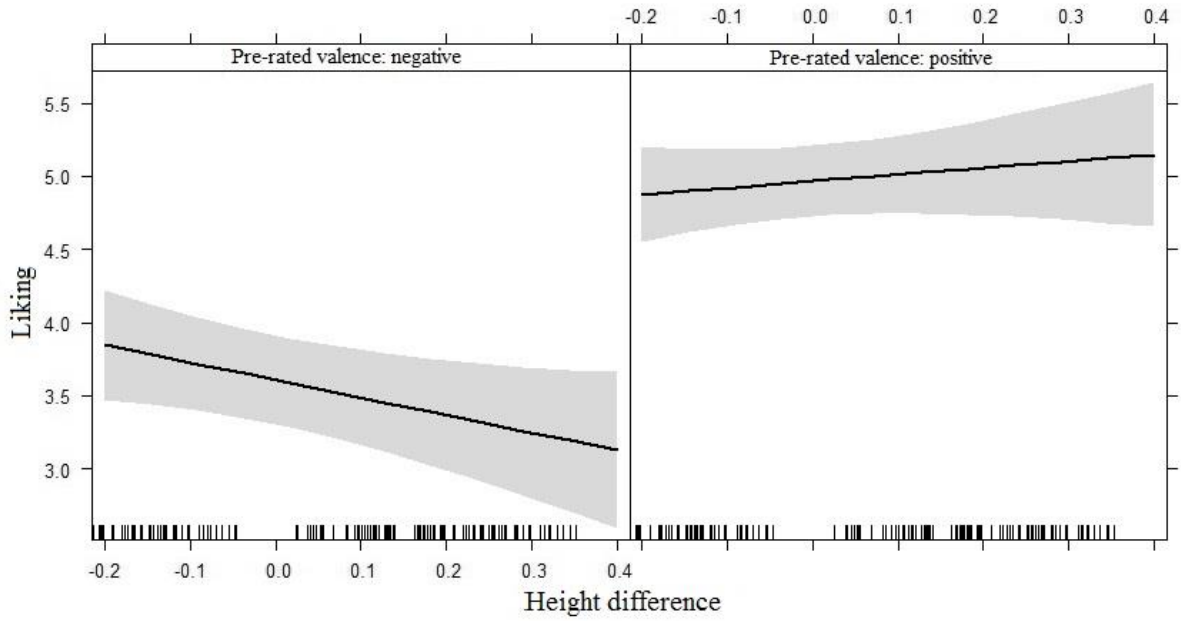

Figure 12. Interaction of height difference (centered and in m) and pre-rated valence on liking.

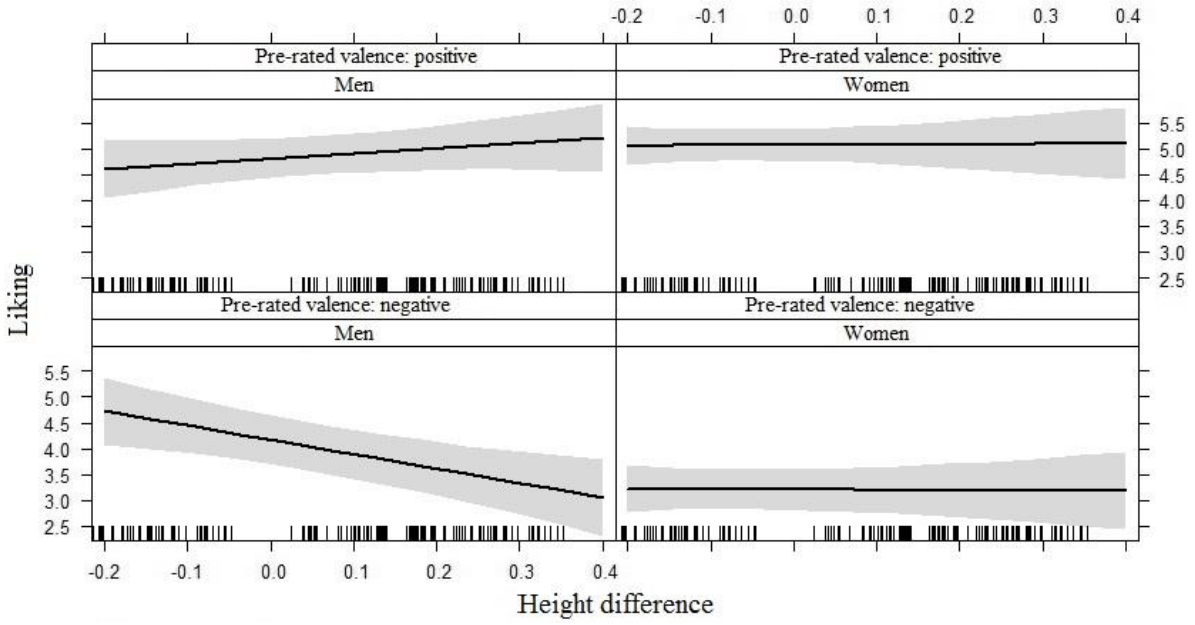

Figure 13. Three-way interaction between sex of participant, height difference (centered and in m) and pre-rated valence on liking. The left column shows the plots for men, the right column for women. The upper row shows the positive, the lower row the negative artworks.

For valence (Intercept: *Est.* = 3.85, *SE* = 0.07), as in the prior analysis, there was a main effect of pre-rated valence, β = 1.54, *Est.* = 2.67, *SE* = 0.13, *t*(95.47) = 20.45, *p* < .001, in that (pre-rated) positive artworks, *Est.* = 5.18, 95% CI [5.00, 5.37], were rated to be more positive than (pre-rated) negative artworks, *Est.* = 2.51, 95% CI [2.33, 2.70]. We found no main effect of sex of the participant, *Est.* = -0.14, *SE* = 0.14, *t*(94.16) = -1.01, *p* = .31, however, there was a Sex of participant × Pre-rated valence interaction, β = 0.31, *Est.* = 0.54, *SE* = 0.26, *t*(95.47) = 2.07, *p* = .04. Men, *Est.* = 2.72, 95% CI [2.43, 3.01], found negative artworks less negative than women did, *Est.* = 2.31, 95% CI [2.07, 2.55], whereas women, *Est.* = 5.25, 95% CI [5.01, 5.48], found positive artworks slightly more positive than men did, *Est.* = 5.12, 95% CI [4.83, 5.40] (see Figure 14). There was no other main effect or interaction (all $p \geq .25$).

For art quality (Intercept: *Est.* = 5.20, *SE* = 0.10), as in the main analysis, the main effect of height difference was significant, β = 0.11, *Est.* = 0.67, *SE* = 0.30, *t*(276.46) = 2.23, *p* = .03, in that artworks were perceived as of higher quality the more they were seen from above. There were no other main effects or interactions (all $p \geq .15$).

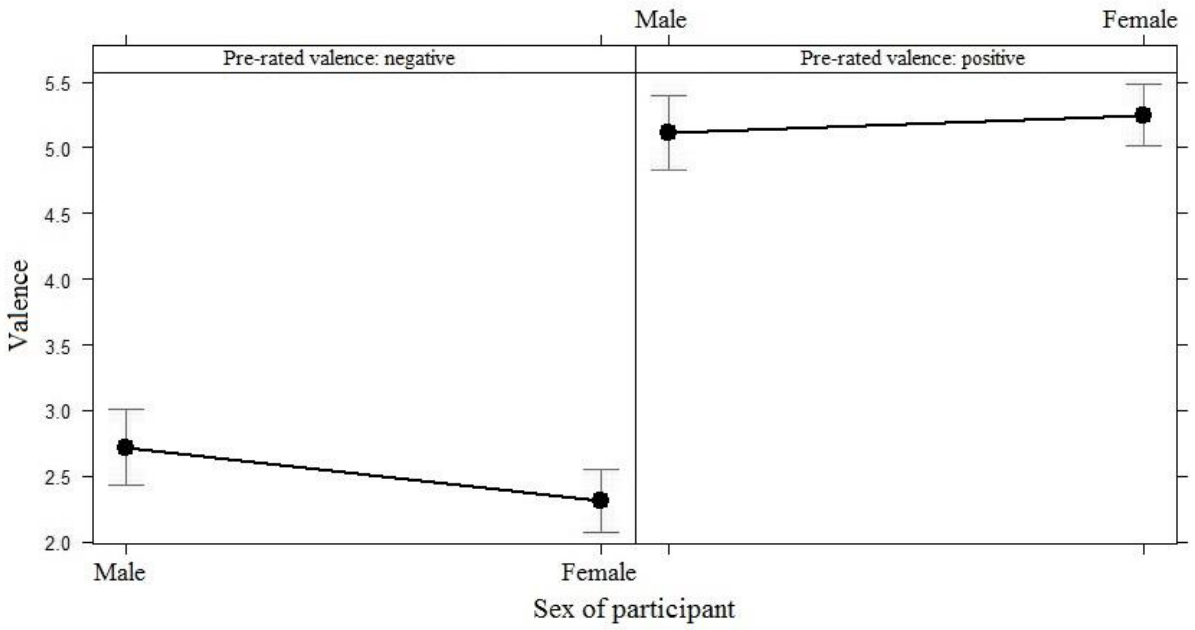

Figure 14. Interaction of sex of participant and pre-rated valence on valence.

It should be mentioned that there were no clear hypotheses of how including gender as a variable would influence the results, therefore, the found effects (including the now found interaction of height difference and pre-rated valence) should be handled with caution. However, future studies could investigate such gender differences in the perception of art. Although sex of participants was mildly correlated with height difference, this correlation was relatively low (in LMM for liking: r = .22; in LMM for valence: r = .23; in LMM for art quality: r = .18). Future studies might control for this, to get more stable results. The other assumptions for LMM were met as with the main analysis.

Positive and negative affect. We included the PANAS, which asked for current mood, to investigate, if – rather explorative with no clear hypotheses – positive or negative affect has an influence on the perception of emotional stimuli in a vertical dimension. Research suggests, that, as mentioned before, depression influences vertical attention (e.g. Meier & Robinson, 2006); therefore, an influence of current mood was plausible. The PANAS gives two scores, one for positive and one for negative affect (Watson, Clark, & Tellegen, 1988); see Figure 15 for how both variables were distributed in the sample. Both scores were added as continuous, centered fixed factors in separate LMMs.

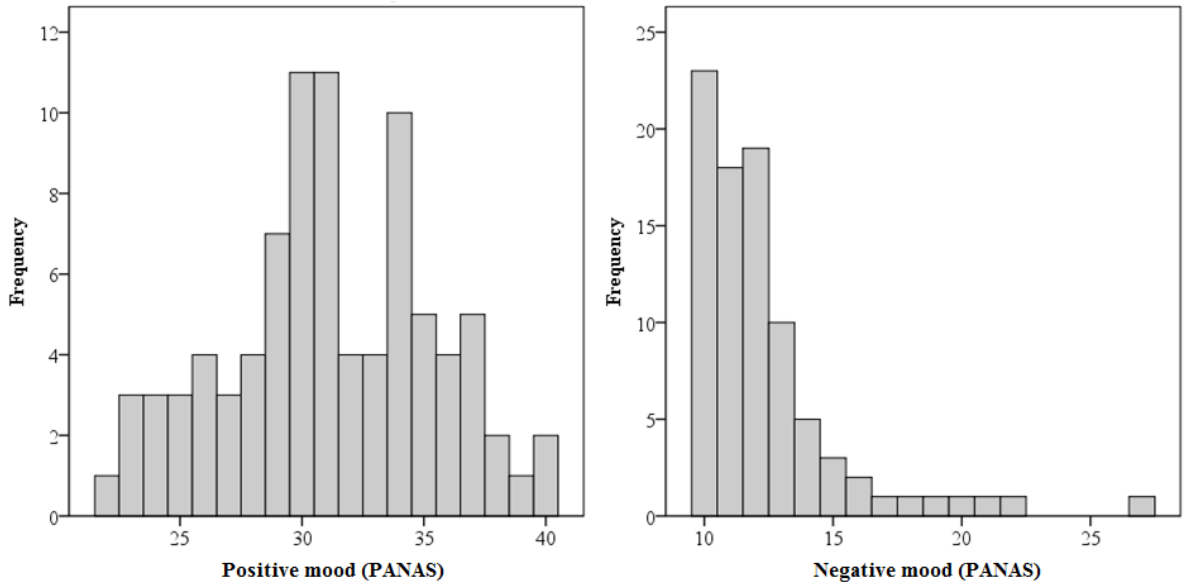

Figure 15. Histograms of positive and negative mood as measured by the PANAS-questionnaire. Each scale (positive and negative) consists of ten items on 5-point Likert-scales that are sum-scored, resulting in a score range of 10 to 50 each. Positive mood was higher (M = 31.13, SD = 4.24) than negative mood (M = 12.38, SD = 2.99). Note that the histograms depict the distribution for the sample (N = 87).

Positive affect. For liking (Intercept: *Est.* = 4.27, *SE* = 0.10) there were, next to the already found main effect of pre-rated valence, β = 0.80, *Est.* = 1.45, *SE* = 0.19, $t(85.11) = 7.80$, $p < .001$, no other main effects or interactions (all $p \geq .15$). For valence (Intercept: *Est.* = 3.85, *SE* = 0.07), there was the expected main effect of pre-rated valence, β = 1.56, *Est.* = 2.71, *SE* = 0.12, $t(84.29) = 21.80$, $p < .001$. Additionally, there was a Pre-rated valence × Positive affect interaction, β = 0.15, *Est.* = 0.06, *SE* = 0.03, $t(84.09) = 2.07$, $p = .04$, in that increasing positive mood led negative artworks to be experienced more negative and positive artworks more positive (see Figure 16). There were no other main effects or interactions (all $p \geq .50$).

For art quality (Intercept: *Est.* = 5.22, *SE* = 0.10), the main effect of height difference was significant, β = 0.10, *Est.* = 0.63, *SE* = 0.29, $t(194.38) = 2.20$, $p = .03$. Next to that, the three-way interaction of Height difference × Pre-rated valence × Positive affect turned out to be significant, β = 0.19, *Est.* = 0.27, *SE* = 0.13, $t(226.16) = 2.08$, $p = .04$: with increasing positive mood, positive artworks were seen of higher quality the more they were seen from above; however, participants in a low positive mood prior to the study found negative artworks to be

of higher quality the more they were seen from above, whereas participants in a high positive mood showed the opposite pattern (see Figure 17). There were no other main effects or interactions (all $p \geq .20$). The assumptions for LMM were met as with the main analysis.

In conclusion, for liking and valence, positive affect did not affect the interaction between height difference and pre-rated valence, however, it did for art quality.

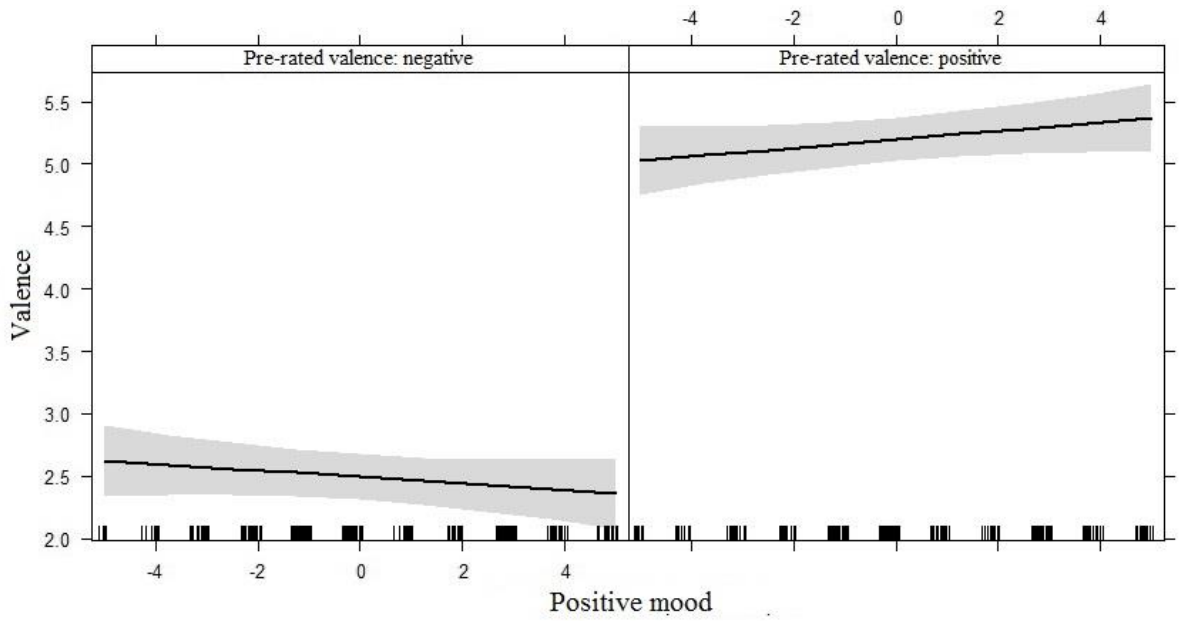

Figure 16. Interaction of positive mood (centered), as measured by the PANAS, and pre-rated valence on valence.

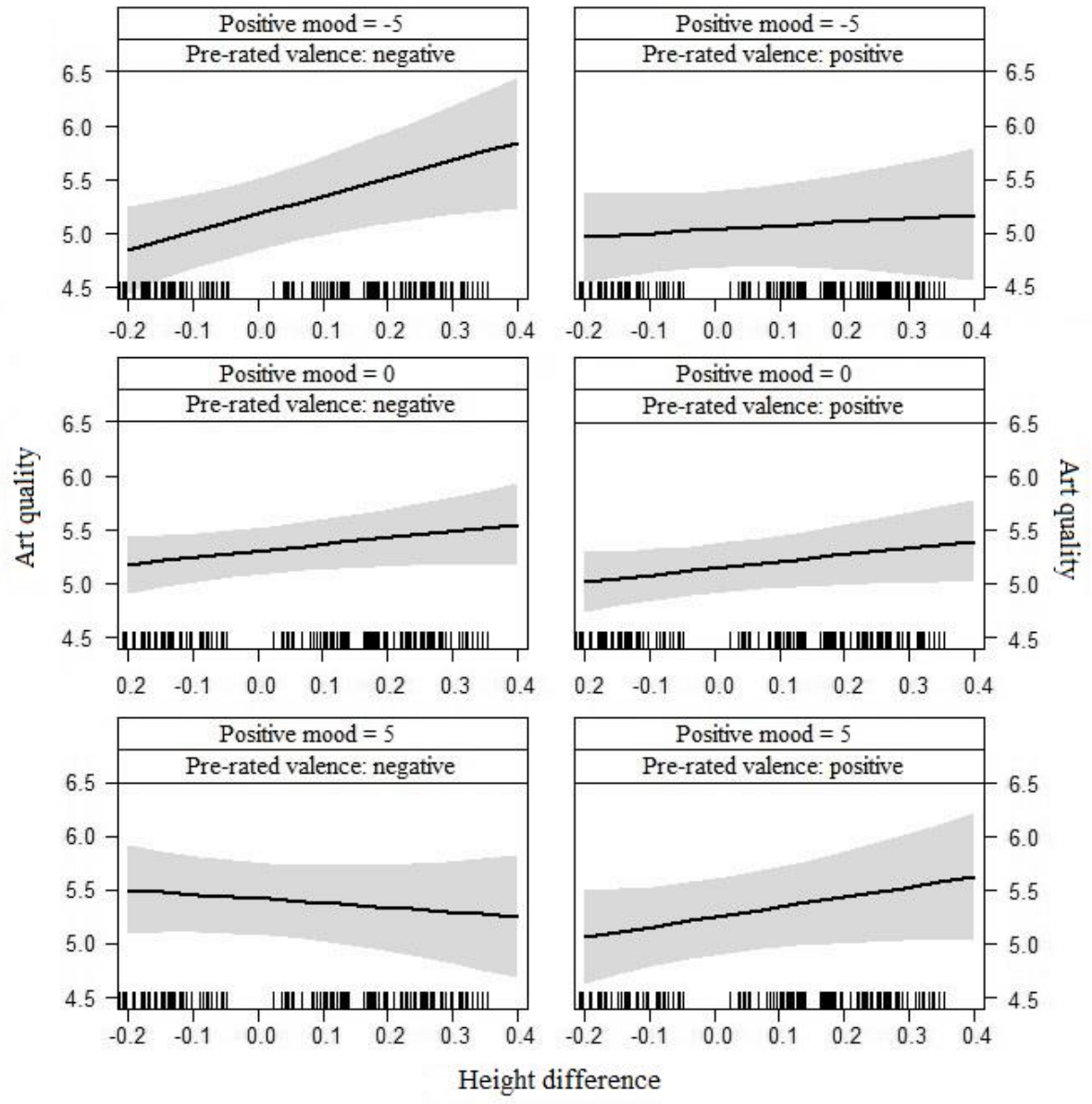

Figure 17. Three-way interaction between height difference (centered and in m), pre-rated valence and positive mood (centered) on art quality. The left column shows the negative, the right column the positive artworks. Positive mood increases from top to bottom (the variable is continuous, for the graph it is separated into sections).

Negative affect. One participant marked two answers ("1" and "3") for one item; since that participant marked all other nine items with "1", the missing value was exchanged with the mean of "1" to calculate the sum-score.

For liking (Intercept: *Est.* = 4.27, *SE* = 0.10) there were, next to the already found main effect of pre-rated valence, β = 0.80, *Est.* = 1.46, *SE* = 0.19, *t*(102.05) = 7.76, $p < .001$, no other main effects or interactions for liking (all $p \geq .14$). For valence (Intercept: *Est.* =

3.85, *SE* = 0.07), the main effect of pre-rated valence was still significant, β = 1.56, *Est.* = 2.71, *SE* = 0.13, *t*(84.34) = 21.54, $p < .001$. There were no other main effects or interactions for valence (all $p \geq .14$). Finally, for art quality (Intercept: *Est.* = 5.22, *SE* = 0.10), as in the prior analyses, the main effect of height difference was significant, β = 1.04, *Est.* = 0.63, *SE* = 0.29, *t*(289.33) = 2.16, $p = .03$. There were no other main effects or interactions for art quality (all $p \geq .22$). Interestingly, the three-way interaction with positive mood found for art quality was far from being significant with negative mood (β = -0.01, $p = 0.93$). The assumptions for LMM were met as with the main analysis. In conclusion, we did not find that negative affect influenced the ratings significantly.

Art interest and art knowledge. Since art experts differ from lay people in their ratings of artworks (e.g. Leder, Gerger, Brieber, & Schwarz, 2014; van Paaschen, Bacci, & Melcher, 2015), we explored, if art interest or knowledge would influence ratings regarding the current research question. Again, there were no a-priori hypotheses about which influence those variables might have on the interaction. The questionnaire used results in two scores, one for art interest and the other for art knowledge; both scores were entered as continuous, centered fixed factors in separate LMMs.

Art interest. For a distribution of art interest in the sample, see Figure 18. For liking (Intercept: *Est.* = 4.27, *SE* = 0.10), next to the main effect of pre-rated valence, β = 0.80, *Est.* = 1.47, *SE* = 0.18, *t*(85.05) = 8.00, $p < .001$, there was a main effect of art interest, β = 0.15, *Est.* = 0.02, *SE* = 0.01, *t*(84.81) = 2.82, $p < .01$, in that participants having a higher interest in art liked the artworks more (see Figure 19). Additionally, there was an interaction of Pre-rated valence × Art interest, β = -0.23, *Est.* = -0.03, *SE* = 0.01, *t*(84.79) = -2.32, $p = .02$, in that increasing interest in art also increased liking of negative artworks, whereas art interest had nearly no influence on liking of positive artworks (see Figure 20). There were no other main effects or interactions for liking (all $p \geq .17$).

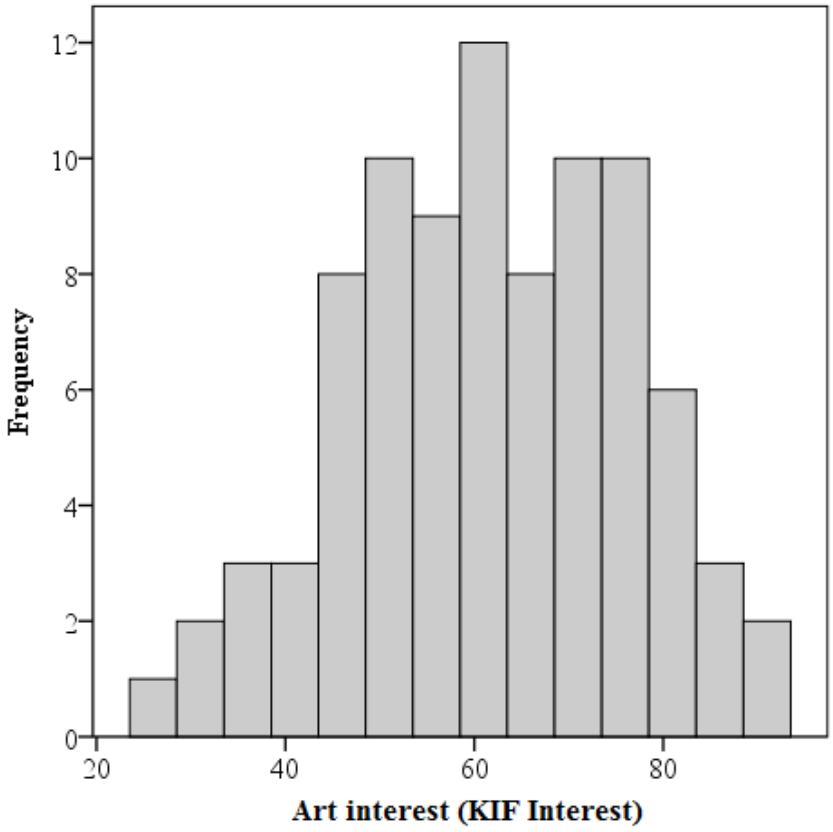

Figure 18. Histogram of art interest (*M* = 61.53, *SD* = 14.73; N = 87) as measured by the questionnaire. The questionnaire consisted of 15 item measured on 7-point Likert-scales, which were sum-scored, resulting in a minimum score of 15 and a maximum score of 105. The histogram depicts the distribution for the sample (*N* = 87).

For valence (Intercept: *Est.* = 3.85, *SE* = 0.07), only the main effect of pre-rated valence was significant, β = 1.56, *Est.* = 2.71, *SE* = 0.13, *t*(84.65) = 21.31, $p < .001$. There were no other main effects or interactions for valence (all $p \geq .41$). For art quality (Intercept: *Est.* = 5.22, *SE* = 0.10), next to the main effect of height difference, β = 0.11, *Est.* = 0.64, *SE* = 0.29, *t*(193.93) = 2.20, $p = .03$, there were no other main effects or interactions (all $p \geq .23$). The assumptions for LMM were met as with the main analysis.

In sum, although art interest influenced ratings of (emotionally valent) artworks, it had no effect on the interaction between height difference and pre-rated valence.

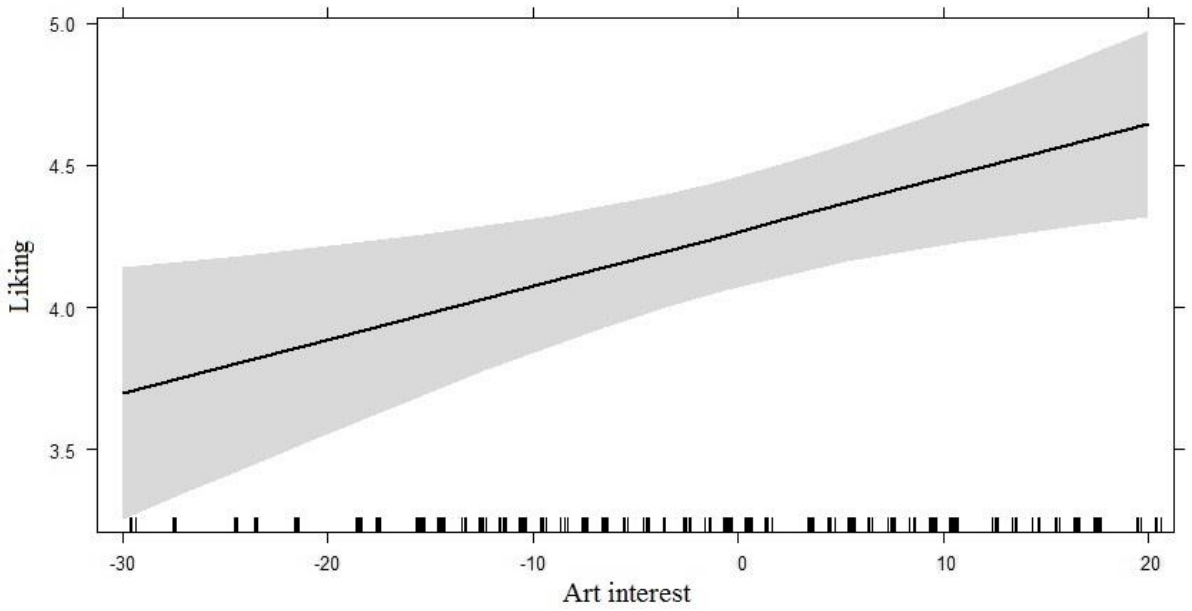

Figure 19. Main effect of art interest (centered) on liking.

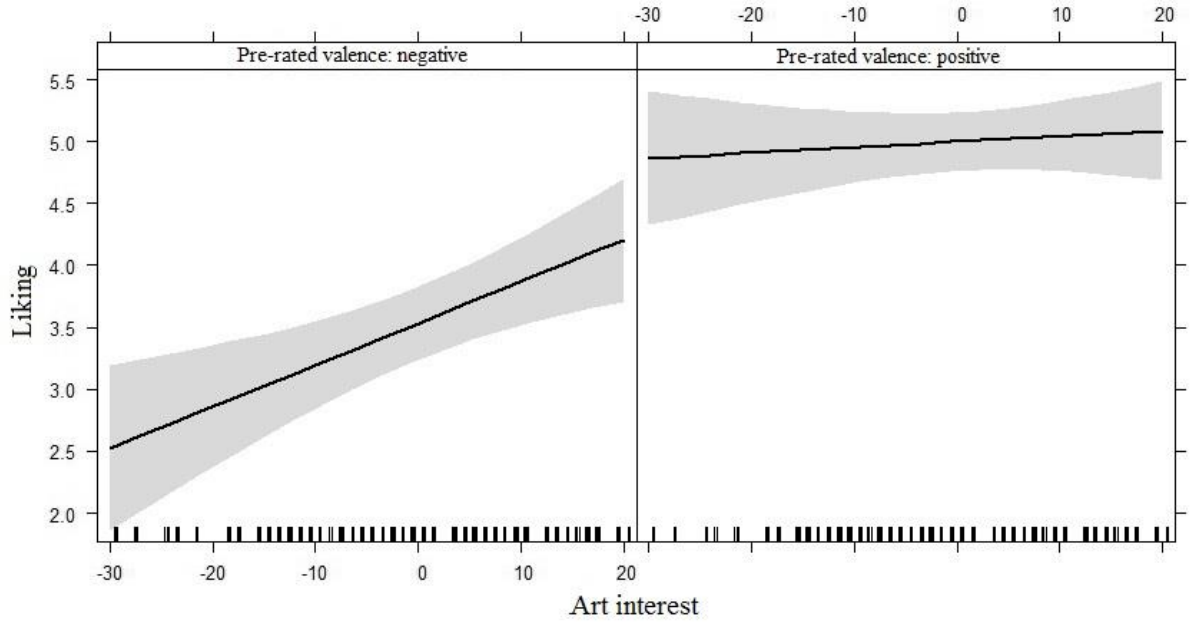

Figure 20. Interaction of art interest (centered) and pre-rated valence on liking.

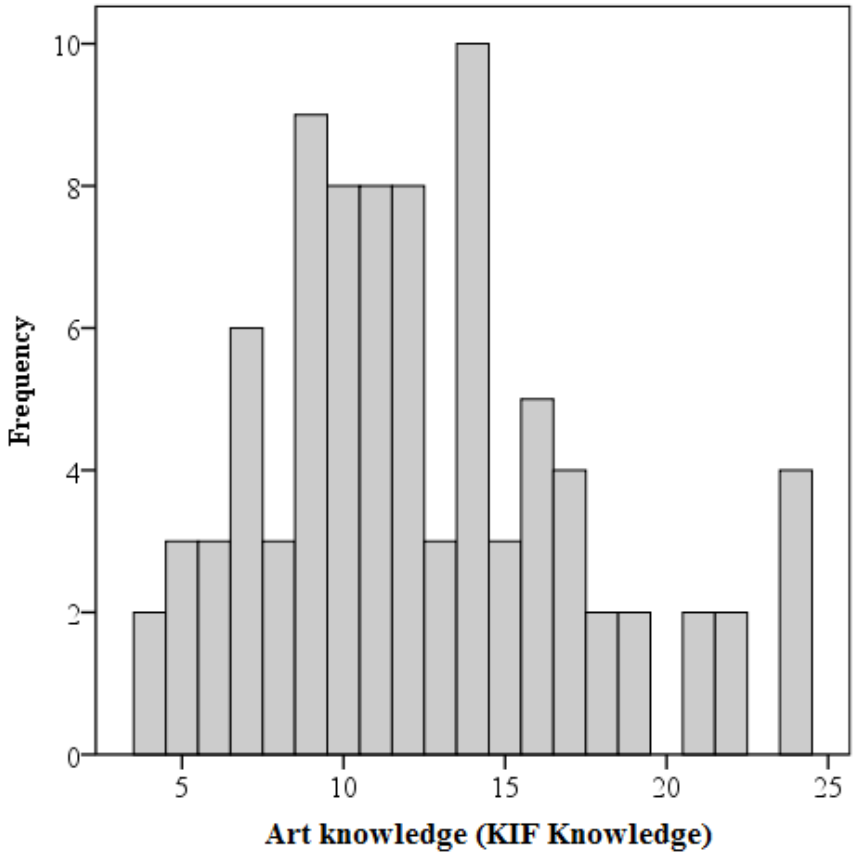

Figure 21. Histogram of art knowledge (*M* = 12.41, *SD* = 4.88) as measured by the questionnaire. The questionnaire consisted of several multiple-choice and open questions (see method section), whose answers were sum-scored, resulting in a minimum score of 0 and a maximum score of 34. The histogram depicts the distribution for the sample (N = 87).

Art knowledge. The art knowledge questionnaire consisted of multiple-choice questions as well as a part where artworks had to be identified regarding style, artist and if those artworks were familiar. In the multiple-choice part, a few participants left out some questions; those missing values were exchanged with the probability of solving the question (four answers and one of them correct, therefore 25 % probability of solving the question) and added to the sum-score. In the second part, one participant identified two of seven artworks to be known, with one missing value; therefore, 0.5 (the probability of answering the question in either way) was added to that score. A second participant identified one artwork to be known and left out all other seven questions, which was interpreted as not knowing the artworks. Since a sum-score was calculated, it was decided that this kind of data handling would be a reasonable practice. For a distribution of art knowledge see Figure 21.

Including art knowledge in the model for liking (Intercept: *Est.* = 4.27, *SE* = 0.10), resulted in no other main effects or interactions (all $p \geq .14$), other than the main effect of pre-rated valence, β = 0.78, *Est.* = 1.43, *SE* = 0.19, *t*(86.06) = 7.57, $p < .001$. For valence (Intercept: *Est.* = 3.85, *SE* = 0.07), only the main effect of pre-rated valence was significant, β = 1.56, *Est.* = 2.70, *SE* = 0.13, *t*(85.66) = 21.33, $p < .001$, but no other effects (all $p \geq .19$). For art quality (Intercept: *Est.* = 5.23, *SE* = 0.10), however, next to the main effect of height difference, β = 0.11, *Est.* = 0.65, *SE* = 0.29, *t*(193.13) = 2.26, *p* = .02, there was a significant Height difference × Art knowledge interaction, β = 0.10, *Est.* = 0.13, *SE* = 0.06, *t*(191.83) = 2.12, *p* = .04: the effect of height difference, with experiencing artworks to be of higher quality the more they were seen from above, got stronger, the more the participants were knowledgeable about art (see Figure 22). There were no other effects (all $p \geq .20$). The assumptions for LMM were met as with the main analysis.

In conclusion, although art knowledge had no effects on liking and valence, the main effect for height difference found in the main analysis increased with increasing art knowledge.

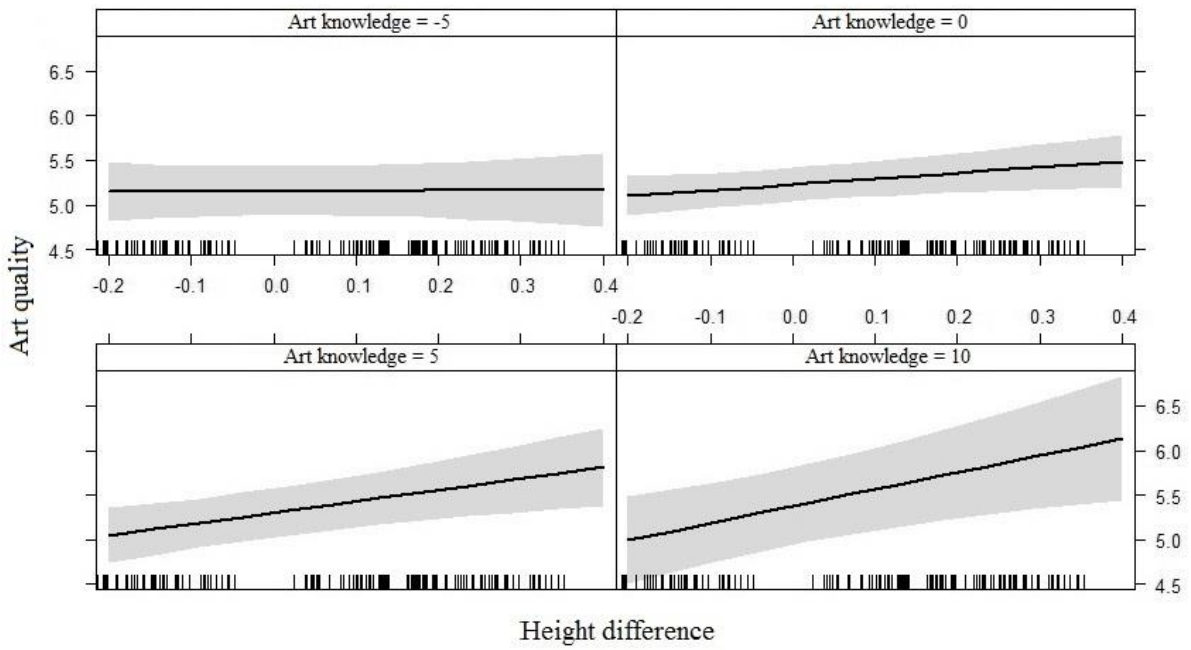

Figure 22. Plot showing the interaction of art knowledge (centered) and height difference (centered and in m) on art quality. Art knowledge increases from upper left, to upper right, to lower left and to lower right.

Faces

For the analysis, attractive and less attractive male and female faces at each hanging position were aggregated. This resulted in four values for each subject: averaged male stimulus at high vertical location, averaged female at the high vertical location, as well as averaged male and female stimuli at the low locations, respectively. Eye height was included as explained with the artworks. Therefore, Table 5 only shows the descriptive results of sex of face. As mentioned above, data of one participant was excluded, resulting in a marginally different distribution of height difference; however, for the sake of completeness, the distribution can be found in appendix D.

Table 5

Descriptive Results for the Faces showing Mean Ratings of the Variables

		Total		Men		Women	
Scales	Sex of face	M	SD	M	SD	M	SD
	Overall	3.95	0.96	3.91	0.87	3.98	1.01
Attractiveness	Male	3.61	0.85	3.72	0.81	3.53	0.88
	Female	4.30	0.93	4.10	0.90	4.44	0.93
	Overall	2.28	1.19	2.40	1.21	2.20	1.18
Familiarity	Male	2.20	1.23	2.40	1.35	2.05	1.12
	Female	2.37	1.15	2.40	1.07	2.35	1.21
	Overall	4.09	1.10	4.03	1.07	4.13	1.12
Approaching	Male	3.70	1.02	3.67	0.94	3.73	1.08
	Female	4.47	1.04	4.40	1.06	4.53	1.03

Note. Here, ratings were averaged across sex of face, therefore, for example, the values for "male" include the ratings from the male faces hanging high, as well as hanging low. Scales were presented on 7-point Likert-scales (see method section).

As with the artworks, familiarity ratings of faces were not normally distributed. The question asked could have been interpreted differently, for example, as knowing exactly the depicted person, as knowing a person who looked similar, or as identifying the face as being

typically male or female. Again, an interpretation of familiarity ratings would be biased or unclear. Therefore, responses for faces were coded as mentioned above for the artworks. For familiarity, faces were aggregated across subject, sex of face, height difference (therefore as in the main analysis), plus the now new predictor "familiarity". This resulted in more cases of observations (Number of observations: $N = 466$). For the main analysis, every case of observation consisted of two aggregated faces, resulting in four cases of observation. However, adding the independent factor of familiarity, resulted in at least four, but up to eight observations for each participant. Any faces that were familiar – due to any reason – were in the same category, contrasted to those not being familiar. Familiarity was included as a predictor, and not as a dependent variable, in additional linear mixed models (see below), to see if familiarity interacted with height difference.

For each of the two other scales (attractiveness, willingness to approach), we ran a linear mixed model (LMM) in R with the settings mentioned above. We included a contrast for sex of the shown face (female minus male), a contrast for sex of the participant (female minus male) as fixed factors and the difference in meter (!) between the eye-height and the height of each artwork as a continuous, centered fixed factor. We also included random by-participants intercepts with a random slope for sex of the face. For all significant effects, the standardized effect size β is reported. This was done as reported above.

For attractiveness (Intercept: *Est.* = 3.94, *SE* = 0.06), we found no main effect of height difference, *Est.* = 0.08, *SE* = 0.21, $t(279.08) = 0.39$, $p = .70$, but an expected main effect of sex of face, β = 0.72, *Est.* = 0.68, *SE* = 0.09, $t(200.61) = 7.35$, $p < .001$, in that female faces, *Est.* = 4.28, 95% CI [4.14, 4.42], were found to be more attractive than male faces, *Est.* = 3.60, 95% CI [3.44, 3.76] (see Figure 23). There was no main effect of sex of the participant, *Est.* = 0.08, *SE* = 0.12, $t(91.49) = 0.66$, $p = .51$. We found no Height difference × Sex of face interaction, *Est.* = -0.55, *SE* = 0.41, $t(252.97) = -1.33$, $p = .19$, no Height difference × Sex of participant interaction, *Est.* = -0.23, *SE* = 0.42, $t(279.08) = -0.54$, $p = .59$, but a Sex of face × Sex of participant interaction, β = 0.48, *Est.* = 0.46, *SE* = 0.19, $t(200.61) = 2.47$, $p = .01$, in that men, *Est.* = 3.67, 95% CI [3.42, 3.92], rated male faces to be more attractive than women did, *Est.* = 3.52, 95% CI [3.32, 3.73], whereas women, *Est.* = 4.44, 95% CI [4.26, 4.62], rated female faces more attractive than men did, *Est.* = 4.13, 95% CI [3.91, 4.34] (see Figure 24). There was no significant interaction of Height difference × Sex of face × Sex of participant, *Est.* = 1.04, *SE* = 0.83, $t(252.97) = 1.26$, $p = .21$.

For willingness to approach (Intercept: *Est.* = 4.09, *SE* = 0.07) we found no main effect of height difference, *Est.* = 0.12, *SE* = 0.24, *t*(185.55) = 0.50, *p* = .62, a main effect of sex of face, β = 0.72, *Est.* = 0.79, *SE* = 0.11, *t*(94.09) = 6.99, *p* < .001, in that participants would prefer meeting female faces, *Est.* = 4.48, 95% CI [4.30, 4.67], compared to male faces, *Est.* = 3.69, 95% CI [3.51, 3.87] (see Figure 25), and no main effect of sex of the participant, *Est.* = 0.11, *SE* = 0.15, *t*(89.78) = 0.74, *p* = .46. We found no Height difference × Sex of face interaction, *Est.* = -0.28, *SE* = 0.46, *t*(197.12) = -0.61, *p* = .54, no Height difference × Sex of participant interaction, *Est.* = 0.25, *SE* = 0.47, *t*(185.55) = 0.54, *p* = .59, and no Sex of face × Sex of participant interaction, *Est.* = 0.02, *SE* = 0.23, *t*(94.09) = 0.11, *p* = .91. Again, there was no significant interaction of Height difference × Sex of face × Sex of participant, *Est.* = 0.85, *SE* = 0.92, *t*(197.12) = 0.92, *p* = .36.

Fixed effects of height difference and sex of participant were mildly correlated in the LMMs (in LMM for attractiveness: r = .21; in LMM for willingness to approach: r = .19). Regarding the other assumptions of LMMs, residual plots for the two dependent variables indicated linearity and homoscedasticity (see Appendices C4 and C5 for residual plots), and residuals were normal.

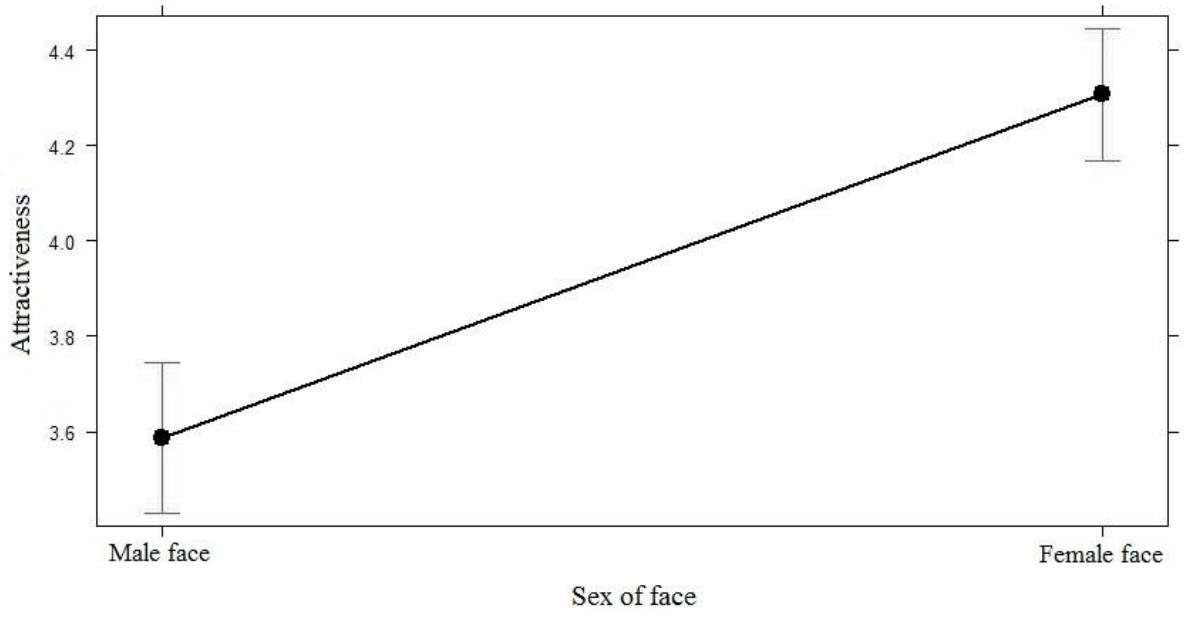

Figure 23. Main effect of sex of face on attractiveness.

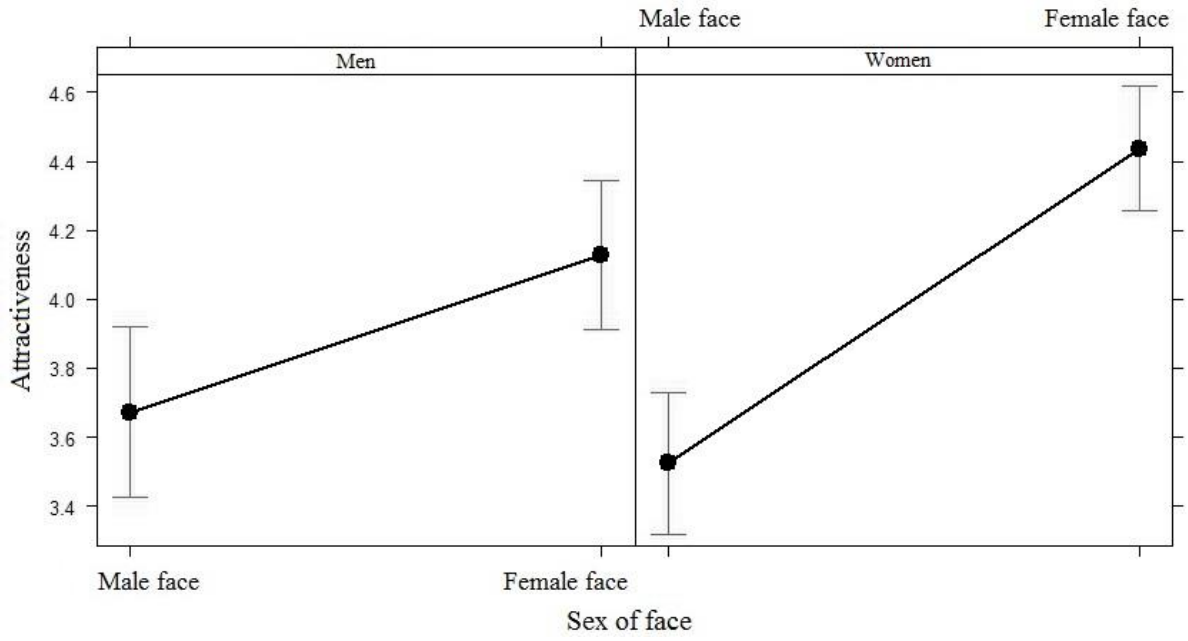

Figure 24. Interaction of sex of face and sex of participant on attractiveness.

Figure 25. Main effect of sex of face on willingness to approach.

Post-hoc analysis of familiarity. Familiarity was included as a contrast-coded fixed factor in two LMMs for attractiveness and willingness to approach. For attractiveness (Intercept: *Est.* = 3.89, *SE* = 0.07) there was, next to the already found main effect of sex of face, β = 0.49, *Est.* = 0.60, *SE* = 0.11, *t*(294.50) = 5.46, *p* < .001, a main effect of familiarity, β = 0.44, *Est.* = 0.54, *SE* = 0.11, *t*(443.60) = 4.77, *p* < .001, in that familiar faces, *Est.* = 4.16, 95% CI [3.99, 4.32], were rated to be more attractive than unfamiliar faces, *Est.* = 3.62, 95% CI [3.44, 3.80] (see Figure 26). The already found interaction of Sex of face × Sex of participant was significant, β = 0.39, *Est.* = 0.47, *SE* = 0.22, *t*(294.50) = 2.16, *p* = .03. There were no other main effects or interactions (all $p \geq .10$).

For willingness to approach (Intercept: *Est.* = 4.04, *SE* = 0.08) there was, next to the already found main effect of sex of face, β = 0.55, *Est.* = 0.71, *SE* = 0.12, *t*(93.20) = 5.97, *p* < .001, a main effect of familiarity, β = 0.43, *Est.* = 0.56, *SE* = 0.11, *t*(392.00) = 4.88, *p* < .001, in that participants preffered meeting familiar faces, *Est.* = 4.32, 95% CI [4.14, 4.51], compared to unfamiliar faces, *Est.* = 3.76, 95% CI [3.56, 3.96] (see Figure 27). The three-way interaction of Familiarity × Sex of face × Sex of participant approached, but did not reach, significance, *Est.* = -0.82, *SE* = 0.44, *t*(385.50) = -1.86, *p* = .06. There were no other main effects or interactions (all $p \geq .38$). Again, it should be mentioned, that familiarity was originally planned as a dependent variable. Therefore, the effects found here should be interpreted carefully and different from our original research question. The assumptions for LMM were met as with the main analysis.

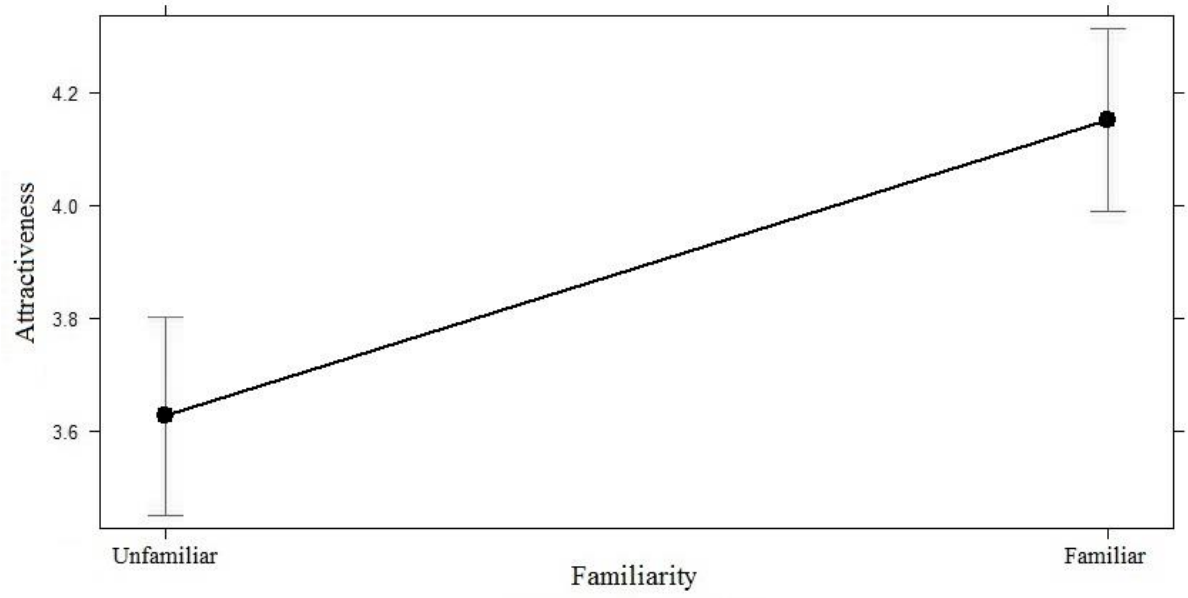

Figure 26. Main effect of familiarity on attractiveness.

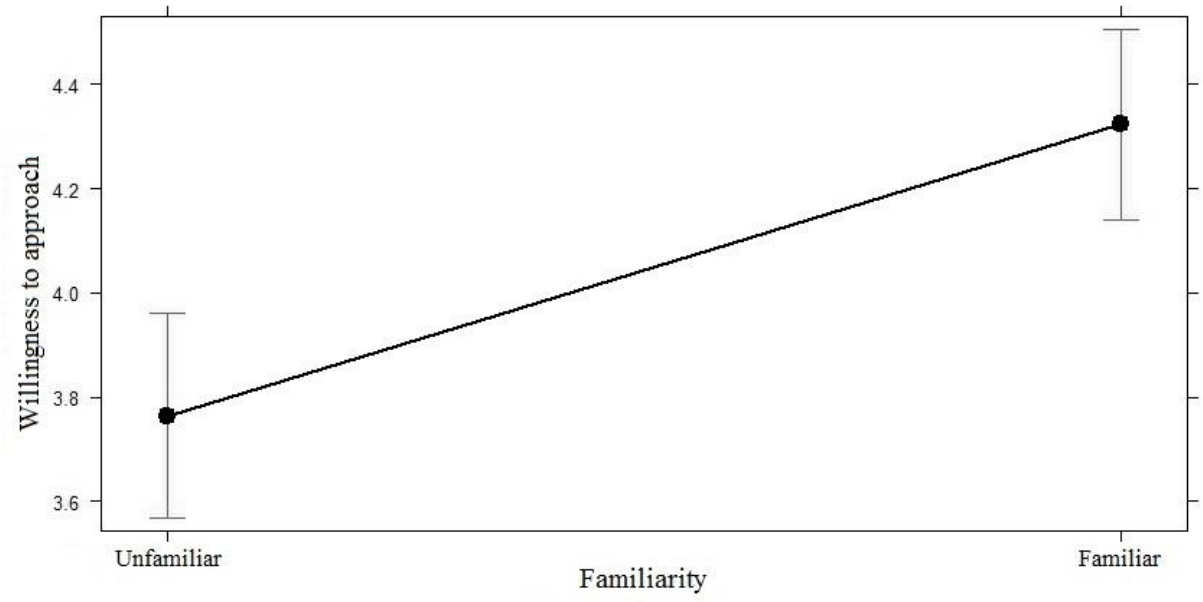

Figure 27. Main effect of familiarity on willingness to approach.

Exploratory analyses. We asked participants for their sexual orientation and their relationship status, to control for possible influences of those. As with the exploratory analysis of the artworks, we had no prior hypotheses of how these would affect the results.

Relationship status. Relationship status was included as a continuous, centered fixed factor into each LMM. For attractiveness (Intercept: *Est.* = 3.92, *SE* = 0.06), we found the main effect of sex of face, β = 0.75, *Est.* = 0.72, *SE* = 0.10, *t*(200.89) = 7.41, $p < .001$, but no other main effects (all $p \geq .12$). As in the main analysis, there was a Sex of face × Sex of participant interaction, β = 0.45, *Est.* = 0.43, *SE* = 0.19, *t*(200.89) = 2.24, $p = .03$. Additionally, the interaction of Relationship status × Sex of face approached, but did not reach significance, *Est.* = 0.33, *SE* = 0.19, *t*(200.89) = 1.71, $p = .09$ (participants in a relationship rated male faces less attractive than those being single, for female faces there was no difference between relationship statuses). There were no other significant interactions for attractiveness (all $p \geq .11$). For willingness to approach (Intercept: *Est.* = 4.08, *SE* = 0.08), there was the main effect of sex of face, β = 0.72, *Est.* = 0.79, *SE* = 0.12, *t*(94.81) = 6.72, $p < .001$, but there were no other main effects or interaction (all $p \geq .19$). In summary, relationship status only had a very minor (if any) effect on the ratings and no effect on the interaction with height difference. The assumptions for LMM were met as with the main analysis.

Sexual orientation. Although bisexual individuals differ in their ratings of attractiveness from heterosexuals (Lippa, 2013), participants who indicated to be bisexual were includ-

ed in the analysis, since there was no strong indication to exclude them. To examine this assumption, both LMMs of the main analysis were repeated with excluding the nine participants, who indicated being bisexual. Main effects and interactions turned out to be the same as in the general models, with only marginally different numerical values. The assumptions for LMM were met as with the main analysis. In conclusion, in the current study, (bi-)sexual orientation had no statistical effect on the hypotheses.

Discussion

Artworks

Main analysis. It was proposed that emotion evoking artworks that are hung congruent with the conceptual metaphor of Positive = Up/ Negative = Down (PU/ND) are, for example, liked more. In our analysis, we calculated a difference between eye height and center of each image, which was included with the pre-rated valence of the artworks into the analysis. However, we did not find an interaction congruent with the conceptual metaphor.

For liking, there was no significant difference if an artwork was looked down or up to, additionally no interaction between pre-rated valence and viewing angle. This means we found no effect of metaphor congruent hanging. We found a main effect of valence which was expected from stimulus selection and prior research (e.g. Leder et al., 2014): positive artworks were like more than negative artworks. For valence, the results were similar, including the expected main effect of pre-rated valence, with pre-rated positive artworks rated more positive than pre-rated negative artworks.

For art quality, there was a main effect of height difference: artworks that were seen from above were rated to be of higher quality. This was independent of artworks' pre-rated valence. It is possible that this was caused by head tilt; but instead of a head tilted downward embodying a negative state, it might have been experienced as a relaxed posture. Contrary to some of the earlier mentioned studies, in which a slumped posture included the whole upper body, shoulders down, etc. (e.g. Michalak et al., 2014; Wilson & Peper, 2004), in this study participants just stood in front of an artwork, and mostly tilted the head up- or downward. A "hanging" head might have been experienced as relaxing – and not as embodying a negative affective state, or, in terms of metaphors, "letting one's head hang down". Raising the head upward, might have been experienced as tense or slightly more uncomfortable. Price and Harmon-Jones (2010) found that leaning forward—following their argumentation resembling high approach motivation—narrowed categorization. Therefore, it could also be possible, that looking down on artworks might have made them appear easier to categorize as good art.

As mentioned, familiarity was not normally distributed and in general not distributed as expected. It is uncertain, what caused familiarity ratings. Familiarity was included to measure a feeling of familiarity, which, in accordance with the hypothesis, would be stronger in metaphor congruent positions. However, it could have been understood in several directions, for example, as asking if exactly that artwork was known (what was asked afterwards in the

post-questionnaire), or as if the style or the artist were familiar. We therefore transformed familiarity into a binary predictor, of an artwork being familiar due to any reason, or unfamiliar. In line with research on familiarity and art (e.g. Leder, 2001), we found that familiar artworks were liked more and had higher ratings in art quality.

Interestingly, adding familiarity as a factor to the model, yielded a significant interaction of height difference and pre-rated valence for liking: negative artworks were liked less the more they were seen from above, whereas liking of positive artworks slightly increased with seeing them from above. This is the opposite of what we would have expected. We expected, that by tilting the head downward, negative affect might be simulated (see Niedenthal, 2007), therefore negative artworks hanging in the location that caused the head tilt, might be liked more, because they "fit" more (maybe through processing fluency; Reber et al., 2004) or more strongly resemble the participant's state (refers to Freedberg & Gallese, 2007). For positive artworks on the other hand, an upward tilt may have simulated positive affect and therefore positive artworks in that position would be liked more. This found interaction is contrary to what we expected from the conceptual metaphor.

To interpret this interaction, one should be very careful: the effect might not be stable because it was only found by adding an additional fixed factor of familiarity to the model. Additionally, it was contrary to our hypotheses—in other words: unexpected.

If we stay in the framework of embodiment and metaphors, it could be, that a head tilted downward might have indeed simulated negative affect. However, instead of increasing the liking of negative artworks, this negativity just made them appear more dislikeable. Zavoyskiy, Taylor and Friedman (2016) found that participants in a sad mood felt worse after listening to sad music; in the current study, looking down on negative artworks could have caused more disliking of the negative artworks due to embodied support of their valence. It is also possible that negative affect resulting from head tilt interfered, for example, with feelings of personal safety (because it became more resembling), changing the outcome in that negative artworks were liked less (with regard to Menninghaus, et al., in press). For example, negative artworks are liked more when being framed as art, compared to non-art (e.g. as a press photo) (Gerger, Leder, & Kremer, 2014); an art context weakened by embodied emotion might have influenced the ratings accordingly. However, if this would be the case, it is interesting that head tilt only had a marginal influence on positive artworks. That such an effect for negative artworks was found for liking, but not for valence, could be explained by research that suggests, that art context increases liking of negative artworks, but negative reactions

seem to be stable and do not differ across art/ non-art conditions (Gerger, Leder, & Kremer, 2014; Wagner, Menninghaus, Hanich, & Jacobsen, 2014).

On the other hand, interpreting it with the main effect of height difference for art quality in the main analysis, it could also be that a hanging head was experienced as relaxing. Negative artworks might have been experienced as disturbing/ interrupting the relaxation. Positive artworks might have been marginally liked more with increasing height, because the positive valence was in accordance with the relaxed posture.

Metaphorical effects seem to be complex and might even function in metaphor-incongruent patterns (e.g. Crawford, Cohn, & Kim, 2014; Lynott & Coventry, 2014). With novelty being an influence on the evaluation of art (for an overview see e.g. Lindell & Mueller, 2011), it could also be possible that the higher liking incongruent with the metaphor might have resulted, because the artworks location was perceived as novel and therefore more interesting. All in all, future studies should investigate those ideas; for example, it could be asked how relaxing it is to see the artwork, how well it captures its content, or—as formulated in the research question, but not directly asked the participants—how it fits its location. The latter bears the problem, that hanging height becomes an obvious factor to the participant, at least in a within-subjects-design.

Lastly, including familiarity as a predictor resulted in a significant interaction of familiarity, height difference and pre-rated valence for liking: the interaction of height difference and pre-rated valence was found only for familiar artworks. As discussed above, it is unknown what caused the familiarity ratings. This three-way interaction could be interpreted that emotionally valent artworks interact with a vertical location, only if they are familiar. On the one hand, a feeling of familiarity could cause liking that is influenced by the hanging height and the depicted valence, because those artworks fit better at that location: the artworks are known, due to any reason, and therefore fit better at that place. A known, emotionally valent artwork fits better at one location. On the other hand, it could also be—more strongly in line with the research question—that due to the hanging height and pre-rated valence, a feeling of familiarity was created, so to say “false-familiarity”, that therefore influenced liking in interaction with a vertical location of affect. However, this vertical location was opposed to what was expected. The latter interpretation requires some proof of causation and, since we did not find direct support for it, it should be understood as an idea that should be investigated. However, it would support an effect that links vertical position and valence/ affect.

Exploratory analyses. By further exploring the data, we found some sex differences. I will speak of "sex difference" for continuity with the results section. However, found effects might be caused by gender identity. For example, men liked pre-rated negative artworks more than women, whereas there was no such clear difference for pre-rated positive artworks. Additionally, men rated negative artworks less negative than women did, with only a slight difference for positive artworks. This supports research suggesting that women more strongly respond to negative stimuli (e.g. Bianchin & Angrilli, 2012; Lithari et al, 2010).

Adding participant's sex to the model, yielded in the significant interaction of height difference and pre-rated valence, as discussed above. Negative artworks were liked less when looked down at and positive were liked slightly more when looked down at. Additionally, there was a three-way interaction of sex of participant, pre-rated valence and height difference, in which the only strong effect of height difference was found for men looking at negative artworks: the more they saw those from above, the more they disliked them. This is interesting because, for example, Mahieu et al. (2014) found the metaphorical effect mostly for women. As research suggest, men seem to be more aroused by threatening stimuli (for a review see Kret & De Gelder, 2012) (not to be confused with the stronger responses of women regarding negative stimuli as mentioned above). This effect of men liking negative artworks less the more those artworks were seen from above, could be caused by the body posture, in that it made the negative artworks more "threatening", at least somehow more negative and liked less. Another interpretation would be, that men preferred the negative artworks to be closer to their face, fueled by male gender role stereotypes of being brave (for a review see McLean & Anderson, 2009) or taking risks (for adolescents, Granié, 2009). This would also be in line with research on men's enjoyment of fright (see Hoffner & Levine, 2005). However, this is mere speculation over an unexpected finding; future studies should investigate such differences between men and women.

Positive mood influenced the ratings of valence, in that it led pre-rated positive artworks to appear more positive and pre-rated negative artworks more negative. Research on mood congruency for listening to happy or sad music (e.g. Hunter, Schellenberg, & Griffith, 2011) could explain this to some extent. Although mainly focusing on the influence of sad mood on the perception of happy or sad music, with sad mood leading to a preference for sad music, a positive mood might be more congruent with positive artworks, leading to a distancing from negative artworks. If mood congruency would be the cause of this interaction, it would be likely, that negative mood also influences the ratings. We did not find this. However, one has to note that the distribution of scores of negative mood was more homogeneous

than positive mood, allowing less variance. For art quality, the three-way interaction of positive mood, pre-rated valence and height difference was significant. Taking a low score of positive mood as an indicator of less positive (not necessarily negative mood), showed a preference (art quality) for negative artworks when looked down at, which slightly reversed with increasing positive mood. This would coincide with an embodiment effect of the conceptual metaphor: feeling less positive results in higher quality attributed to the negative artworks when looked down at. However, for positive artworks, increasing positive mood led to an increased effect of rating art quality higher when looked down at the artworks. This would be more in line with the idea, that a head tilted forward resembles a more relaxing posture.

It should be noted, that effects of mood congruency—or incongruency—for listening to happy or sad music are debated (e.g. O'Malley, Seror, & Friedman, 2016; Zavoyskiy et al., 2016). Eskine, Kacinik and Prinz (2012) found, that priming of fear increases ratings of the sublimity of artworks. Following that and since we found an effect, a future study could use priming of, for example, a happy or sad mood, to see, if this "triggers" an effect of height difference and pre-rated valence. However, we did not directly find an effect of negative mood (only of less positive mood). One might argue that people with current negative mood are not affected as people with a negative state like depression (e.g. Michalak et al., 2014; Peper & Lin, 2012; Wilson & Peper, 2004), by experiencing affect in the vertical dimension. However, using priming of affect could test this assumption.

Art expertise was measured in two scales, which were analysed separately. Higher interest in art increased liking of negative artworks, similar to prior research (e.g. Leder et al., 2014). Interestingly, there was a significant interaction of art knowledge and height difference, in that the already in the main analysis found main effect of height difference increased with higher knowledge in art. It is possible that the effect for people high in art knowledge led to easier processing of the stimuli (Reber et al., 2004), which was further eased by a relaxed body posture of a head tilted downward, which resulted in higher appreciation of quality. Or, regarding the mentioned research by Price and Harmon-Jones (2010), leaning forward might have eased categorization as a good piece of art—which was especially the case for art experts due to their knowledge contributing to their ability to categorize art. Again, this is mere speculation and needs further investigation.

Concerns and limitations. To our knowledge this was the first study to investigate viewing angle towards artworks in connection to the metaphorical concept of "Positive = up/ Negative = down". The studies which investigated a link between affect and the vertical di-

mension (e.g. Mahieu et al., 2014; Crawford et al., 2006) did not investigate effects of liking. In the current study, it was proposed that emotion evoking artworks in a position congruent with the conceptual metaphor would be liked more, possibly because of more fluent processing (Reber et al., 2004). We did not find support for this hypothesis.

That we did not find an effect might have to do with the stimulus category. It might be that—at least the chosen—artworks are too diverse. The artworks were chosen because of their prior ratings; however, their style – Baroque, Pointillism (Impressionism) and Expressionism – differed. It is known that style affects ratings (e.g. see Leder et al., 2004; Leder, Ring, & Dressler, 2013). Those different styles, as well as the depicted content, possibly confounded any possible interaction of pre-rated valence and height difference. Through balancing the order of the artworks with a Latin square design, we tried to control for this. However, a future study might choose artworks of nearly the same epoch, to control for preferences of style—or even abstract works that lack any representational content.

Since the conceptual metaphor is relatively abstract towards artworks, which means (to our knowledge) there is no prominent metaphor that links emotional valence of artworks to height, the setting might have been too distant from "activating" a strong abstract concept of affect, as in the conceptual metaphor. Linking to the mentioned point, artworks can be complex stimuli and work on several levels (Leder et al., 2004), therefore, using "Positive = Up" and "Negative = Down" as a concept, might be too simple to categorize those stimuli. However, in general, metaphors can be found in artworks and might influence perception (for an overview see Ramachandran & Hirstein, 1999). Therefore, a metaphor that connects the artwork to where it is presented is plausible.

Regarding valence, participants were asked, how the artworks made them feel. Although a valid question, since an embodied effect of changing head angle was investigated, it is possible that this diminished an effect. All other questions (liking, familiarity, art quality) were closer to the stimulus itself, "valence" asked how the person felt, while viewing it. An alternative question could have been: "The artworks is..." "very negative"... "very positive".

From a theoretical point of view, regarding the idea behind viewing angle and how art is perceived, it is possible that the design made it challenging to find an effect, at least for negative artworks. Looking up to a negative artwork might make the person like it more, because of an upward movement of the head or the "up" position; on the other hand, looking down on a negative artwork might also increase liking because it fits the metaphor-congruent position. In total, liking might equalize, at least for negative artworks. However, this would

result in different ratings for the positive artworks, in that positive artworks hanging high should be liked more, because being "up" and congruent with the metaphor; positive artworks hanging low would activate a downward movement and would be incongruent with the metaphor, therefore disliked most. We did not find such an effect, but future studies should be vigilant of this.

Faces

Main analysis. In this study, we hypothesized, that male faces looked up at, as well as female faces looked down at would be preferred, especially by the opposite sex, because of a sexual dimorphism in height. However, we did not find this effect. We found no effects of height difference.

For attractiveness and willingness to approach, we found a main effect of the sex of the depicted person: female faces were found to be more attractive and there was a higher willingness to approach them. This was regardless of sex of the participant. That female faces are found to be more attractive was expected, because stimuli were chosen beforehand. This is also in line with other study results of higher attractiveness ratings for female faces (e.g. Mitrovic, Tinio & Leder, 2016). Additionally, there was an interaction between sex of face and sex of participant, showing that women found female faces more attractive than men did, but male faces less attractive than men did. In other words, the main effect of finding female faces more attractive than male faces was strengthened for female participants. This is interesting because, for example, Lippa (2013) found that men preferred women and women preferred men. In this sample, women found female faces more attractive than male faces; men rated the male faces as more attractive than women did. It could be that this was due to the small number of stimuli: it might be that participants rated faces more attractive, because there were only a few and they therefore found not a lot of variation. In usual laboratory studies, more than eight faces get presented; it might be that participants are more aware that a general score will be calculated. In the current study, they may have hesitated to rate the depicted faces as less attractive because they more resembled individuals—and not as just one face among tens of others. Additionally, they could have been in resemblance with participant's sex, comparing or adding oneself to the group of faces. In turn, women found female faces more attractive and men found male faces more attractive, because they belonged to those groups.

As with the artworks, the question regarding familiarity could have been interpreted differently. It was therefore included as a binary predictor into the LMMs. Faces that were rated to be familiar—due to any reason—were rated to be more attractive and there was a

higher willingness to approach them. Other research supports this effect of familiarity on attractiveness (e.g. Peskin & Newell, 2004). To support our research question, familiarity should have had an interaction at least with height difference and sex of face: familiar faces might have been familiar at the vertical location "typical" for that person's sex. However, we did not find this. There were no other effects of familiarity.

Exploratory Analyses. Exploratively including relationship status as an additional fixed factor to the LMMs yielded no further findings. Rerunning the LMMs with only heterosexual individuals in the sample had no effect on significance levels of main effects or interactions. To say that those variables have no influence on the perception of faces in a vertical dimension might be invalid, since, after all, we did not find any effect of height difference for the faces in this study. Therefore, future studies might still include those variables to control for any possible effects.

Concerns and Limitations. Because there was no effect might be due to the chosen stimuli. Two-dimensional photographs were used, which showed a frontal view of a face, with straight eye gaze. First, a height difference might not change the perspective towards a two-dimensional photograph as it would change towards a three-dimensional face. Therefore, height might not have been experienced to a strong degree, because the faces were only experienced as randomly assigned to a location. Second, Main, DeBruine, Little, and Jones (2010) found that attractive, happy faces were rated as more attractive when in frontal, compared to a three-quarter view, suggesting an influence of perceived attention of the depicted face towards the viewer. These results led Burke and Sulikowski (2010, p. 575), on which this study is partially based on, to create their stimuli of faces tilted forward or backward with eyes looking at the viewer. This was not possible in the design of the current study, since participants differ in height, making it impossible to, for example, create face versions that have the face look up or down but being valid for all participants. In conclusion, the height might have been experienced as an arbitrary assignment of the straight-staring faces at the wall, because faces were not seen as being in the natural position of their height.

The latter point, of faces being not experienced as natural, might have also been influenced by the chosen position. With an image-center at 138.50 cm, a person would be experienced as unusually short; existing females or males experienced at that position would have a body height of roughly 150 cm. Although resembling relatively tall people with a body height of roughly 190 cm, the upper position (center at 178.50 cm) was more likely for both sexes. This is also connected to perceived body height, since faces give cues towards the assumed

body height of a person (e.g. Re, DeBruine, Jones & Perrett, 2013; Re & Perett, 2012). Therefore, some of the photographed faces might have been experienced as unusual in either the low or high condition. For example, by looking at a tall appearing male face, the low position would have been unlikely as depicting a real person.

On the other hand, it can be argued that those "extremes" could have also yielded an exaggeration of an existing average height difference between men and women, resulting in attitudes and experiences towards those extremes (see also Burke & Sulikowski, 2010, p. 583). Those extremes might also yield some sort of embodied version of the peak shift effect (Ramachandran & Hirstein, 1999). In conclusion, the chosen stimuli and hanging height can be justified from a theoretical point of view. However, as our results suggest, they did not cause an embodied effect of height difference towards them.

General Discussion

There was an effect of presentation order for both stimuli categories: artworks were rated to be more familiar, when presented after the faces. On the other hand, photographs of faces were rated to be more unfamiliar when presented after the artworks. These findings were unexpected. In total, looking at the means, faces were rated as more familiar than artworks. Therefore, it might be possible, that the ratings for familiarity of the first "block"—faces or artworks—were used as an anchor for following ratings. For example, the average participant, who saw artworks first, rated them as unfamiliar, and took the first ratings as an anchor for the faces, resulting in lower ratings of familiarity for them.

However, a framing-effect is also possible. The object category of the first seen stimuli was used to frame the following stimuli. The average person might have seen faces, which were rated to be more familiar, therefore the following artworks were perceived as more familiar because of a prime of familiar objects. On the other hand, after seeing artworks, faces might have been framed by an unfamiliar category and therefore perceived unfamiliar, too. In conclusion, this transfer effect for familiarity ratings could have been caused by prior ratings on the scale itself or by "priming" of a familiar or unfamiliar stimulus category. Future studies should pay attention to such effects of presentation order. Although only found for one dependent variable (for each experimental setting), order effects might influence study results.

Several things have to be mentioned as general criticism towards the study design. First, the room in which the experiment took place was located in an office area and usually used for group meetings. Therefore, it included large tables, chairs, and printers. As men-

tioned above, the tables with printers underneath were used as a disguise for the "high" condition. Additionally, a large table was positioned at the other side of the room in front of large shelves and chairs were stapled in the corner diametrically from the corner where the two walls with the stimuli met. We tried to make the impression of a tidied-up room, however it might also have appeared as disordered or organized as a box room. This might be of importance for the artworks, because context has an impact on the perception of art (see Leder et al., 2004; Leder, 2013).

Second, using the tables might have diminished a metaphorical effect (artworks) or an effect of height (faces). The tables were used to give a plausible explanation for the height difference; therefore—as intended—the height difference was possibly attributed to the interior. However, theoretically, this perception might differ from unconsciously experiencing a height difference as given, so without any physical explanation for it. As mentioned above, nine participants were excluded, because they indicated hanging height to be the study goal. This was done because Lee and Schwarz (2014, p. 102) suggest that metaphorical effects of bodily experience might be strongest, when unconsciously perceived. A table as a "natural" explanation might have interfered with this.

Third, as mentioned, in the "high" condition, tables (with printers underneath) were used as a disguise for the manipulation of height. However, it is possible, that the height difference might not have been experienced so strongly: the tables might have been used as a new reference point, giving the impression of being low relative to the tables. However, this point concerns a "pure", not necessarily embodied, cognitive effect of linking the vertical dimension and affect, since the body posture—and with it the change of viewing angles—were not affected by the tables. As already discussed above, the tables might have also changed the perception of the artworks, because artworks in the low condition were presented "on their own", whereas artworks in the high position had a table in front of them. Without a table underneath, artworks could have appeared more prominent; alternatively, tables were distracting while viewing high hanging artworks. This might be an alternative explanation for the found main effect of height difference for art quality.

Fourth, I, as the experimenter, sat at a large table throughout the whole experiment. Although I tried to focus in another direction (towards the opposite wall/ corner), the participants might have felt observed or monitored during the experiment. To which extent this influenced the participant's behaviour is not clear. However, research suggests that (the feeling

of) being watched has an influence on cognition (Yu, Tseng, Muggleton, & Juan, 2015) and might elicit negative affect (Panagopoulos & van der Linden, 2017).

A future study could investigate the hanging height in a plain setting, with only the stimuli in the room. A different presentation height might be more obvious in that case, so a between-subjects-design could be used. To my knowledge, this was the first study that investigated this kind of research questions in a "real" setting with "real" viewing angles towards the stimuli. Although several things can be criticized, the current study gave a setting with higher ecological validity, than, for example, studies at the computer.

Conclusion

In this study, we investigated effects of viewing angle towards stimuli. For the object category of artworks, we hypothesized that interactive effects congruent with the conceptual metaphor of "Positive = Up/ Negative = Down" would be found. The expected hypothesis could not be supported with our results; however, there were effects of, for example, viewing angle influencing perception of art quality, and interactions with familiarity and sex. Interactions of pre-rated valence and height difference were found by further exploring the data, however, this interaction was not as expected. For faces, we expected, that a hanging of photographs congruent with the "typical" height difference of men and women (with men being taller than women), would interact with one's own sex and viewing angle towards it, as being experienced to be more attractive, etc. We did not find support for that hypothesis. However, the current study gave several findings that are worth in following up and shows the importance of factors like height for some object categories.

References

Ansorge, U., & Bohner, G. (2013). Investigating the association between valence and elevation with an implicit association task that requires upward and downward responding. *Universitas Psychologica, 12,* 1453-1471. doi:10.11144/Javeriana.UPSY12-5.iave

Barsalou, L. (2008). Grounded cognition. *Annual Review of Psychology, 59,* 617-645. doi:10.1146/annurev.psych.59.103006.093639

Barsalou, L. (2010). Grounded cognition: Past, present, and future. *Topics in Cognitive Science, 2*, 716-724. doi:10.1111/j.1756-8765.2010.01115.x

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1-48. doi:10.18637/jss.v067.i01.

Bennett, K. M., Latto, R., Bertamini, M., Bianchi, I., & Minshull, S. (2010). Does left-right orientation matter in the perceived expressiveness of pictures? A study of Bewick's animals (1753-1828). *Perception, 39,* 970-981. doi:10.1068/p6624

Bianchin, M., & Angrilli, A. (2012). Gender differences in emotional responses: A psychophysiological study. *Physiology & Behavior, 105,* 925-932. doi:10.1016/j.physbeh.2011.10.031

Burke, D., & Sulikowski, D. (2010). A new viewpoint on the evolution of sexually dimorphic human faces. *Evolutionary Psychology, 8,* 573-585. doi:10.1177/147470491000800404

Chandler, J., & Schwarz, N. (2009). How extending your middle finger affects your perception of others: Learned movements influence concept accessibility. *Journal of Experimental Social Psychology, 45,* 123-128. doi:10.1016/j.jesp.2008.06.012

Crawford, L. E. (2009). Conceptual metaphors of affect. *Emotion Review, 1,* 129-139. doi:10.1177/1754073908100438

Crawford, L. E., Cohn, S. M., & Kim, A. B. (2014). "Good is up" is not always better: A memory advantage for words in metaphor-incompatible locations. *PLoS ONE, 9*(9), 1-5. doi:10.1371/journal.pone.0108269

Crawford, L. E., Margolies, S. M., Drake, J. T., & Murphy, M. E. (2006). Affect biases memory of location: Evidence for the spatial representation of affect. *Cognition and Emotion, 20,* 1153-1169. doi:10.1080/02699930500347794

Dai, X., Brendl, C. M., & Ariely, D. (2010). Wanting, liking, and preference construction. *Emotion, 10,* 324-334. doi:10.1037/a0017987

Eskine, K. J., Kacinik, N. A., & Prinz, J. J. (2012). Stirring images: Fear, not happiness or arousal, makes art more sublime. *Emotion, 12,* 1072-1074. doi:10.1037/a0027200

Freedberg, D., & Gallese, V. (2007). Motion, emotion and empathy in esthetic experience. *Trends in Cognitive Sciences, 11,* 197-203. doi:10.1016/j.tics.2007.02.003

Geldart, S. (2008). Tall and good-looking? *Journal of Individual Differences, 29,* 148-156. doi:10.1027/1614-0001.29.3.148

Geldart, S. (2011). Perceptions of attractiveness in female adolescents, university students, and mothers with experience viewing immature faces. *European Journal of Developmental Psychology, 8,* 295-310. doi:10.1080/17405629.2010.490028

Gerger, G., Leder, H., & Kremer, A. (2014). Context effects on emotional and aesthetic evaluations of artworks and IAPS pictures. *Acta Psychologica, 151,* 174-183. doi:10.1016/j.actpsy.2014.06.008

Giessner, S. R., Ryan, M. K., Schubert, T. W., & van Quaquebeke (2011). The power of pictures: Vertical picture angles in power pictures. *Media Psychology, 14,* 442-464. doi:10.1080/15213269.2011.620541

Granié, M.-A. (2009). Effects of gender, sex-stereotype conformity, age and internalization on risk-taking among adolescent pedestrians. *Safety Science, 47,* 1277-1283. doi:10.1016/j.ssci.2009.03.010

Hoffner, C. A., & Levine, K. J. (2005). Enjoyment of mediated fright and violence: A meta-analysis. *Media Psychology, 7,* 207-237. doi:10.1207/ S1532785XMEP0702_5

Horstman, G., & Ansorge, U. (2011). Compatibility between tones, head movements, and facial expressions. *Emotion, 11,* 975-980. doi:10.1037/a0023468

Hunter, P. G., Schellenberg, E. G., & Griffith, A. T. (2011). Misery loves company: Mood-congruent emotional responding to music. *Emotion, 11,* 1068-1072. doi:10.1037/a0023749

Kirsch, L., Urgesi, C., & Cross, E. (2016). Shaping and reshaping the aesthetic brain: Emerging perspectives on the neurobiology of embodied aesthetics. *Neuroscience and Biobehavioral Reviews, 62,* 56-68. doi:10.1016/j.neubiorev.2015.12.005

Kreplin, U., Thoma, V., & Rodway, P. (2014). Looking behaviour and preference for artworks: The role of emotional valence and location. *Acta Psychologica, 152,* 100-108. doi:10.1016/j.actpsy.2014.08.003

Kret, M. E., & De Gelder, B. (2012). A review on sex differences in processing emotional signals. *Neuropsychologia, 50,* 1211-1221. doi:10.1016/j.neuropsychologia.2011.12.022

Krishna, A., & Schwarz, N. (2014). Sensory marketing, embodiment, and grounded cognition: A review and introduction. *Journal of Consumer Psychology, 24,* 159-168. doi:10.1016/j.jcps.2013.12.006

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2016). lmerTest: Tests in linear mixed effects models (R package version 2.0-33) [Computer software]. Retrieved from http://CRAN.R-project.org/package=lmerTest

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. The University of Chicago Press: Chicago and London.

Landau, M. J., Robinson, M. D., & Meier, B. P. (2014). Introduction. In M. J. Landau, M. D. Robinson, & B. P. Meier (Eds.), *The power of metaphor: Examining its influence on social life* (pp. 3-16). Washington, DC: American Psychological Association.

Lange, W., & Windel, A. (2013). *Kleine ergonomische Datensammlung* (15th ed.) [Short ergonomic data collection]. Dortmund: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin.

Leder, H. (2001). Determinants of preference: When do we like what we know? *Empirical Studies of the Arts, 19,* 201-211. doi:10.2190/5TAE-E5CV-XJAL-3885

Leder, H. (2013). Next steps in neuroaesthetics: Which processes and processing stages to study? *Psychology of Aesthetics, Creativity, and the Arts, 7,* 27-37. doi:10.1037/a0031585

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

Leder, H., Gerger, G., Brieber, D., & Schwarz, N. (2014). What makes an art expert? Emotion and evaluation in art appreciation. *Cognition and Emotion, 28*, 1137-1147. doi:10.1080/02699931.2013.870132

Leder, H., Ring, A., & Dressler, S. G. (2013). See me, feel me! Aesthetic evaluations of art portraits. *Psychology of Aesthetics, Creativity, and the Arts, 7*, 358-369. doi:10.1037/a0033311

Lee, S. W. S., & Schwarz, N. (2012). Bidirectionality, mediation, and moderation of metaphorical effects: The embodiment of social suspicion and fishy smells. *Journal of Personality and Social Psychology, 103*, 737-749. doi:10.1037/a0029708

Lee, S. W. S., & Schwarz, N. (2014). Metaphor in judgment and decision making. In M. J. Landau, M. D. Robinson, & B. P. Meier (Eds.), *The power of metaphor: Examining its influence on social life* (pp. 85-108). Washington, DC: American Psychological Association.

Lindell, A. K., & Mueller, J. (2011). Can science account for taste? Psychological insights into art appreciation. *Journal of Cognitive Psychology, 23*, 453-475. doi:10.1080/20445911.2011.539556

Lippa, R. (2013). Men and women with bisexual identities show bisexual patterns of sexual attraction to male and female "swimsuit models". *Archives of Sexual Behavior, 42*, 187-196. doi:10.1007/s10508-012-9981-z

Lithari, C., Frantzidis, C. A., Papadelis, C., Vivas, A. B., Klados, M. A., Kourtidou-Papadeli, C., . . . Bamidis, P. D. (2010). Are females more responsive to emotional stimuli? A neurophysiological study across arousal and valence dimensions. *Brain Topography, 23*, 27-40. doi:10.1007/s10548-009-0130-5

Livingstone, S. R., & Palmer, C. (2016). Head movements encode emotions during speech and song. *Emotion, 16*, 365-380. doi:10.1037/emo0000106

Lynott, D., & Coventry, K. (2014). On the ups and downs of emotion: Testing between conceptual-metaphor and polarity accounts of emotional valence-spatial location interactions. *Psychonomic Bulletin & Review, 21*, 218-226. doi:10.3758/s13423-013-0481-5

Madey, S. F., Simo, M., Dillworth, D., Kemper, D., Toczynski, A., & Perella, A. (1996). They do get more attractive at closing time, but only when you are not in a relation-

ship. *Basic and Applied Social Psychology, 18*, 387-393. doi:10.1207/s15324834basp1804_2

Mahieu, T., Corneille, O., & Yzerbyt, V. (2014). The influence of a verticality metaphor in the processing of happy and sad faces. *Revue Internationale de Psychologie Sociale, 27*(2), 51-77.

Main, J. C., DeBruine, L. M., Little, A. C., & Jones, B. C. (2010). Interactions among the effects of head orientation, emotional expression, and physical attractiveness on face preferences. *Perception, 39*, 62-71. doi:10.1068/p6503

Mather, G. (2012). Aesthetic judgement of orientation in modern art. *i-Perception, 3*, 18-24. doi:10.1068/i0447aap

McLean, C. P., & Anderson, E. R. (2009). Brave men and timid women? A review of the gender differences in fear and anxiety. *Clinical Psychology Review, 29*, 496-505. doi:10.1016/j.cpr.2009.05.003

Meier, B. P., & Dionne, S. (2009). Downright sexy: Verticality, implicit power, and perceived physical attractiveness. *Social Cognition, 27*, 883-892. doi:10.1521/soco.2009.27.6.883

Meier, B. P., & Robinson, M. D. (2004). Why the sunny side is up: Associations between affect and vertical position. *Psychological Science, 15*, 243-237. doi:10.1111/j.0956-7976.2004.00659.x

Meier, B. P., & Robinson, M. D. (2005). The metaphorical representation of affect. *Metaphor and Symbol, 20*, 239-257. doi:10.1207/s15327868ms2004_1

Meier, B. P., & Robinson, M. D. (2006). Does “feeling down“ mean seeing down? Depressive symptoms and vertical selective attention. *Journal of Research in Personality, 40*, 451- 461. doi:10.1016/j.jrp.2005.03.001

Meier, B. P., Schnall, S., Schwarz, N., & Bargh, J. A. (2012). Embodiment in social psychology. *Topics in Cognitive Science, 4*, 705-716.

Menninghaus, W., Wagner, V., Hanich, J., Wassiliwizky, E., Jacobsen, T., & Koelsch, S. (in press). The distancing-embracing model of the enjoyment of negative emotions in art reception. *Behavioral and Brain Sciences*, 1-58. doi:10.1017/S0140525X17000309

Michalak, J., Mischnat, J., & Teisman, T. (2014). Sitting posture makes a difference – Embodiment effects on depressive memory bias. *Clinical Psychology and Psychotherapy, 21*, 519-524. doi:10.1002/cpp.1890

Mignault, A., & Chaudhuri, A. (2003). The many faces of a neutral face: Head tilt and perception of dominance and emotion. *Journal of Nonverbal Behavior, 27*, 111-132. doi:10.1023/A:1023914509763

Mitrovic, A., Tinio, P. P. L., & Leder, H. (2016). Consequences of beauty: Effects of rater sex and sexual orientation on the visual eploration and evaluation of attractiveness in real world scenes. *Frontiers in Human Neuroscience, 10*, 1-10. doi:10.3389/fnhum.2016.00122

Niedenthal, P. M. (2007). Embodying emotion. *Science, 316*, 1002-1005. doi:10.1126/science.1136930

O'Malley, E., Seror, G. A. III., & Friedman, R. S. (2016). Reinvestigating affect-congruency in music choice: Does misery really love company? *Psychomusicology: Music, Mind, and Brain, 26*, 67-78. doi:10.1037/pmu0000114

Panagopoulos, C., & van der Linden, S. (2017). The feeling of being watched: Do eye cues elicit negative affect? *North American Journal of Psychology, 19*, 113-121.

Peper, E., & Lin, I. (2012). Increase or decrease depression: How body postures influence your energy level. *Biofeedback, 40*, 125-130. doi:10.5298/1081-5937-40.3.01

Peskin, M., & Newell, F. N. (2004). Familiarity breeds attraction: Effects of exposure on the attractiveness of typical and distinctive faces. *Perception, 33*, 147-157. doi:10.1068/p5028

Price, T. F., & Harmon-Jones, E. (2010). The effect of embodied emotive states on cognitive categorization. *Emotion, 10*, 934-938. doi:10.1037/a0019809

R Development Core Team (2008). R: A language and environment for statistical computing. R Foundation for Statistical Computing [Computer software]. Location: Vienna, Austria. URL: http://www.R-project.org

Ramachandran, V., & Hirstein, W. (1999). The science of art: A neurological theory of aesthetic experience. *Journal of Consciousness Studies, 6*(6-7), 15-51.

Re, D. E., & Perrett, D. I. (2012). Concordant preferences for actual height and facial cues to height. *Personality and Individual Differences, 53*, 901-906. doi:10.1016/j.paid.2012.07.001

Re, D. E., DeBruine, L. M., Jones, B. C., & Perrett, D. I. (2013). Facial cues to perceived height influence leadership choices in simulated war and peace contexts. *Evolutionary Psychology, 11*, 89-103. doi:10.1177/147470491301100109

Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and Social Psychology Review, 8*, 364-382. doi:10.1207/s15327957pspr0804_3

Salska, I., Frederick, D. A., Pawlowski, B., Reilly, A. H., Laird, K. T., & Rudd, N. A. (2008). Conditional mate preferences: Factors influencing preferences for height. *Personality and Individual Differences, 44*, 203-215. doi:10.1016/j.paid.2007.08.008

Schacht, A., Werheid, K., & Sommer, W. (2008). The appraisal of facial beauty is rapid but not mandatory. *Cognitive, Affective, & Behavioral Neuroscience, 8*, 132-142. doi:10.3758/CABN.8.2.132

Statistisches Bundesamt (2014). *Mikrozensus – Fragen zur Gesundheit: Körpermaße der Bevölkerung 2013* [Microcensus – Questions concerning health: Body measurements of the population 2013]. Wiesbaden: Author.

Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology, 64*, 211-220. doi:10.1037/0022-3514.64.2.211

Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and faciliating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology, 54*, 768-777. doi:10.1037/0022-3514.54.5.768

Sulikowski, D., Burke, D., Havlíček, & Roberts, C. (2015). Head tilt and fertility contribute to different aspects of female facial attractiveness. *Ethology, 121*, 1002-1009. doi:10.1111/eth.12412

Swami, V., Furnham, A., Balakumar, N., Williams, C., Canaway, K., & Stanistreet, D. (2008). Factors influencing preferences for height: A replication and extension. *Personality and Individual Differences, 45*, 395-400. doi:10.1016/j.paid.2008.05.012

van Paasschen, J., Bacci, F., & Melcher, D. P. (2015). The influence of art expertise and training on emotion and preference ratings for representational and abstract artworks. *Plos ONE, 10*, 1-21. doi:10.1371/journal.pone.0134241

Wagenmakers, E.-J., Beek, T., Dijkhoff, L., Gronau, Q. F., Acosta, A., Adams, R. B., Jr., . . . Zwaan, R. A. (2016). Registered replication report: Strack, Martin, & Stepper (1988). *Perspectives on Psychological Science, 11*, 917-928. doi:10.1177/1745691616674458

Wagner, V., Menninghaus, W., Hanich, J., & Jacobsen, T. (2014). Art schema effects on affective experience: The case of disgusting images. *Psychology of Aesthetics, Creativity, and the Arts, 8*, 120-129. doi:10.1037/a0036126

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070. doi:10.1037/0022-3514.54.6.1063

Wilson, V. E., & Peper, E. (2004). The effects of upright and slumped postures on the recall of positive and negative thoughts. *Applied Psychophysiology and Biofeedback, 29*, 189-195.

Yu, J., Tseng, P., Muggleton, N. G., & Juan, C.-H. (2015). Being watched by others eliminates the effect of emotional arousal on inhibitory control. *Frontiers in Psychology, 6*, 6-10. doi:10.3389/fpsyg.2015.00004

Zavoyskiy, S., Taylor, C. L., & Friedman, R. S. (2016). Affect-incongruency in emotional responses to music. *Psychomusicology: Music, Mind, and Brain*, *26*, 247-256. doi:10.1037/pmu0000156

Figure Index

Table Index

List of abbreviations

CMT	Conceptual Metaphor Theory
KIF	Kunstinteresse-Fragebogen (Art-Interest-Questionnaire)
LMM	Linear Mixed Model
PANAS	Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988)
PU/ND	Positive = Up/ Negative = Down

Appendix A

Table A1

Latin Square Design: Conditions (Order) of the Artworks

	Position of the artwork			
Condition	Position 1	Position 2	Position 3	Position 4
1	A	B	C	D
2	B	C	D	A
3	C	D	A	B
4	D	A	B	C

Note: Conditions were approximately balanced across all 96 participants. Letters indicate the artwork-ID, with A and C resembling the positive artworks, and B and D resembling the negative artworks. Artworks were rated from left to right. During the first half of testing, positions 1 and 2 were in the low vertical position, which changed during the second half of testing (see text).

Table A2

Latin Square Design: Conditions (Order) of the Faces

	Position (Pos.) of the face							
Condition	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8
1	A	B	C	D	E	F	G	H
2	B	C	D	E	F	G	H	A
3	C	D	E	F	G	H	A	B
4	D	E	F	G	H	A	B	C
5	E	F	G	H	A	B	C	D
6	F	G	H	A	B	C	D	E
7	G	H	A	B	C	D	E	F
8	H	A	B	C	D	E	F	G

Note: Conditions were approximately balanced across all 96 participants. Letters indicate the face-ID, with A and E resembling attractive male faces, B and F resembling attractive female faces, C and G resembling less attractive male faces, and D and H resembling less attractive female faces. Faces were rated from left to right. During the first half of testing, positions 1-4 were in the high vertical position, which changed during the second half of testing (see text).

Appendix B

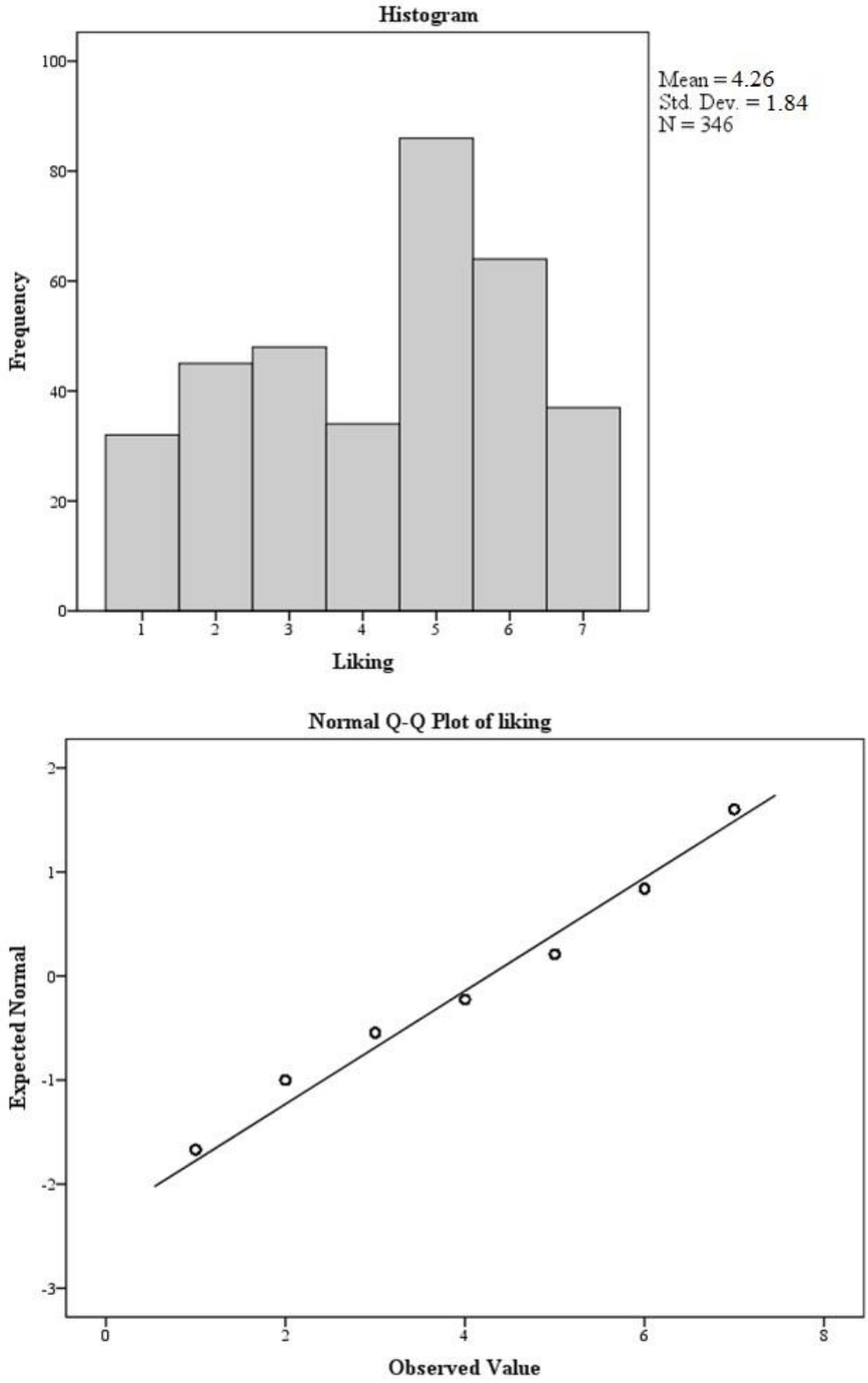

Figure B1. Histogram and Q-Q Plot of liking (artworks). Number of observations N = 346 results from one missing value.

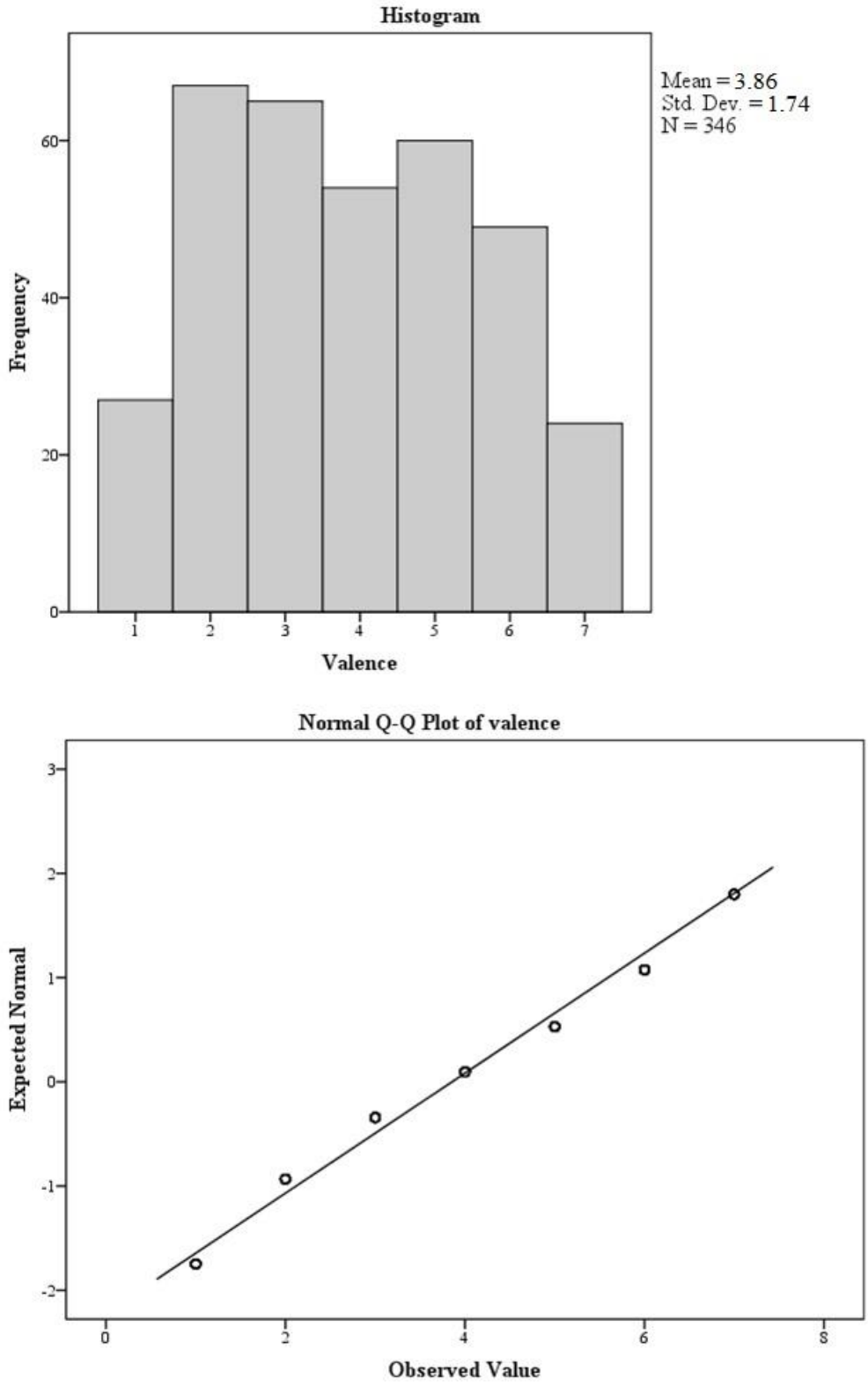

Figure B2. Histogram and Q-Q Plot of valence (artworks). Number of observations N = 346 results from one missing value.

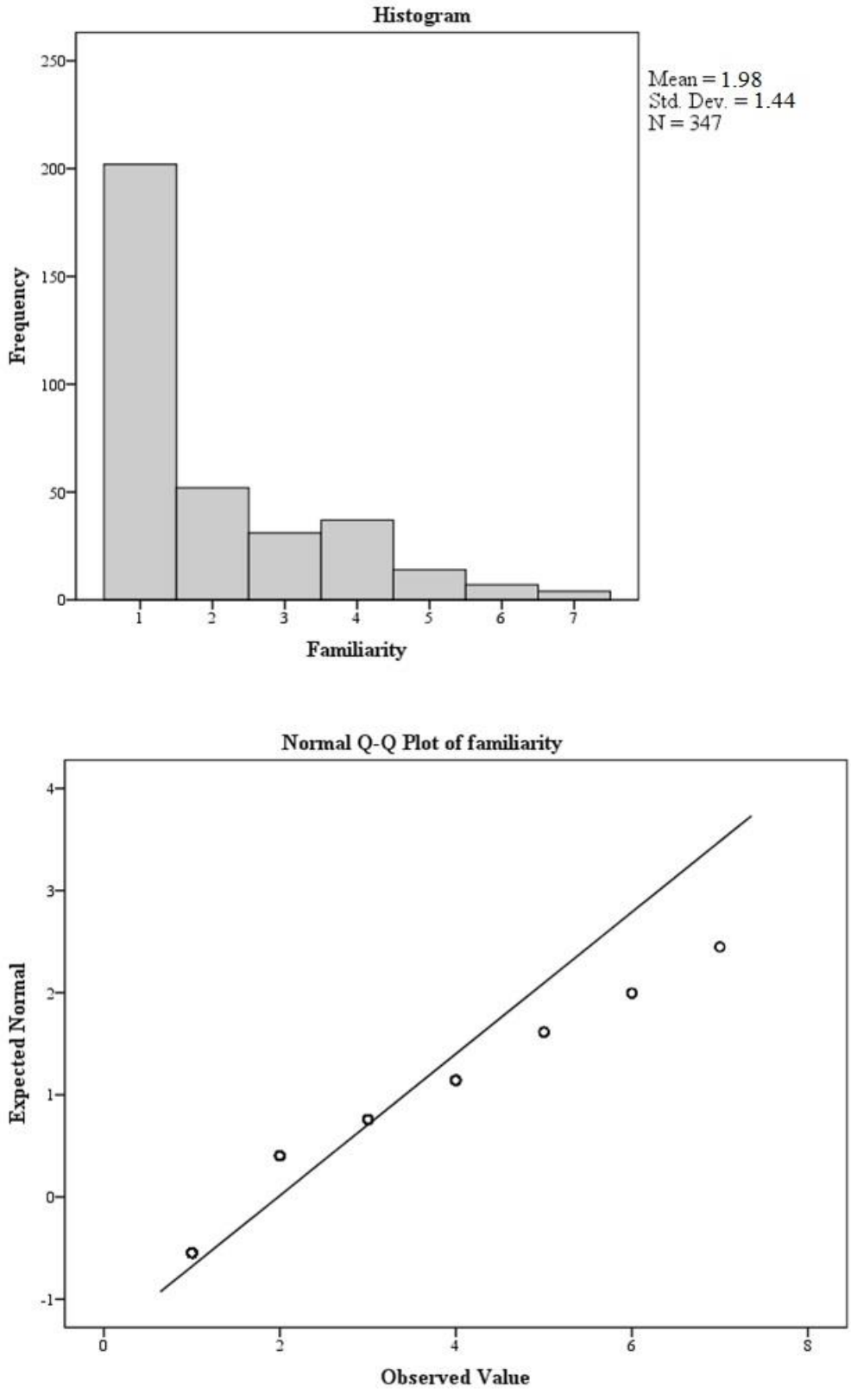

Figure B3. Histogram and Q-Q Plot of familiarity (artworks).

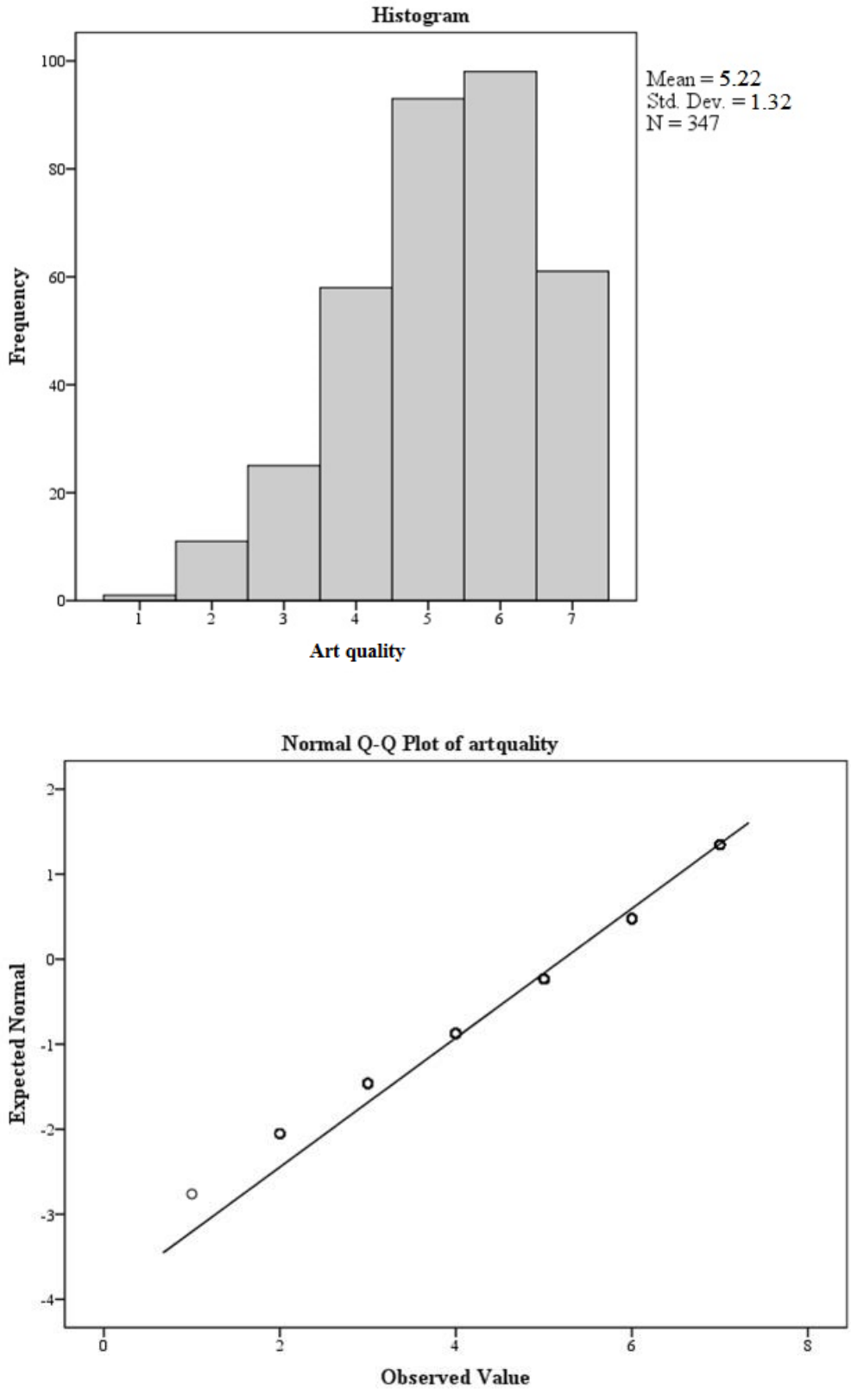

Figure B4. Histogram and Q-Q Plot of art quality (artworks).

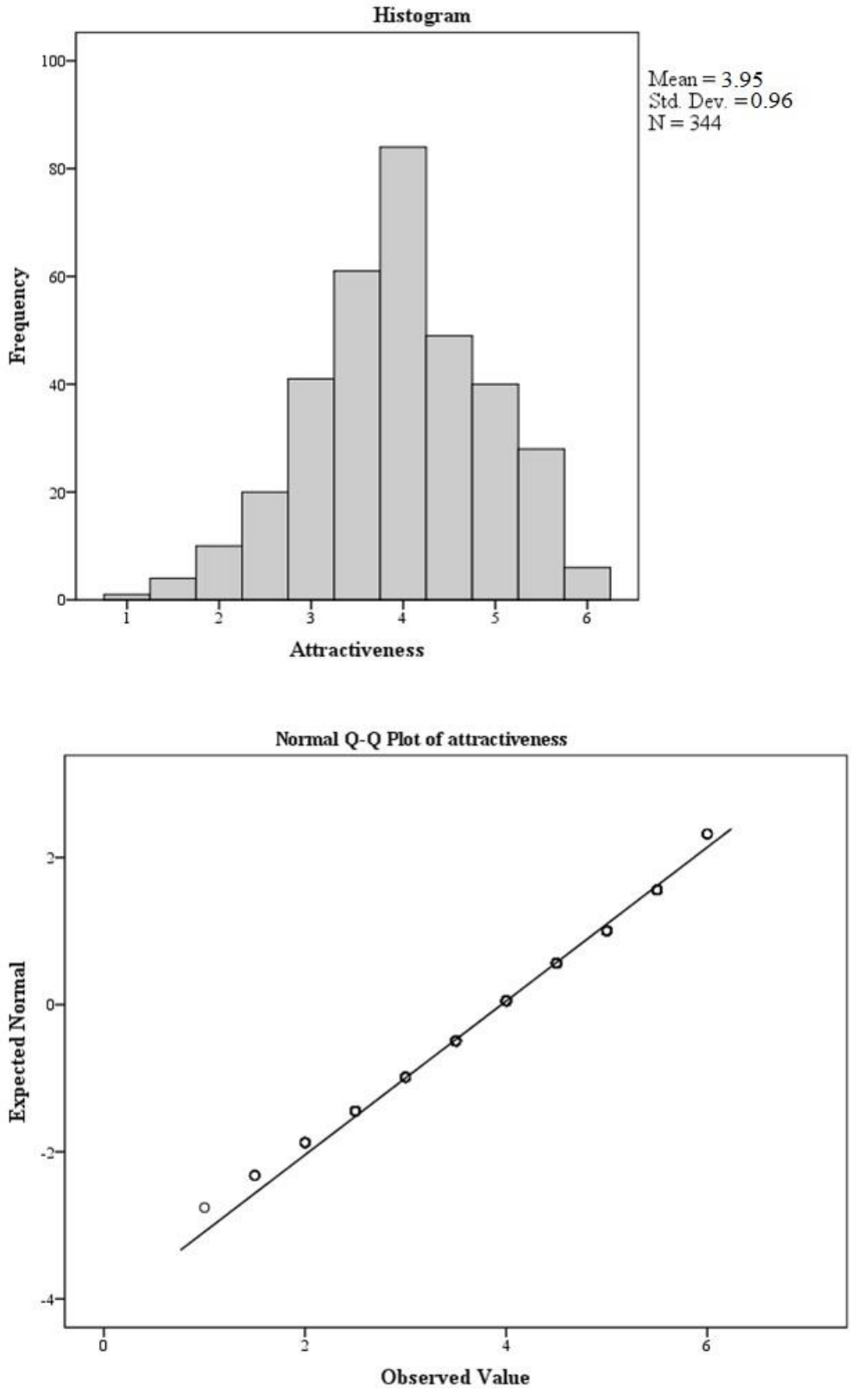

Figure B5. Histogram and Q-Q Plot of attractiveness (faces).

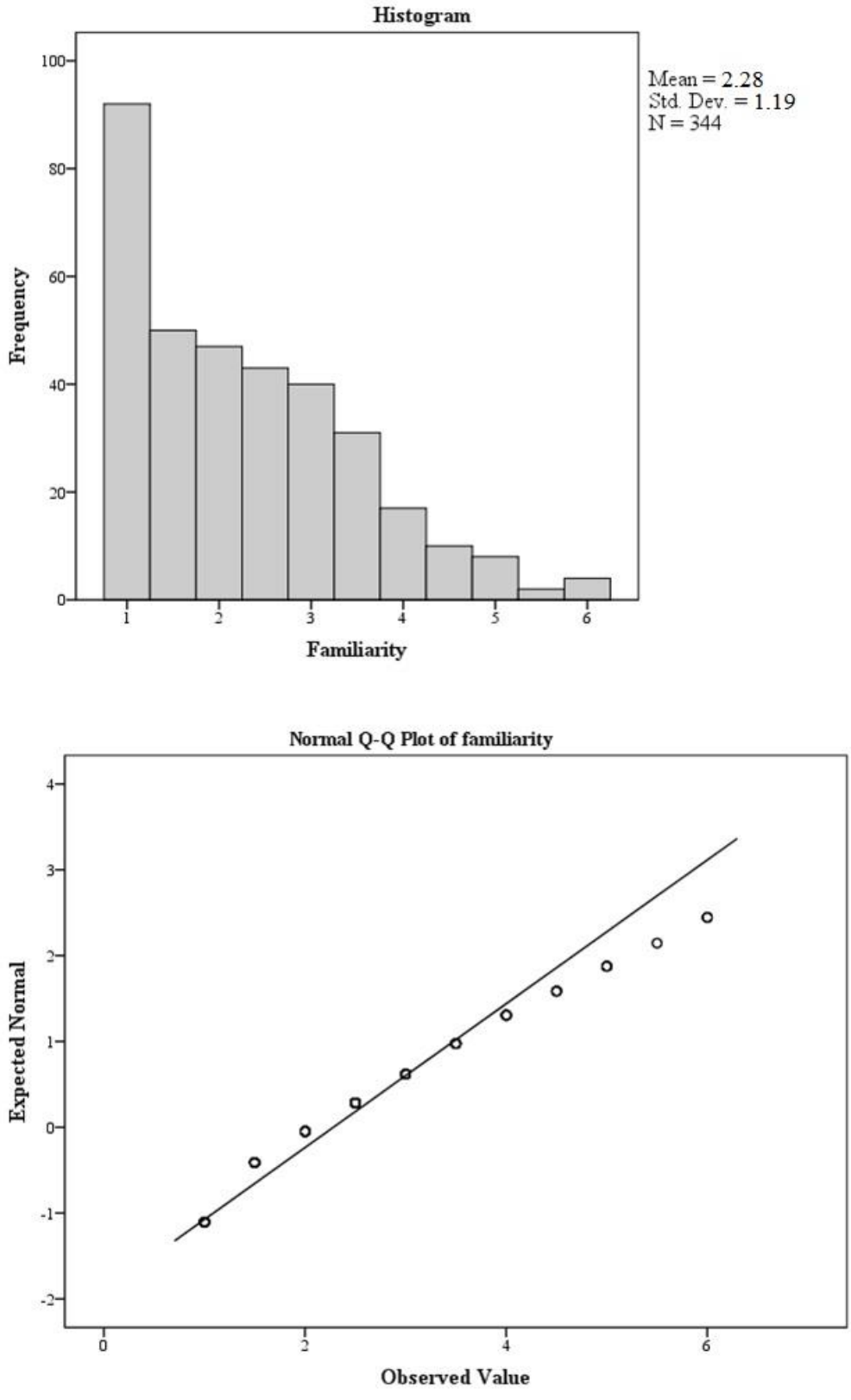

Figure B6. Histogram and Q-Q Plot of familiarity (faces).

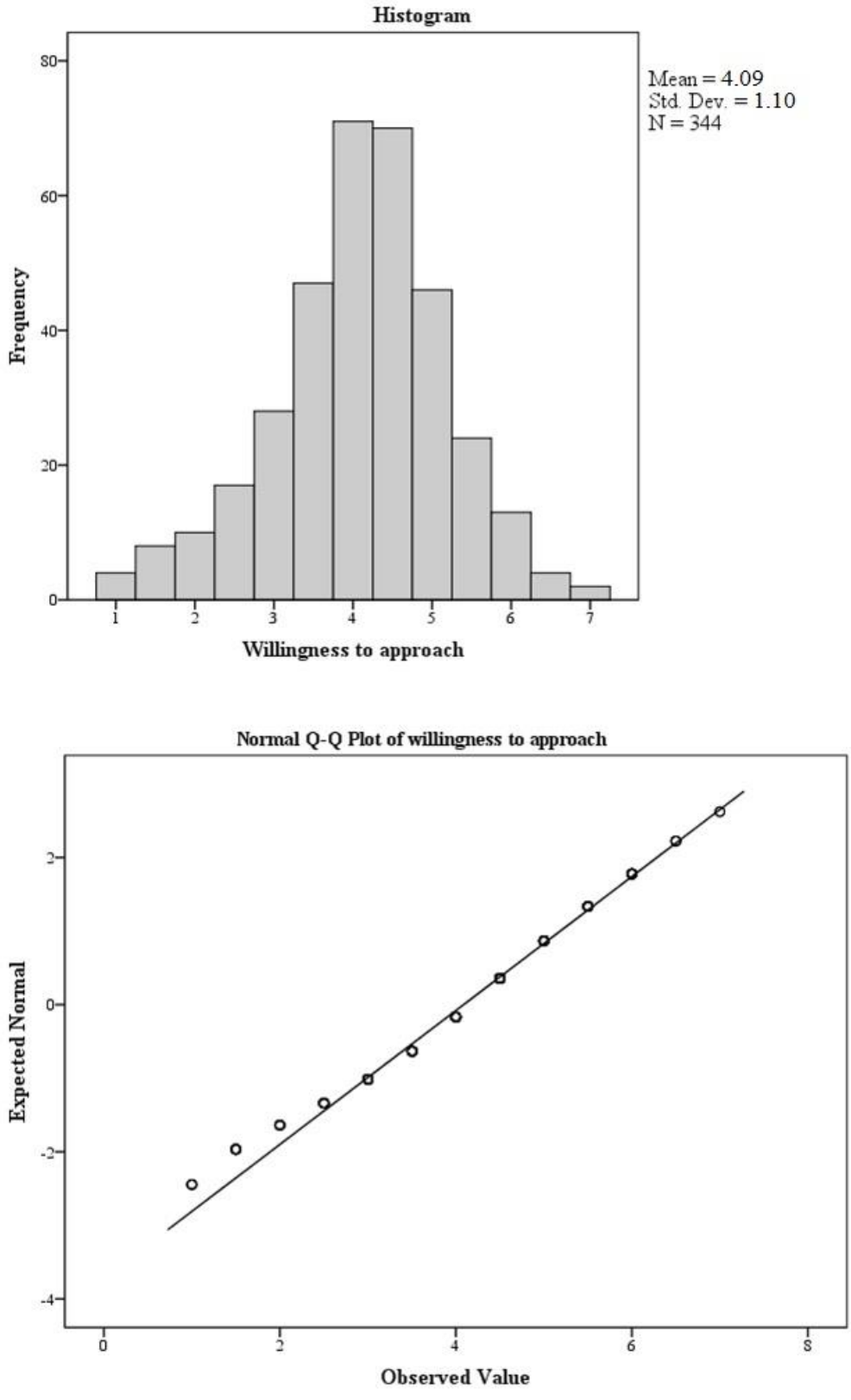

Figure B7. Histogram and Q-Q Plot of willingness to approach (faces).

Appendix C

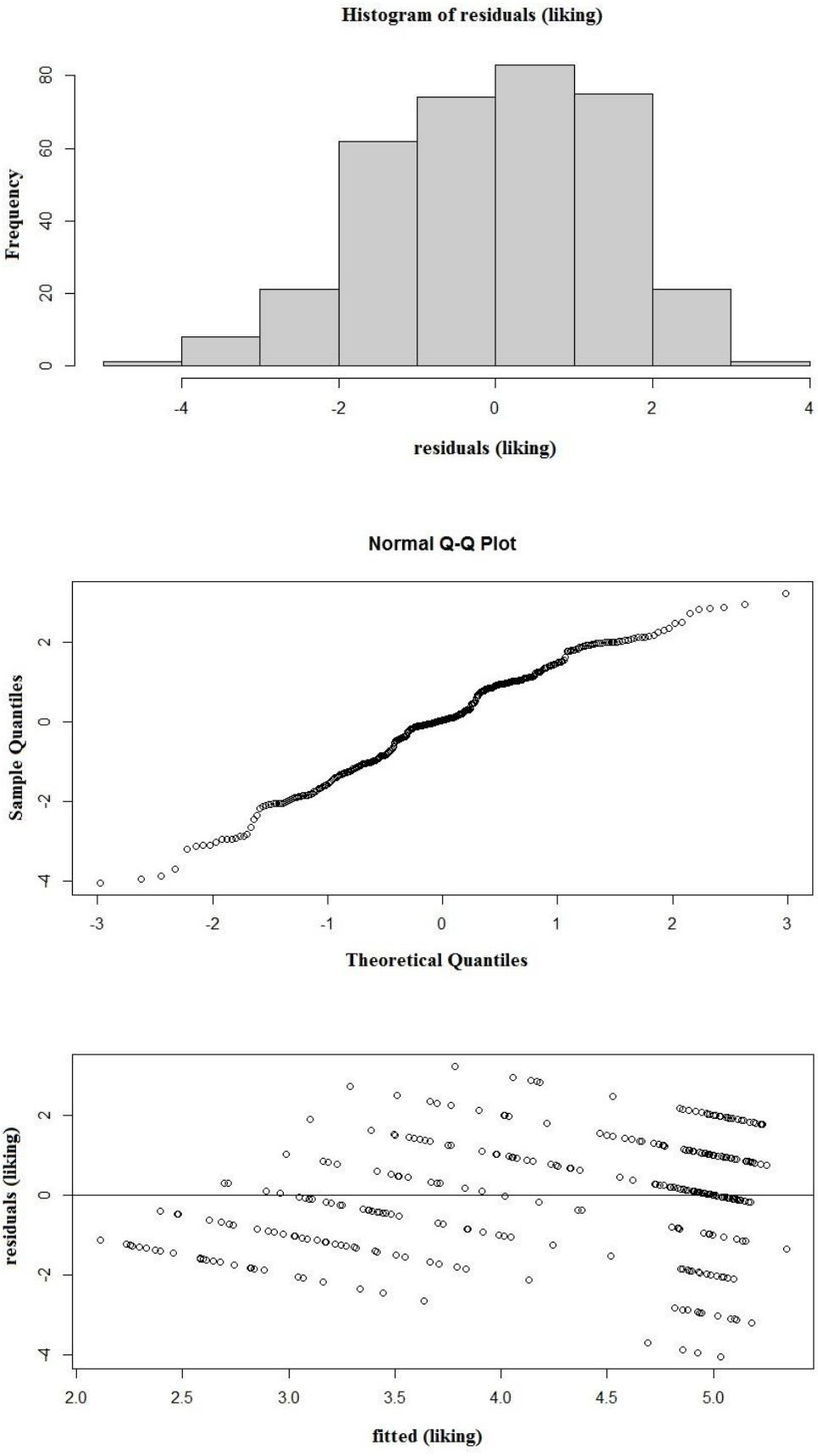

Figure C1. Histogram, QQ-Plot and residual plot of the residuals for liking (in the main analysis for artworks).

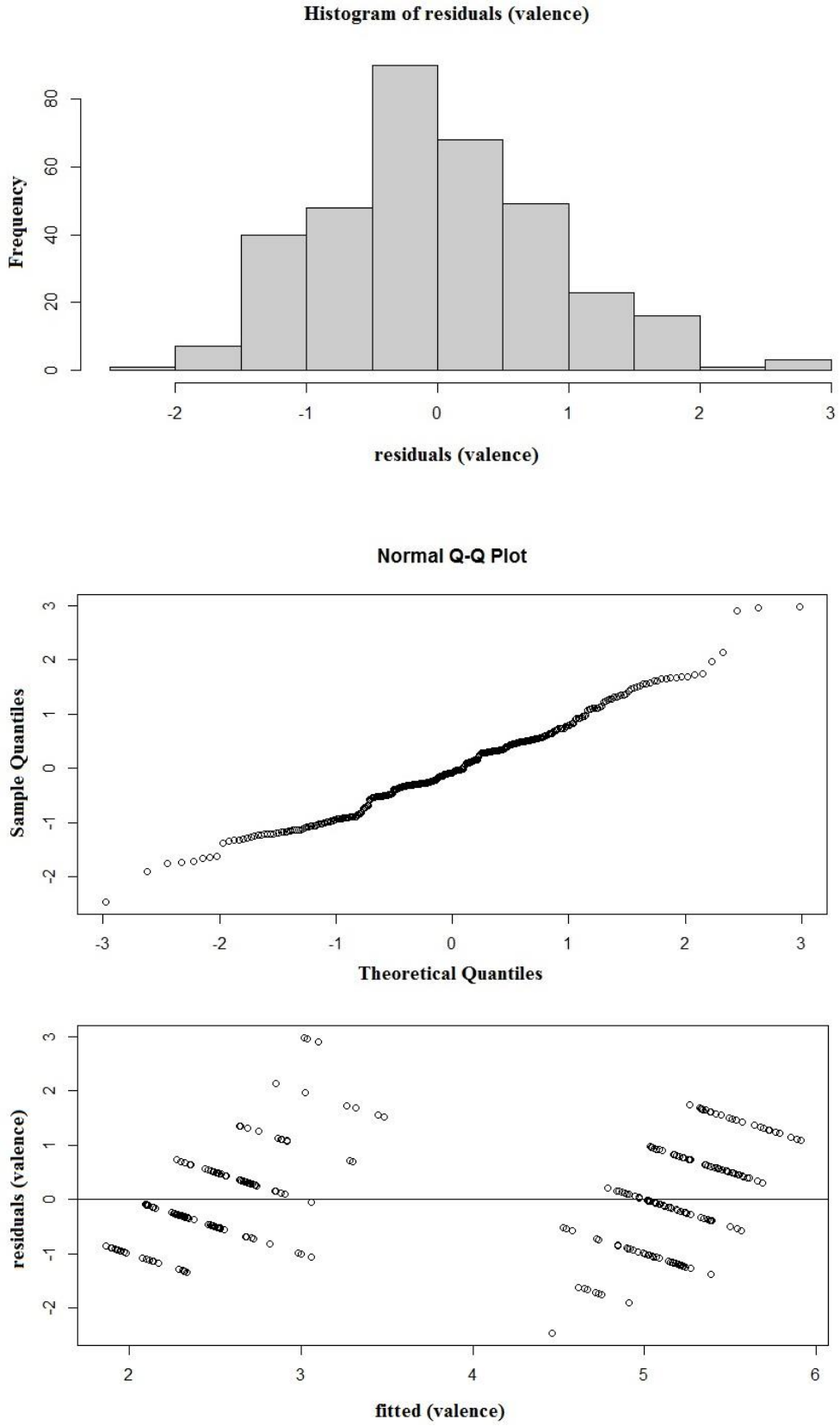

Figure C2. Histogram, QQ-Plot and residual plot of the residuals for valence (in the main analysis for artworks).

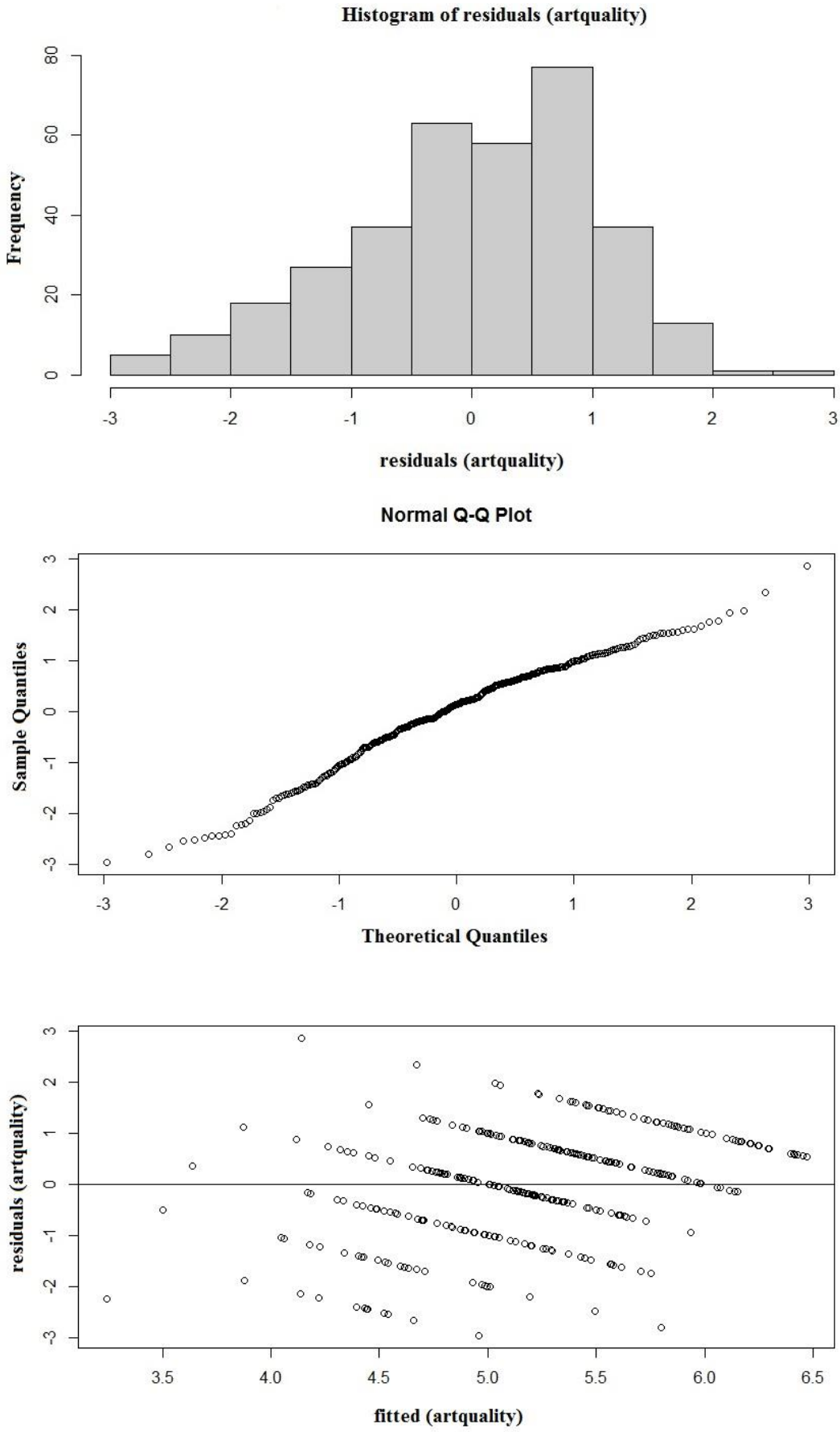

Figure C3. Histogram, QQ-Plot and residual plot of the residuals for art quality (in the main analysis for artworks).

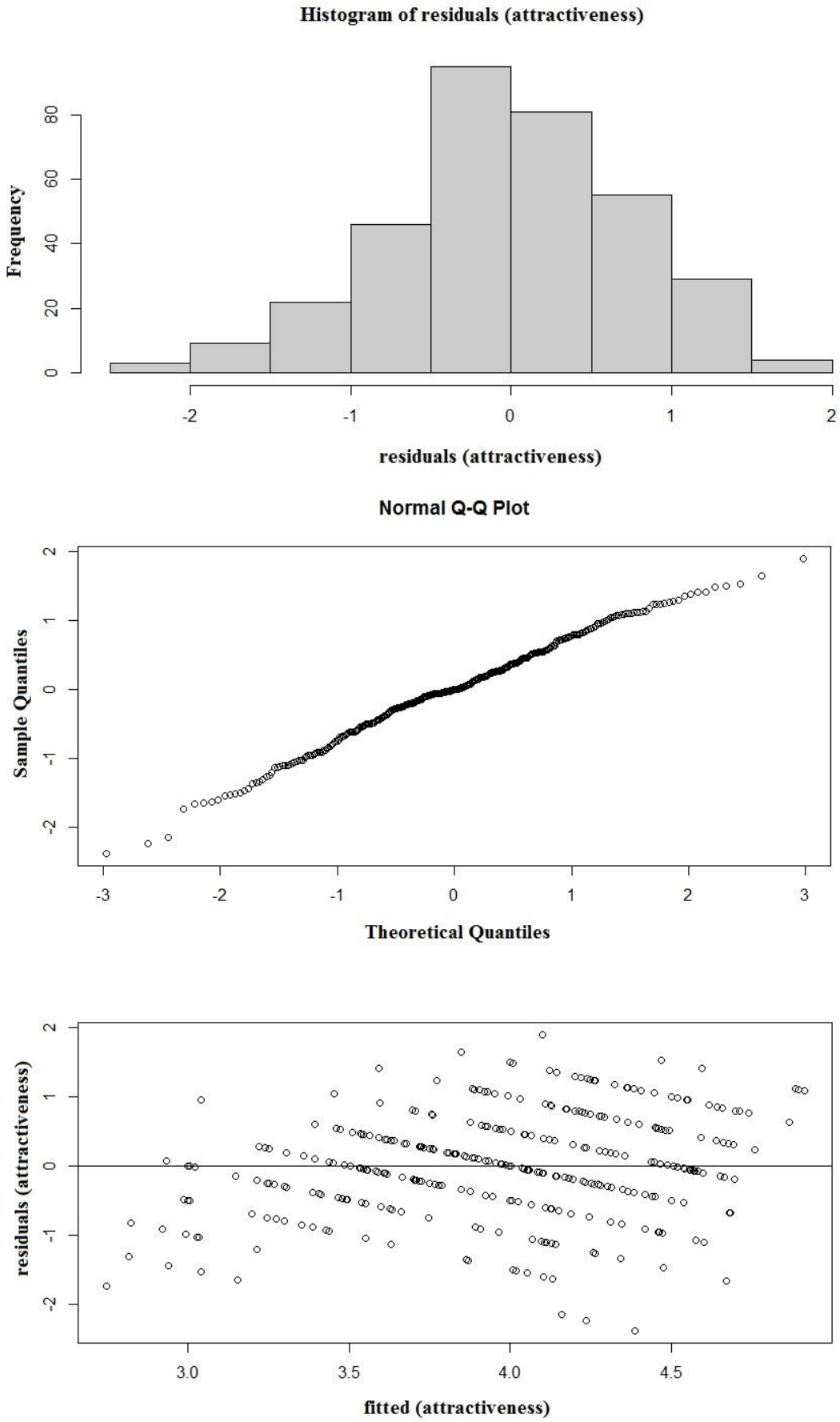

Figure C4. Histogram, QQ-Plot and residual plot of the residuals for attractiveness (in the main analysis for faces).

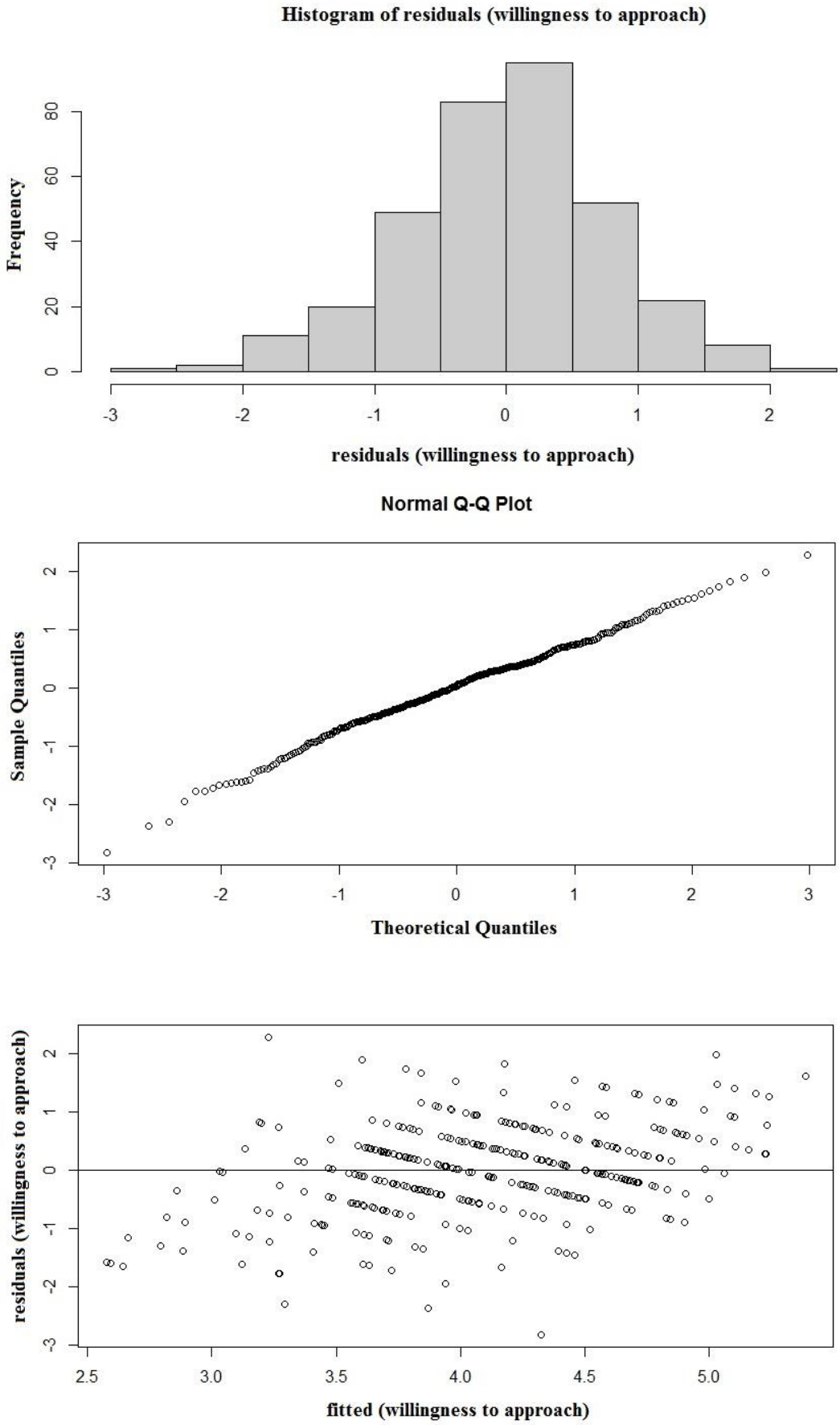

Figure C5. Histogram, QQ-Plot and residual plot of the residuals for willingness to approach (in the main analysis for faces).

Appendix D

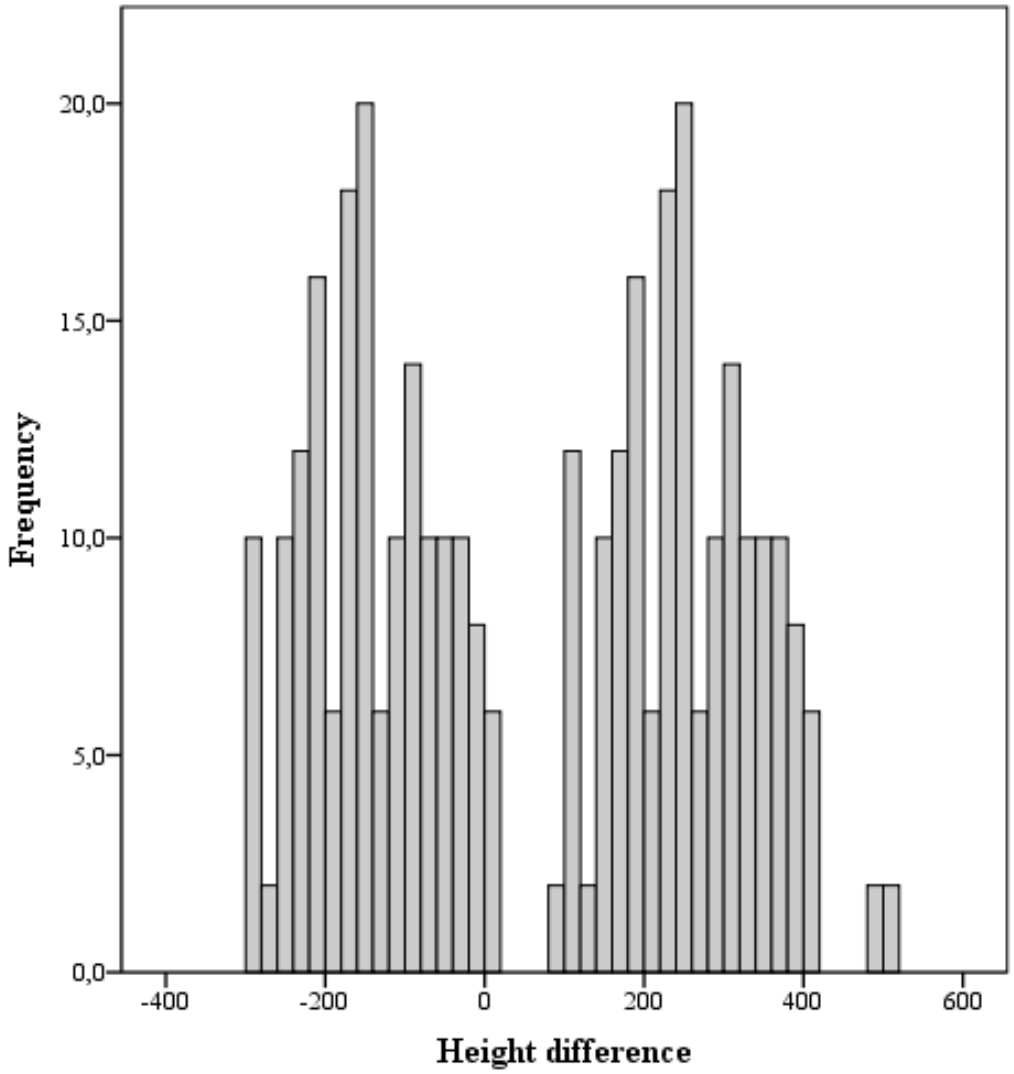

Figure C. Histogram of height difference for faces (*M* = 63.67, *SD* = 219.53; N = 344). Height difference was calculated as with the artworks. For the analysis, it was centered and entered in m. The histogram depicts N = 344 numbers of observations.

Abstract

Research on metaphors and embodiment suggests, that concepts of affect might be associated with the vertical dimension: this conceptual mapping can be summarized as “positive = high/ up”, and “negative = low/ down”. We investigated, if—congruent with that mapping—emotionally valent artworks might be liked more when looked up or down at. Additionally, in everyday life we look up or down at other faces; usually men are taller than women. Building up on research on viewing angles towards (male and female) faces, we investigated if looking up at men and looking down at women might make them appear more attractive. Since an average woman looks up at an average man and vice versa, it was assumed that this interaction would interact with participant’s sex, too. In this study, participants rated artworks regarding liking, valence, familiarity, and art quality, and faces regarding attractiveness, familiarity, and wanting (willingness to approach). Those were presented in two different height, low and high, and eye height of every participant got measured. For the artworks, regarding the research question, revealed an effect of viewing angle, in that looking down at artworks increased their quality. In exploratory analyses, we found interactions with, for example, familiarity and participant’s sex. Some of those results were incongruent with what we expected, and possible alternative consequences of head tilt are discussed. For faces, we found no influence of viewing angle. Results and limitations of the study design, including advantages and disadvantages of such a “real” setting, are discussed.

Key words: Verticality, Metaphors, Affect, Artworks, Embodiment, Conceptual Metaphor Theory, Body posture, Viewing Angle, Body Height, Eye Height, Faces, Attractiveness

Kurzzusammenfassung

Metapher- und Embodimentforschung fand, dass Konzepte von Affekt mit der vertikalen Dimension verbunden sein könnten: diese konzeptuelle Passung kann als „positiv = hoch oder oben“, und „negativ = niedrig oder unten“ zusammengefasst werden. Wir haben untersucht, ob—kongruent mit dem genannten Konzept—emotional valente Kunstwerke mehr gemocht werden, wenn zu ihnen herauf- oder herabgeschaut wird. Im alltäglichen Leben schauen wir auf andere Gesichter herauf oder herab; dabei sind Männer üblicherweise größer als Frauen. Aufbauend auf Forschung zu Betrachtungswinkeln auf (männliche und weibliche) Gesichter, haben wir untersucht, ob es männliche Gesichter attraktiver macht, zu ihnen hinaufzuschauen, und ob es weibliche Gesichter attraktiver macht, zu ihnen hinabzuschauen. Da eine durchschnittliche Frau zu einem durchschnittlichen Mann heraufschaut, sowie entsprechend andersherum, sollte diese Interaktion auch mit dem Geschlecht der Versuchsperson interagieren. In dieser Studie bewerteten Versuchspersonen Kunstwerke bezüglich Gefallen, Valenz, Vertrautheit und Qualität, und Gesichter bezüglich Attraktivität, Vertrautheit und Wollen (das Gesicht kennenzulernen). Diese wurden in zwei verschiedenen Höhen präsentiert, niedrig und hoch, und die Augenhöhe der Versuchspersonen wurde gemessen. Bezüglich der Fragestellung bei den Kunstwerken, fanden wir einen Effekt des Betrachtungswinkels, nach dem Kunstwerke zu denen heruntergeschaut wurde, als qualitativ hochwertiger eingestuft wurden. Bei explorativen Analysen fanden wir Interaktionen mit z.B. Vertrautheit und Geschlecht der Versuchsperson. Einige von diesen Ergebnissen waren inkongruent mit dem, was wir erwartet hatten, und mögliche, alternative Konsequenzen von Kopfneigung werden diskutiert. Bezüglich der Gesichter fanden wir keinen Einfluss des Betrachtungswinkels. Ergebnisse und Limitationen bezüglich des Studiendesigns, inklusive der Vor- und Nachteile solch eines „realen“ Settings, werden diskutiert.

Schlüsselwörter: Vertikalität, Metaphern, Affekt, Kunstwerke, Embodiment (Verkörperung), Conceptual Metaphor Theory, Körperhaltung, Betrachtungswinkel, Körperhöhe, Augenhöhe, Gesichter, Attraktivität