Title: The relation between the aesthetic perception of objects and the focus in visual attention across different stages of Ego-development

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Abstract

In Loevinger's stage model of ego development and Parsons' stage model of aesthetic experience, development is described as a process of changing references. This reference can be interpreted in aesthetics from terms associated with the beauty of objects. In visual perception, this reference is expressed in the attention given to the contents of an image in the center and periphery. In order to investigate this assumed change in reference for both the aesthetic conceptual description of objects and the visual memory of images, the present study combined Loevinger's Washington University Sentence Completion Test (WUSCT) with a questionnaire on the aesthetics of objects and a questionnaire on the visual memory of images. The results not only show that they agree well with the descriptions of the two models, but also confirm this assumed feature of changing reference to other contextual structures as development progresses, both in relation to the aesthetics of objects and in relation to visual memory. Hence, development is mirrored in the visual attention patterns, where more advanced stages of development are associated with the ability to integrate center and periphery elements and to appreciate the contextual nuances in the aesthetic appreciation of an object.

Key words: Parsons stage model of aesthetic experience, Loevinger's Ego-development, aesthetics of objects, visual perception of pictures, center-periphery perception

1. Introduction

The mental development of aesthetic appreciation is a multifaceted process influenced by cognitive, emotional, and social factors. Initially, infants exhibit a preference for simple visual stimuli, such as high-contrast patterns and primary colors, which gradually evolves into an appreciation for more complex forms and textures as their perceptual abilities mature (Fantz, 1961; Kavšek, 2004). Cognitive development plays a crucial role, as children learn to recognize and categorize different artistic styles and cultural symbols through exposure and education (Gardner & Gardner, 2008; Pariser & Zimmerman, 2004). Emotional responses to art also develop over time, becoming more nuanced and sophisticated; young children may react to the bright colors and dynamic shapes, whereas adolescents and adults may appreciate subtler themes and emotional expressions (Jacobsen & Beudt, 2017; Menninghaus et al., 2019; Russell & Milne, 1997; Silvia, 2005). Social influences, including parental guidance, peer interactions, and cultural norms, further shape one's aesthetic preferences and judgments (Csikszentmihalyi & Robinson, 1990; Winner, 1982). Research indicates that the integration of these cognitive, emotional, and social elements leads to an enriched and personalized experience of aesthetic appreciation, reflecting both individual differences and shared cultural values. Different models for aesthetic appreciation that integrate cognitive, emotional, and social factors (Jacobsen, 2004, 2006, 2010; Leder et al., 2004) explore how individual differences in cognitive processing, emotional responses, and social influences contribute to the subjective experience of aesthetic judgments. The models highlight the role of both personal preferences and shared cultural values in shaping aesthetic experiences.

Michael Parsons developed a stage model for aesthetic development. Parsons' stage model of aesthetics outlines how individuals progress in their ability to understand and appreciate art, moving through five distinct stages of aesthetic development (Parsons, 1982, 1987, 1991, 1994, 1999, 2002; Parsons, 1979). According to Parson's model (1987), the stages can be outlined as follows (Parsons, 1987, chap. 3, pp. 37-69). The first stage is

characteristic of sensory pleasure: at this initial stage, individuals derive aesthetic enjoyment primarily from sensory experiences such as colors, shapes, and textures in artworks. This stage is characterized by immediate sensory gratification and sensory exploration (Freeman & Parsons, 2001; Parsons, 1994). Then follows stage two, which is dominated by a concern for subject matter, with a strong preference for realism, but where expression, use of materials etc. are not taken into account. Stage three is characteristic of an appreciation of expressive content and emotional impact. They are drawn to artworks that convey strong emotions or personal expression, and they begin to interpret artworks in terms of their emotional impact (Pariser, 1988, p. 96). Stage 4 is that of expressive form, which include also historical and social issues. At this stage, individuals focus on the formal qualities of artworks as vehicles for expressing emotions or ideas. They appreciate how artists use formal elements such as line, color, and composition to convey deeper meanings and emotions (for an overview see also: Chen, 1997; Rocha et al., 2020). After that follows Stage 5, which is characterized by personal evaluation. Individuals at this stage engage in critical analysis and interpretation of artworks. They seek to understand the cultural, historical, and philosophical contexts in which artworks were created. Artistic traditions are understood and integrated into the personal judgment. They appreciate artworks that challenge conventions or provoke intellectual curiosity (see also: Parsons, 2002). They can appreciate artworks from multiple perspectives - sensory, expressive, and intellectual. They understand and value the diverse ways in which artworks can evoke aesthetic experiences and meanings (Parsons, 1987, chap. 3).

We can connect Michael Parsons' stage model of aesthetic experience to the stage model of ego development by Jane Loevinger. Jane Loevinger's stage model of ego development describes a progression of stages through which an individual's understanding of themselves and their relationship to the world evolves. This model emphasizes the development of self-awareness, interpersonal relationships, and a sense of identity over time (Cohn & Westenberg, 2004; Hauser, 1976; Hy & Loevinger, 2014; Loevinger, 1966, 1969,

1976, 1983, 1998; Loevinger & Knoll, 1983; Loevinger & Wessler, 1970; Westenberg et al., 2013). The stages are measured using Loevinger's Washington University Sentence Completion Test (WUSCT), for which there are detailed data on homogeneity, reliability and validity, which are presented primarily in its original manual from 1970 (Loevinger & Wessler, 1970), subsequent reviews (Hauser, 1976; Loevinger, 1979) and Loevinger's *Technical Foundations for Measuring of Ego Development* (Loevinger, 1998, chap. 5). The stages are as follows (Hy & Loevinger, 2014, pp. 4-7): The first, Pre-social Stage (E1) is pre-verbal and since the WUSCT is a verbal test, this stage occurs before the possibility of verbal measurement of the test and the description of the results and stages only begins with the second stage, which is the Impulsive Stage (E2). This is predominantly observed in early childhood, where behavior is driven by impulses and immediate needs. Individuals at this stage have little self-control and are focused on avoiding punishment. The third, Self-Protective Stage (E3) is characteristic of later childhood and is marked by an increased awareness of rules and consequences. Individuals are focused on self-interest and may use manipulative behaviors to get what they want while avoiding punishment. In the fourth, Conformist Stage (E4), which is typically emerging in adolescence, individuals seek to conform to social norms and expectations. They value belonging to groups and view morality as following the rules. There is a strong emphasis on approval from others and fitting in. At the fifth, Self-Aware Stage (E5) individuals begin to develop a deeper self-awareness and recognize their own uniqueness. They start to understand and accept differences in themselves and others, leading to more nuanced social interactions and a growing capacity for empathy. At the sixth, Conscientious Stage (E6) individuals develop a strong sense of personal responsibility and a more complex understanding of morality. They are capable of self-evaluation and have internalized standards for behavior. This stage is often marked by the ability to think independently and critically about social norms. The seventh, Individualistic Stage (E7) is marked by a heightened sense of individuality and self-expression, individuals at

this stage appreciate and respect diversity in perspectives and experiences. They have a more complex and integrated understanding of themselves and others, often valuing personal relationships deeply. At the eighth, Autonomous Stage (E8) individuals demonstrate high levels of self-awareness, self-acceptance, and respect for others' autonomy. They are capable of managing inner conflicts and are open to new ideas and experiences. There is a strong emphasis on self-fulfillment and achieving personal goals while maintaining meaningful relationships. The highest stage in Loevinger's model, the ninth, Integrated Stage (E9) is characterized by a fully integrated sense of self. Individuals at this stage exhibit wisdom, broad empathy, and an appreciation for the complexity of human existence. They can reconcile inner conflicts and accept paradoxes in life, achieving a sense of peace and fulfillment.

Loevinger's model highlights the gradual development of the ego through increasingly complex and mature stages of understanding oneself and others. Each stage represents a more sophisticated way of making sense of the world, reflecting the growing complexity of internal and external experiences (Loevinger, 1983). In addition, it must be noted that a connection can be drawn between ego development and a shift in the dominance of personality traits, e.g. measured with the five-factor-model of personality (Einstein & Lanning, 1998; Kurtz & Tiegreen, 2005; Loevinger, 1993). It may be that at lower levels, the characteristics of individual traits, such as conscientiousness or openness to experience (McCrae, 1993; McCrae & Greenberg, 2014), are less pronounced, which then also has an impact on aesthetic appreciation, where, for example, openness to experience plays a role (Jacobsen & Beudt, 2017; Rawlings, 2000, 2003; Silvia et al., 2015). Studies that have shown a connection between the stage models of development and the personality traits include, e.g., a study by Helson and Roberts (1994), which showed that ego level was associated with differential personality change on scales of the California Psychological Inventory, a study by Cohn and Westenberg (2004) on the relationship between ego development and intelligence, and a study

by Starrett (1983) on the conceptual commonality between impulsiveness as a personality trait and as an ego development stage. For an overview of different studies and commonalities see also Westenberg et al. (2013).

Parsons' model of aesthetic development is not based primarily on psychometric properties, as is the case in Loevinger's model, but on the foundations of his art education experience. It is therefore noteworthy that in both models we can identify a change, i.e. expansion, of the frame of reference as a core feature, which is the key feature of the connection between Parsons' and Loevinger's models. This core feature of the change of the frame of reference, which is included in an explicit description in Loevinger's model, can be found in Parsons' model in the following way. Here too, the stages change from the concrete to deeper dimensions of observation and judgment: 1. color, surface features - 2. subject/realism - 3. expressiveness of the artwork - 4. traditional context of style and form - 5. concept and meaning of the artwork in relation to traditions, personal and social dimensions of evaluation. Apart from that, connecting the two models by Parsons and Loevinger reveals parallels in how individuals progress through stages of understanding and appreciation, both in terms of self-development and aesthetic perception. Loevinger's stage model describes a progression from simpler, more impulsive stages to more complex, integrated stages of ego development (Loevinger, 1976; Loevinger & Wessler, 1970). Similarly, Parsons' stage theory of aesthetics posits that individuals progress from basic sensory experiences to more refined and sophisticated aesthetic judgments (Parsons, 1987, 2002). In Loevinger's model, individuals move towards greater self-awareness, empathy, and cognitive complexity as they advance through stages. Likewise, Parsons' theory suggests that aesthetic appreciation evolves from basic sensory enjoyment to an understanding of formal and expressive elements, and finally to a deeper appreciation of cultural and philosophical dimensions of art (Loevinger & Knoll, 1983; Parsons, 2002). Both theories emphasize the integration of perspectives as individuals mature. Loevinger's Integrated Stage involves reconciling inner conflicts and

embracing paradoxes, while Parsons' advanced stages of aesthetic development involve synthesizing diverse artistic experiences and critical perspectives (Hy & Loevinger, 2014, pp. 6-7; Parsons, 1991). Loevinger's model applies primarily to personal growth and maturity, highlighting how individuals develop a more coherent sense of self and interpersonal relationships over time. Parsons' theory applies to the development of aesthetic sensibilities, illustrating how individuals refine their ability to perceive, interpret, and evaluate art (Loevinger, 1976; Parsons, 1982, 2002; Parsons, 1979). Both theories emphasize cognitive and emotional growth as individuals advance through stages. Loevinger focuses on the development of self-awareness, interpersonal relationships, and moral reasoning. Parsons emphasizes the development of aesthetic sensibilities, from sensory pleasure to the recognition of formal qualities and deeper philosophical meanings in art (Loevinger, 1976, 1983; Parsons, 1999, 2002; Parsons, 1979). Together, these theories offer interdisciplinary insights into human development and aesthetic experience. They suggest that personal growth and aesthetic appreciation are interconnected processes involving cognitive, emotional, and social dimensions. Both models provide complementary frameworks that illustrate the evolution of human understanding and appreciation, both internally and externally through art and culture. They highlight the importance of fostering cognitive complexity, emotional maturity, and cultural awareness in both personal and aesthetic development (for further overviews see also: Eisner, 2003; Gardner & Gardner, 2008; Winner, 1982).

The development of personality and the development of aesthetic experience can be specifically related to the aesthetic perception of objects in connection with the visual perception of relations in space. Already the aesthetic appreciation of objects and the visual perception of images, particularly regarding center and periphery, has a relation, which lies in how our cognitive and perceptual systems organize and interpret visual information to create meaningful and aesthetically pleasing experiences. This organization not only helps in distinguishing and focusing on key elements but also enhances the overall aesthetic

experience by creating depth, context, and emotional resonance. In visual perception, the figure-ground organization is a fundamental principle, which is essential in determining what we pay attention to and how we interpret visual scenes (Palmer, 1999; Rubin, 1921, § 1). Aesthetic appreciation relies on our ability to discern and appreciate the relationships between objects and their contexts. A well-composed image or artwork effectively uses the figure-ground relationship to guide the viewer's focus, create depth, and evoke an emotional response. The foreground or center typically contains the main subject, which captures immediate attention, while the background or periphery provides context and can enhance the overall aesthetic experience by adding layers of meaning or contributing to the mood (Arnheim, 1954; Cupchik, 2020; Joshi et al., 2011; Krauss et al., 2021; Stamatopoulou et al., 2016; Ulrich, 1983; Wang et al., 2013). The interpretation of center and periphery is not limited to figure-ground separation, since the evaluation of information in the background or periphery already represents a connection between attention and working memory. This relationship between attention and memory can be described using Cowan's embedded-processes-model (Cowan, 1999; Cowan et al., 2020), where the focus of attention concerns the short-term memory and thus the activated parts of the long-term memory. The processing is also influenced by awareness, which increases the number of encoded features during perception and allows new content to be available for explicit retrieval in memory (Cowan, 1999). This functionality also plays a role in the aesthetic processing (Weigand & Jacobsen, 2021, 2023). Therefore, the processing of center and periphery is an interplay of the primary perceptual performance of figure-ground separation and memory performance. The perception of depth and spatial relationships between center and periphery elements is crucial for both visual and aesthetic experiences. Artists and designers use techniques such as overlapping, perspective, and contrast to create a sense of depth, making the visual experience more engaging and realistic. This manipulation of space can also evoke different aesthetic responses, such as tranquility in a balanced composition or tension in a more dynamic

arrangement (Gombrich, 1960; Livingstone & Hubel, 2002). Contrast between the figure and ground helps in distinguishing the main subject from its background. High contrast can draw immediate attention to the center object, making it the focal point of the aesthetic experience. On the other hand, subtle contrasts can create a more harmonious and unified visual field, which can be aesthetically pleasing in a different way. The interplay between center and periphery elements, through contrast and blending, shapes the viewer's emotional and aesthetic response (Itti & Koch, 2001; Treisman, 1985). The background or periphery often provides context that influences the interpretation and appreciation of the center object. For example, a solitary tree in the center of a barren landscape might evoke feelings of isolation or resilience, while the same tree in a lush forest might evoke a sense of harmony or abundance. Thus, the aesthetic perception of objects is deeply intertwined with how the background contributes to the overall narrative and emotional impact of the image (Bar, 2004; Biederman, 2017). Gestalt psychology, which studies how people perceive visual components as whole structures rather than just a collection of parts, highlights principles such as proximity, similarity, and continuity. These principles explain how we naturally organize visual elements into coherent groups, enhancing our aesthetic experience by creating a sense of order and unity in the perception of images (Koffka, 1935; Wertheimer, 1938).

With regard to the perception of center and periphery, a distinction must be made between influences from personality development over the lifespan and cultural influences. On the one hand, based on the stage models of personality development and the development of aesthetic experience described above, it can be assumed that there are differences in the perception of center and periphery in connection with aesthetic perception, within personal development over the lifespan. On the other hand, research regarding the cultural differences in the visual perception of center and periphery has shown that individuals from different cultural backgrounds often exhibit varying tendencies in how they perceive and prioritize visual information. This variation is largely influenced by the cognitive styles and cultural

practices prevalent in different societies. Cultural differences significantly influence how people perceive visual scenes, with Western cultures leaning towards analytic perception and East Asian cultures favoring holistic perception. These differences reflect broader cultural values and cognitive styles that shape how individuals interact with and interpret their environments (Chua et al., 2005; Masuda & Nisbett, 2001; Wang et al., 2012). Regardless of these cultural influences on the visual perception of center and periphery, the influences on the level of personality development and aesthetic development suggest that there is also a conceptual connection between the stages of ego development and the visual perception of center and periphery, which presumably lie in the evolving cognitive and perceptual abilities that accompany the maturation of the ego, as described by Jane Loevinger's stage model of ego development. In the early stages of ego development, like the Impulsive (E2) and Self-Protective (E3) stages, individuals tend to have a more concrete and immediate way of thinking. As individuals move to the Conformist (E4) and Self-Aware (E5) stages, they start to develop a greater understanding of context and relationships. In visual terms, this could be compared to an increased ability to perceive and appreciate the background elements and how they relate to the foreground or center. At the Conscientious stage (E6), individuals demonstrate higher levels of introspection and responsibility with a deeper understanding of context and broader implications. This could reflect a more sophisticated visual and cognitive processing ability, where both center and periphery are integrated to form a more comprehensive understanding.

In order to examine this connection between the stages of ego development, aesthetic experience, or aesthetic concepts (similar to the aesthetic association task conducted here: Jacobsen et al., 2004), and the perception of center and periphery in more detail, we conducted the present study, whereby we did not focus on cultural influences, but on the influences of personality development and therefore only examined one cultural group with a shared linguistic background. Jane Loevinger's WUSCT was administered to our participants

and combined with questions about the aesthetic perception of objects and the visual memory of images. The aim of the study was to examine the change in the frame of reference described in Loevinger's and Parsons' models more closely and to find out whether the proportion of those who consider a larger context in the aesthetics of objects and who focus more on the entire scene and thus the connection between center and periphery in the visual memory of images increases with each stage. The study therefore provides important information on whether this assumed connection between personality development, the development of aesthetic experience and the visual memory of center and periphery actually exists.

2. Materials and Methods

2.1 Participants and Ethics statement

Via the email distribution lists of the university conducting the study, HSU Hamburg (Helmut Schmidt University / University of the Federal Armed Forces Hamburg), the participants of this study were recruited, whereby 110 participants (age range of 18-67, *mean*: 28.85, *sd*: 13.75; gender: 34 male, 76 female) were available for testing. The target number of participants was set at approximately this level from the beginning to ensure the largest possible sample for evaluation, and thus to obtain as many participants as possible in the individual development stages, while keeping the complex qualitative analysis of the data manageable. This approach was due to our mixed-method design. Prior to data collection, the study received approval from the university's ethics committee. Participants were informed about the study and data protection, and their informed consent was obtained. All data was collected anonymously. Socio-demographic information, such as age, gender, and cultural background, was gathered without revealing individual identities. Since the WUSCT is a language-based test, it was necessary to find out whether all participants had German as their

native language and could therefore answer confidently and intuitively in this language. If this had not been the case, the test results might not have been comparable due to a language barrier between individual test participants. We therefore defined the cultural affiliation of a participant by his or her native language. Some participants reported to have diverse cultural backgrounds, but all participants reported to have been grown up in Germany and, hence, that their native language was German. Therefore, the study was conducted in German.

2.2 Testing Procedure

The study was conducted with the online questionnaire software *unipark*. The software was provided and the study was installed by HSU Hamburg. After collecting socio-demographic data, participants answered the questions of our study. Participants who did not complete the questionnaire were immediately deleted in the data export and counted as not tested, whereby 3 participants were dropped. This left 107 participants in the same age range for further evaluation. Along with the three parts presented here, additional data on personal life focus, world concept, and other aesthetic preferences were collected, which were part of other studies and are reported and published separately (in preparation). All parts were presented in a randomized order.

2.3 Tests

The parts of this study, presented here, consisted of the sentence stems of the WUSCT (Part 1) developed by Jane Loevinger, translated into German, with four sentence stems being replaced (13, 14, 29, 33 of the original WUSCT, see appendix) because we considered them more appropriate in relation to our questions. The original sentences dealt with the participants' own attitudes towards sex, which is an important part of psychosexual development. However, these sentences could have been perceived as irritating in the professional and student area of our survey group, which is why we replaced them with

sentences that were more suitable for the professional context (see also: Binder, 2015). The exchange of some sentence stems is possible without any problems, as described in Hy and Loevinger's evaluation manual (2014, pp. 26; 32), since the remaining sentence stems still offer enough opportunity to adequately measure the development stage and the new sentence stems can also be evaluated with the help of the manual, according to the general rules of coding. The presented sentence stems from Part 1 can be found in detail in the appendix. The instructions for the Loevinger Sentence Completion Test were: "Please complete the following sentences. There are no right or wrong answers. Use the words in italics (in some sentences) if you are a woman." In the second part of this study, respondents were asked about their association of terms with the beauty of objects. The instructions were: "In the order from most important to least important, name 5 terms that you associate with the beauty of objects. An object is beautiful if it: ...". In the third part of this study, ten pictures of different scenes of landscapes or the living environment, like the scene of a kitchen or an office, were presented in a randomized order. The images were selected based on the characteristic that they all depicted natural scenes without any emphasis on aesthetic features or other semantic content, since the focus here was not on aesthetic preferences but on the visual processing of natural everyday scenes that corresponded to our culture. Based on visual inspection, several independent scientists rated the images informally for quality to ensure that they all corresponded to a similar quality. All participants saw the same 10 different images, but in a randomized order. The instructions were: "Below you will see various images. After each image you will be asked what content you were able to remember." Afterwards, for the input field, which was a text box with space for free, arbitrarily long answers, the instruction was: "Name the image content that you were able to recognize/remember." The presentation time of each image was 3 seconds. For more information on the presentation of visual stimuli and the measurement of visual attention, see

also (Mühlenbeck & Jacobsen, 2020; Mühlenbeck et al., 2017; Mühlenbeck et al., 2015, 2016; Mühlenbeck et al., 2020; Pritsch et al., 2017).

2.4 Data analysis

All data were evaluated qualitatively by two independent raters. The evaluation of the sentence completions was conducted using the manual written by Hy and Loevinger (2014) and intended for evaluation. The Ego-development stage (E) corresponding to the sentence completions was determined in each case. The remaining data from Part 2 were initially freely coded into thematic primary categories and then assigned to two overall categories in relation to our research question, which corresponded to an object centering on the one hand and a larger frame of reference on the other. The data from Part 3 were coded in regard to the question of whether the participants had primarily perceived objects from the center within the scenes or also from the background areas to such an extent that they could remember them, which also resulted in two categories. Regarding this coding, it was important that the perception of the periphery did not necessarily concern the one within the images, but rather the periphery areas on the image itself, i.e. whether only the center of the image or also its peripheral areas were perceived as a whole scene. The degree of agreement between the two raters was determined for the ratings or codings from all three sub-surveys. After that, descriptive statistical characteristics were evaluated, namely the frequency distributions of the following object categories and perception categories in the developmental stages obtained, in order to receive information about the change in frequency distribution in the respective developmental stages. To obtain inferential statistical results, a χ^2 independence test between the different variables was calculated in addition to the descriptive statistics. The evaluations were calculated using R (R-Core-Team, 2013).

Aesthetics of objects: First, with regard to our research question whether the perceived beauty of objects is related to the direct object properties or to the relationship of the object in

a larger context of meaning the initial codes were chosen freely. From these initial codes, we were then able to form the two object categories of '*direct object properties'* and '*context of meaning'*, that corresponded to our research question. From these object categories, the participants were then assigned a weighted total-object-category (wTOC) with a weighted evaluation (in relation to the category *'context of meaning'*) by multiplying the position of the occurrence of the category by a weighting: 5 at position 1 (most important) descending to 1 at position 5 (least important). This resulted in a possible maximum value of 15 and a possible minimum value of 0. Participants who obtained a value >7 were then assigned to the wTOC *'context of meaning'*. The wTOC was then used for further evaluation regarding the relation to the visual memory of center and periphery. In addition, the χ^2 independence test was calculated for the variables of the developmental stages and the wTOC.

Visual memory of center and periphery in pictures of scenes: First, the responses of the participants to the visual scenes were coded in regard to our research question whether the remembered content was only individual objects from the foreground/center of the image or also content from the peripheral areas and the background, that is, we had the two categories: *center* and *center with periphery*. The participants were then assigned a total-perception-category (TPC) based on frequency. This means that the category that accounted for more than half (> 5 if no data points were missing, otherwise the calculated half) of all individual codings was assigned to the participant. Then, the frequency distribution in the three obtained developmental stages E4 to E6 was determined and, in addition, the degree of agreement between wTOC and TPC for each participant. The χ^2 independence test was also calculated for the variables *developmental stages* and *TPC*, and in addition, also for the variables *developmental stages* and *congruence between wTOC and TPC*.

3. Results

The distribution of development stages was as follows (see also Table 1): stage E4: 26 participants (24 %); stage E5: 56 participants (52 %); stage E6: 23 participants (21 %), stage E7: 2 participants (2 %). The percentage of agreement between the two ratings of the development stages (Total Protocol Rating - TPR) was: number of participants: 107, percentage agreement: 93 %. Since two participants were rated as development stage E7 and this number is too small for further evaluation, they were excluded from further analysis.

Aesthetics of objects: since our research question was whether the perceived beauty of objects is related to the direct object properties or to the relationship of the object in a larger context of meaning, we received for Part 2 the following primary categories: (1) structural properties; (2) sensory properties; (3) connection to purpose and function; (4) connection to space and time. We were then able to summarize these to the following weighted total-object-categories (wTOC): (a) direct object properties and (b) aesthetics of object in relation to a larger context. The percentage of agreement between the two raters was: 96 %. The percentage of the wTOC '*context of meaning'* in the individual stages was for E4: 12 %, for E5: 27 % and for E6: 43 %.

The percentage distribution of the total-perception-category (TPC) *'center and periphery*' was for E4: 12 %, for E5: 29 % and for E6: 70 %. In total, this category was assigned to 35 participants (33 %), namely 3 in E4, 16 in E5 and 16 in E6. The percentage of agreement between the two raters was: 96 %. The percentage agreement between wTOC *'context of meaning*' and TPC *'center and periphery'* was then for E4: 4 %, for E5: 9 % and for E6: 26 %. For a graphical description of the percentage distribution in the three development stages see Figure 1.

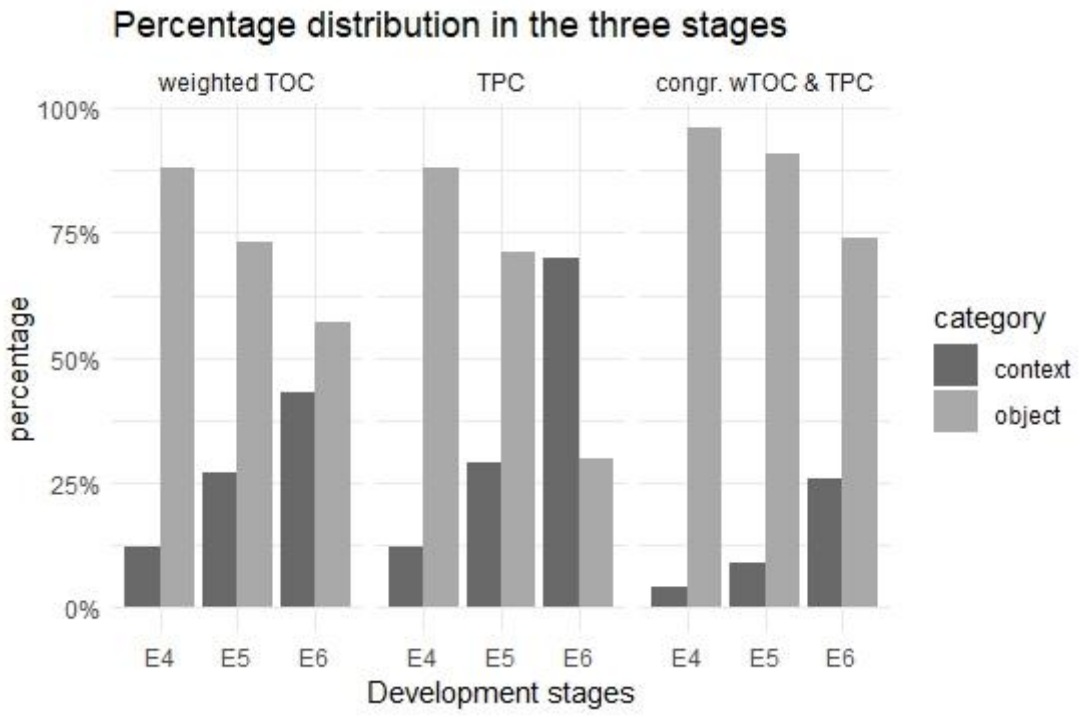

Figure 1: Results of the percentage distribution in the three analyses performed (*wTOC*, *TPC* and the *congruence between wTOC and TPC*) and in comparison of the three developmental stages E4, E5 and E6.

Development stages from TPR (E)	E4	Percentage	E5	Percentage	E6	Percentage
Frequency Development stage	26	24 %	56	52 %	23	21 %
Weighted Total-object-category (wTOC) *context of meaning*	3	12 %	15	27 %	10	43 %
Total-perception-category (TPC) *'center and periphery'*	3	12 %	16	29 %	16	70 %
Congruence between wTOC *'context of meaning'* and TPC *'center and periphery'*	1	4 %	5	9 %	6	26 %

Table 1: Results from the ratings of the development stages, the weighted total object-category (wTOP) and the total-perception-category (TPC). For all parts the quantity and the respective percentage is given.

For the χ^2 independence test between the developmental stages and (a) the wTOC, (b) the TPC and (c) the congruence between both, we received the following results: (a) the χ^2-value was

5.991 with 2 df, $\alpha = 0.05$, χ^2 statistic of 6.37 and $p = 0.041$. For (b) the χ^2-value was 5.991 with 2 df, $\alpha = 0.05$, χ^2 statistic of 19.72 and $p < 0.001$. For (c) the χ^2-value was 5.991 with 2 df, $\alpha = 0.05$, χ^2 statistic of 6.7 and $p = 0{,}035$.

4. Discussion

Our study aimed to determine if the percentage of individuals who consider the broader context in object aesthetics and focus more on the entire scene, including the relationship between the center and periphery in visual perception, increases at each stage. Since the participants were recruited via the university's email distribution lists, they were all from an academic environment. A brief socio-demographic query revealed that the entire sample group had grown up in the German cultural area, as described above. The results regarding the number of participants within the developmental stages, as measured by the WUSCT, align with those of previous studies by Hy and Loevinger (2014, pp. 4-7) and Cook-Greuter (2000, p. 229). In our study, almost all adults were rated in stages E4 to E6—approximately 80% according to Cook-Greuter's (2000, p. 229) findings. However, it is important to note that Cook-Greuter's distribution was based on a very large and diverse sample of several thousand participants, whereas this study tested a relatively small sample of 107 individuals from an academic setting. The descriptive results of the questionnaire on the aesthetics of objects showed that in levels E4, E5 and E6 there was an increase in those who associated the aesthetics of objects in relation to a larger context, namely for the wTOC *'context of meaning'* from E4: 12 %, to E5: 27 % and to E6: 43 %. Also in the χ^2 independence test this dependency between the two variables *development stages* and *wTOC* could be found at the inferential statistical level, which is visible in the p-value of 0.041 as a significant result. Likewise, in regard to our question concerning the visual memory of scenes and their center and periphery, the descriptive results show that in levels E4 to E6 there was an increase in

those who were able to perceive and remember both parts of the center and the periphery in the pictures, namely in the percentage distribution from E4: 12 %, to E5: 29 % and to E6: 70 %, which was also confirmed by our χ^2 independence test as a dependency between the variables, which is reflected in the p-value of <0.001. Also with regard to the agreement between the wTOC *'context of meaning'* and the TPC *'center and periphery'*, the percentage showed an increase in the individuals, namely from E4: 4 %, to E5: 9 % and to E6: 26 %, which was also confirmed by our χ^2 independence test as a dependency between the variables *developmental stages* and the *congruence between wTOC and TPC,* visible in the p-value of 0.035. This means that the number of those who had a connection between the visual memory of center and periphery and the aesthetic perception/appreciation of a larger context increased with progressed developmental stage. Overall, with further development, the increased perception of an object in a larger contextual framework does not necessarily apply to aesthetic perception alone, but, in our culture and at least for the developmental stages obtained here, it applies to the general visual memory of scenes and also to the connection between aesthetic perception and visual memory. However, these results regarding developmental stages and visual memory of center and periphery must be put in a relative perspective to cultural background. As described in the introduction, there are some studies and results on the cultural difference in the visual perception of center and periphery in scenes that cannot be attributed to development, but are part of influences concerning different cultural ways of life and worldviews, such as an analytical focus in Western cultures in contrast to a holistic perspective in Eastern cultures (Chua et al., 2005; Masuda & Nisbett, 2001; Wang et al., 2012). Here, only participants were tested who, although some of them stated different family cultural affiliations in addition to their German cultural affiliation, all grew up in the same way of life in a common culture, which is why the cultural effects found in the studies mentioned do not apply here. In future studies, it would therefore be important

to confirm or relativize the effect we found here regarding personality development by collecting and comparing data from different cultures.

Regarding our study and the cultural context of the participants tested here, the results fit very well with the descriptions of the stages in the two models by Loevinger and Parsons and the parallels between these models and their stages, as described in detail in the introduction, although it is not clear, or has not yet been tested sufficiently, to what extent the two models under consideration, i.e. general development and aesthetic development, are coupled or whether aesthetic development may be considered rather independent of general development. Further extensive studies linking the two models are necessary to investigate this connection. Nevertheless, we can point out some parallels. Development in the individual stages is understood as the processing and interpretation of experience within a certain frame of meaning, which is characterized differently in each case (Schultz & Selman, 2013). In stage E4 the frame of reference consists primarily of the identification with a reference group or authority, whereby an initial self-awareness is formed through identification with group rules, in contrast to the self-centeredness of the previous stage, in which the personal needs and ego-dimensions are primarily unconscious (Hy & Loevinger, 2014, p. 5). Individuals at the Conformist Stage are heavily influenced by societal norms and peer opinions. They seek acceptance and often adhere strictly to social conventions. In this respect, the results also show only a few participants who focus on a larger context in visual perception and associate the beauty of objects more with terms that refer to the direct object properties, such as structural or sensory properties of the object, which corresponds to a rather centered perception of the self as well as visual and aesthetic dimensions (Arnheim, 1954; Parsons, 1991, 1994). We can relate this to Parsons' stage 3, which is that of emotions and expressive content, where individuals show a strong preference for realism (Parsons, 1987, 1991, 1994; Parsons, 1979). They develop a preference for artworks that exhibit orderly and balanced compositions. At stage E5 an awareness of interpersonal relationships is developed in regard

to actions and in terms of feelings, with "an acute sense of the distinction between self and group" (Hy & Loevinger, 2014, p. 5). They recognize the perspectives of others and begin to understand the complexity of human emotions. Our results also showed that there were now more individuals who related more strongly to the contextual structure and background in both object aesthetics and visual memory. This corresponds to Parsons' Stage 4 where individuals start to construct a first framework for understanding artworks based on medium and form (Parsons, 1987, 1999, 2002). At stage E6 the frame of reference can be seen in the awareness of the relationship to culture, where "People at this level are more likely than those at lower levels to think beyond their own personal concerns to those of society" (Hy & Loevinger, 2014, p. 6). Accordingly, in our results, we saw in this stage the strongest focus on the periphery in visual memory and also the strongest aesthetic connection between the object and its further contextual references. This fits well into Parsons' description of his Stage 5, which is based on personal evaluation, where artistic traditions are understood and give the individuals the authority to transcend the norms of society in order to make personal judgment (Parsons, 1987, 1999, 2002).

In summary, our findings are as follows: On the one hand, both the ratings of the developmental stages from Loevinger's model agree with previous results, and an inferential statistical relationship each between the aesthetic appreciation of objects and the developmental stages, the visual memory of center and periphery and the combination of object aesthetics and visual memory could be confirmed, whose effect corresponds with the stages described by Parsons in his development model of aesthetic experience. Here, our study was able to establish a connection between the described developmental stages, the aesthetics of objects and the visual memory of images in relation to center and periphery. The characteristics of both stage models, that of personality development and that of aesthetic development, are that the radius of reference shifts outwards and thus increases in the advancing stages, thus releasing a stronger connection to other contextual structures. With the

results of our study we confirmed this developmental feature of a stronger background reference in visual memory and aesthetic appreciation.

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Appendix

Part 1 Loevinger's Sentence Completion Test

Instruction: "Please complete the following sentences. There are no right or wrong answers. Use the words in italics (in some sentences) if you are a woman."

Instruction in German: "Bitte vervollständigen Sie die folgenden Satzstämme. Es gibt keine richtigen oder falschen Antworten. Benutzen Sie die (bei manchen Satzstämmen) kursiv gedruckten Wörter, wenn Sie eine Frau sind."

The original WUSCT can be found here (Hy & Loevinger, 2014). In our version, the sentences were translated into German and sentences (13), (14), (29), (33) of the original WUSCT were exchanged to transfer them from a sexual to a professional context. The original sentences (13), (14), (29) and (33) would have read as follows: (13) A girl has a right to ..... ; (14) When they talked about sex, I ..... ; (29) When I am with an man (woman) ..... ; (33) Usually she (he) felt that sex ..... .

Tested Sentence Completion Test in German:

1. Wenn ein Kind sich Gruppenaktivitäten nicht anschließt ...
2. Eine Familie gründen und Kinder aufziehen ...
3. Wenn ich kritisiert werde ...
4. Die Aufgabe eines Mannes ...
5. Mit anderen zusammen sein ...
6. Das, was ich an mir mag ...

7. Meine Mutter und ich ...

8. Was mich in Schwierigkeiten bringt ...

9. Bildung ...

10. Wenn Menschen hilflos sind ...

11. Frauen haben Glück, weil ...

12. Ein guter Vater ...

13. Wenn ich Macht über andere ausübe ...

14. Ein gutes Leben ...

15. Eine Ehefrau sollte ...

16. Ich empfinde Mitleid ...

17. Ein Mann fühlt sich gut, wenn ...

18. Regeln sind ...

19. Kriminalität könnte gestoppt werden, wenn ...

20. Männer haben Glück, weil ...

21. Ich kann Menschen nicht ausstehen, die ...

22. Manchmal war er / *sie* beunruhigt über ...

23. Ich bin ...

24. Eine Frau fühlt sich gut, wenn ...

25. Mein Hauptproblem ist ...

26. Ein Ehemann hat das Recht ...

27. Das schlimmste daran, ein Mann / *eine Frau* zu sein ...

28. Eine gute Mutter ...

29. Wenn ich an meine Grenzen stoße ...

30. Manchmal wünschte er / *sie* (sich), dass ...

31. Mein Vater ...

32. Wenn ich nicht bekomme, was ich will ...

33. Andere zu führen ...

34. Für eine Frau ist Karriere ...

35. Mein Gewissen plagt mich, wenn ...

36. Ein Mann / *eine Frau* sollte immer ...

Part 2 Aesthetics of objects

Instruction: "In the order from most important to least important, name 5 terms that you associate with the beauty of objects. An object is beautiful if it: ...".

Instruction in German: "Nennen Sie in einer Reihenfolge von – am wichtigsten absteigend bis weniger wichtig – 5 Begriffe, die Sie mit der Schönheit von Objekten assoziieren. Ein Objekt ist schön, wenn es:..."

Part 3 Visual memory of scenes

Instruction: "Below, you will see various images. After each image you will be asked what content you were able to remember." Afterwards, in the input field, the instruction was: "Name the image content that you were able to recognize/remember."

Instruction in German: "Im Folgenden sehen Sie verschiedene Bilder. Nach jedem Bild werden Sie gefragt, an welchen Inhalt Sie sich erinnern konnten."

Input field: "Nennen Sie die Bildinhalte, die Sie erkennen konnten / an die Sie sich erinnern können."