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# Individual Differences in Understanding and Preferring Different Styles of Art and Music: Need for Cognitive Closure, Empathy and Perspective Taking

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## Abstract

This study investigated the relationship between degree of understanding and preference for art and music and how it is mediated by the degree of need for cognitive closure (NFC). This experiment tested 59 participants as they viewed and evaluated works of different styles in art (representational vs. abstract) and music (consonant vs. dissonant) based on preference and

understanding factors (understanding artist's meaning, relation to personal experience, and perceived congruence of personal interpretation and artist's meaning). Results supported predictions that greater degrees of understanding were associated with greater preference rating and that NFC mediates preference ratings for abstract art and dissonant music. Individuals with a high NFC reported lower preference and understanding ratings for abstract art and lower preference ratings for dissonant music than individuals with a low NFC. Predictions that empathy and perspective taking would mediate differences in understanding and preference ratings of art and music were not supported.

## Individual Differences in Understanding and Preferring Different Styles of Art and Music: Need For Cognitive Closure, Empathy and Perspective Taking

I investigated the relationship between individual differences in cognitive style and preference for visual (realistic vs. abstract paintings) and auditory (consonant vs. dissonant music) styles of art. The emergence of art in the history of mankind is, presumably, a byproduct of the natural selection of physiological and cognitive developments that best adapted our early ancestors for survival (Pinker, 2002). Their comprehension is a sensory-cognitive event where an artwork is initially processed through sensory-neural activity innately common to most humans (i.e. stimulation of the retina or cochlea) and then sent to associative sites throughout the brain (i.e. prefrontal or temporal cortices) where a wide diversity of individual interpretations and preferences arise (Solso, 2003). Researchers have shown that there are individual differences in associative-cognitive styles of information processing, such as the experience of a dispositional need for cognitive closure (Webster & Kruglanski, 1994) and empathetic and perspective-taking executive functioning (Davis, 1980; Spinella, 2005). It is hypothesized that individual differences in the style of cognitive-based information processing will be related to differences in individual preferences for disparate styles of both visual art and music.

Environmental pressures on our early ancestors to live cooperatively with one another for optimal survival favored the ability of complex communication. The evolution of human language provided an excellent solution to this problem by allowing humans to symbolically convey meaning about their ideas of the world. As a byproduct of the development of language, the ability of humans to produce and comprehend art and music arose (McDermott & Hauser, 2005; Solso 2003). These forms of expression allowed individuals to further communicate internal experiences that the present moment, external reality, and even language failed to display and, consequently, facilitated better understanding between people.

Degree of understanding has been suggested to be a significant factor in the evaluations of art and music. Leder, Belke, Oeberst and Augustin (2004) proposed a model that conceptualizes aesthetic judgments based upon the degree of understanding of a presented work. Specifically, they suggest that after the aesthetic object is presented and common elementary perceptual

processes are complete, implicit and explicit cognitive representations analyze both art-specific and self-referenced interpretations of the piece that address style, content, familiarity and prototypic qualities. A feedback loop is then activated where these representations interact with a conscious evaluative state whose function is to decipher the meaning of the aesthetic object. A positive evaluation is suggested to be given when a strong understanding is established and a negative evaluation results when the art or music piece is too ambiguous to comprehend. Similarly, Silvia (2005) proposed a two-stage appraisal model of aesthetic judgments. He suggests that upon the detection of a novel-stimulus (i.e., an obscure, contradictory, and/or ambiguous scene that is not congruent with pre-existing mental representations), attitudes about the aesthetic stimulus will depend on one's *coping potential*. A coping potential refers to the appraisal one makes on the perceived likelihood that they can establish a clear understanding of the presented stimulus. An appraisal that leads to a strong understanding is proposed to result in the observer being more interested in the piece while a poor understanding will result in decreased level of interest. The unifying principle of both these models is that a significant element to art and music likability is the ability to clearly understand the aesthetic object. Empirical studies have been conducted that lend support to these models. Russel and Milne (1997) and Millis (2001) have demonstrated that subjects presented with titles to ambiguous paintings gave more positive evaluations to the works than did subjects who were not given any titles at all. The titles most likely facilitated a greater degree of understanding during the subject's evaluations, which, presumably, resulted in increased positive judgments. Further, Baltissen and Ostermann (1998) presented subjects with numerous images of paintings without any titles at all and asked them to evaluate each based on cognitive and emotional factors. Consistent with the above models, results showed that understanding was a significant factor of the subjective aesthetic responses.

Interestingly, researchers have observed individual differences in preferences for different styles of artwork and musical pieces that may further show the importance of understanding in aesthetic evaluations (Feist & Brady, 2004; Ostrofsky & Shobe, under review). For instance, Feist and Brady (2004) reported that individuals with a high openness to novel experience showed stronger preference for abstract art than did those individuals with a low openness. Similarly, Ostrofsky and Shobe (under review) observed that individuals who have higher degrees of open-mindedness (referred to as a low need for closure) prefer abstract art and dissonant music to a higher degree than close-minded individuals (or a high need for closure). Abstract art in both of these studies was defined as an ambiguous, highly subjective portrayal of an object or idea that is visually dissonant with what the eye objectively senses in external reality (Solso, 2003) while dissonant music was identified as having atonality or twelve-tone compositions where no primary key is established (Levitan, 2006). In both studies, however, no significant individual differences were found for preference ratings of realistic art and/or primarily consonant music. The findings of no individual differences might be understood by noting that realistic and consonant styles present observers with a *common reality* where they can easily identify and conceptualize the aesthetic objects (Kreitler & Kreitler, 1972). Spectators of visual art most likely have knowledge and experience of everything presented in a realistic artwork, and therefore can ascribe some kind of meaning to the piece. Similarly in consonant music, most individuals in the western world has experience and is generally adapted to listening to musical pieces with a clearly established key and uniform rhythm between instruments. The differences that are found in these studies concerning abstract art and dissonant music, however,

may exist in relation to individual differences in the tendency to pursue deeper relational understandings of presentations that initially violate cognitive processes that prefer and seek out an orderly and cohesive environment.

Kreitler and Kreitler's (1972) theory of cognitive orientation asserts that one's belief and knowledge structure about an object is what determines and directs how one behaves towards it. If we are to accept Silvia's (2005) appraisal model of aesthetic evaluation, then it is possible that one's cognitive structure will determine one's predisposed coping potential. For example, stable preferential differences in the extent to which alternative perspectives are processed and how often one's world and self-views are updated (versus adhering to cognitive rigidity) could influence whether one most likely decreases the appreciation of an aesthetic object they cannot not readily understand or if they seek deeper meaning outside their initially organized perceptions of it. A substantial amount of research has shed light on such individual differences, such as the degree of need for cognitive closure (Webster & Kruglanski, 1994) and empathetic executive functioning, or the degree to which one can understand other's perspectives (Davis, 1980; Spinella 2005). It is predicted here that individual differences in these factors will predict preferred coping-potential strategies upon presentation of abstract art and dissonant music.

The dispositional need for cognitive closure (NFC) refers to one's stable preference for structure, order, predictability and ambiguity-intolerance during information processing (Webster & Kruglanski, 1994). Individuals with a high NFC tend to engage in an information processing style characterized by the use of more prototypical and heuristic knowledge representations (versus processing information in discriminating, case-by-case manner) (Kruglanski & Mayeseless, 1988; Klein & Webster, 2000). As a result of this cognitive-style, such individuals display behavioral tendencies such as increased stereotype formation and use (Barak, 1999) and increased occurrences of basing judgments and decisions strongly on early impressions (the anchoring effect) (Kruglanski & Freund, 1983), that indicate general urgency and permanency tendencies toward closure that elicit positive affect. The urgency tendency refers to the preference of obtaining, or "seizing" on, closure as quickly as possible, while the permanency tendency refers to the proclivity of maintaining and applying "frozen" closure to a number of different situations for as long as possible. If closure is unable to be established, or is later threatened after it has been established by contradicting information or deviating personal perspectives, negative affect is suggested to arouse (Kruglanski & Webster, 1996). Individuals with high NFC self-report stronger degrees of organization and planning while also showing lower degrees of empathy (Ostrofsky & Shobe, under review), which may promote more rigid and egocentric behavior and attitudes. Such individuals tend to selectively focus on closure-maintaining information while ignoring or experiencing less interference from contradicting information (Kossowska, 2007) and tend to display in-group bias to those who maintain closure and out-group rejection and/or derogation of individuals who threaten closure (Doherty, 1998; Shah, et. al., 2006).

In considering the behaviors and attitudes in relation to predisposed coping potentials, the degree of one's need for closure may predict reliable differences. As cited above, Ostrofsky & Shobe (under review) showed that individuals with a high NFC rate abstract art and dissonant music less favorably than individuals with a low NFC. It is possible these findings reflect a relationship between high NFC and a lesser degree of ability or willingness to find deeper meaning in ambiguous content. For instance, as stated above, individuals with a high NFC prefer a prototypical information processing style. If incoming information happens to be more unique

and does not fit any heuristic available to the observer (i.e., prototype of realistic portrayal of the human body or the prototype of the compositional structure of consonant music), that information may not be chosen to be processed extensively. High NFC individuals tend to focally attend to presentations that establish and maintain closure while ignoring "interfering" presentations that threaten closure. Non-prototypical representations may therefore not be paid as much attention to as it would be in one who prefers a more discriminating style of processing. Along with a decreased empathetic ability or willingness to relate to deviating perspectives that do not readily fit within a highly organized view of the world, a high NFC may predict a tendency to disregard any deeper meaning of an ambiguous abstract art or dissonant music piece more often than not.

Another possible individual difference that may mediate the dispositional coping potential to initially poorly understood aesthetic objects is degree of empathy and perspective taking. These qualities represent the ability to infer and understand the actions, emotions, and intentions of others. Neuropsychology has shed light on this capacity emphasizing the research on the discovery of mirror neurons in the brain. Mirror neurons are mechanisms within the brain that represent the actions and expressions of others by means of neural activity that is identical with actually performing that same action or expressing that same feeling themselves (Arbib, et. al. 2000; Gallese & Goldman, 1998). For example, if one watches another person grasp a bottle of water, activity in the brain will "mirror" the same activity that corresponds to individuals actually grabbing the bottle themselves. Beyond simple imitation, mirror neurons appear to be specialized for different intentions so grasping objects to eat and drink respectively activate different mirror neurons (Kaplan & Iacoboni, 2006). In addition to motor actions, mirror neurons are also activated by the presentation of emotional expressions (Carr, et. al., 2003) and by static images of performed actions (Johnson-Frey, 2003; Urgesi, 2006). Further, scoring on the Interpersonal Reactivity Index, a self-report measure of empathy and perspective taking (Davis, 1980), has been correlated with mirror neural activity (Kaplan & Iacoboni, 2006), providing physiological support for self-report measures of empathy and perspective-taking. These findings suggest that empathy and perspective-taking are not mere intuitive processes as popularly believed, but rather have direct neural correlates.

Freedberg and Gallese (2007) propose that mirror neuron activity is highly influential in the perception of art. They suggest that the emotional experiences that accompany viewing of art are rooted in mirror neuron activity. In realistic art, the artwork's representation of movement actions and emotional expressions cause the observer to empathize with the subject and therefore creates greater understanding of the piece. In abstract art, the "creative gestures", such as visible brush strokes (i.e., whether they are concise, giving the impression of calmness, or wild, giving an emotionally charged impression) form the basis of empathy by the observer "mirroring" the motor actions it would take for the artist to produce such results. In both styles, mirror neurons and empathetic perspective taking may allow the observer to "connect to" and understand the presented piece. Similar to individuals with a high NFC, individuals with low degrees of empathy and perspective taking may be less apt to expand their cognitive structures to integrate ambiguous representations enough to understand and appreciate them.

Similar mechanisms may be activated while listening to music. Koelsch, Fritz, Cramon, Muller and Friederci (2006) observed that listeners experience different emotional reactions to consonant and dissonant music. For instance, by using the fMRI imaging technique, they observed that listening to dissonant musical pieces activated sites in the brain that are related to

negative emotional arousal, such as the amygdala, hippocampus, parahippocampal gyrus and the temporal poles while consonant music activated more positive emotional processing areas. Mirror neurons that facilitate empathy may allow individuals to translate a sound into an emotional feeling. Gridley and Hoff (2006) suggested that this perceptual-behavioral connection might allow individuals to implicitly prepare to mimic the generation of the perceived sound and infer the emotion related to such an activity. This ability to empathetically perceive the emotional content of a piece may influence the differences in perception of consonant and dissonant music. Speculatively, the perception of highly structured consonant music may activate mechanisms representing high order, focus and their accompanying emotions. Conversely, perceiving chaotic, dissonant music may activate mechanisms representing confusion and disorientating emotions. Individual differences in the degree of empathy and perspective taking may then affect the ability to understand musical pieces and, consequently, their preference ratings as well.

Previous research has confirmed that individual differences exist in one's ability to empathize and understand others perspectives (Davis, 1980; Spinella, 2005). In relation to experiencing art and music, these individual differences may play a strong role in determining appreciation for a work. Highly empathetic individuals should be able to connect to a piece and understand it better than individuals with a low degree of empathy. In the case where a piece is initially understood poorly, an increased ability to empathize may lead an individual to process the art or music piece more deeply until a relational understanding is found. Lower empathetic individuals, on the other hand, may be more likely to disregard the meaning of an ambiguous work due to a decreased likelihood of further considering the emotional content of a piece which may lead to a lesser degree of understanding.

The purpose of this study was to investigate individual differences in the understanding and preferences of different styles of art and music as related to one's need for cognitive closure, empathy and perspective taking. Individual differences in NFC, empathy and perspective taking are predicted to influence the extent of understanding of ambiguous presentations and, therefore, their preference ratings. Specifically, individuals with a high NFC and low empathy and perspective taking were hypothesized to be less likely to exert the cognitive effort necessary to gain the understanding it takes to highly appreciate abstract art and dissonant music. Conversely, individuals with a low NFC, and high empathy and perspective taking are predicted to be more apt to find deeper meaning in unclear presentations and therefore, appreciate these presentations to a greater degree. No significant individual differences in preference ratings were predicted for representational art and consonant music due to the ability for all individuals to readily understand and ascribe meaning to these styles, therefore replicating past research. Secondly, it was also predicted that preference ratings for abstract art and dissonant music will be positively related to degree of understanding of a piece, where, increased understanding will coincide with higher ratings for the piece.

## Method

*Participants.* 59 undergraduate students of the Richard Stockton College of New Jersey participated in this study for extra credit or required credit in courses in which they are currently enrolled. Participants were recruited by sign up on the Richard Stockton College Psychology Laboratory website.

*Materials.* Participants viewed 12 images of representational and 12 images of abstract paintings.

For example, abstract art pieces included paintings such as Duchamps's *Nude Descending a Staircase,* Khalo's *What the Water Gave Me,* and Chagall's *The Poet.* Examples of representational art pieces included Giovane's *Mars and Venus*, Hayez's *Kiss*, and Renoir's *The Umbrellas* (see Appendix A for a full list of art pieces) Participants also listened to 9 pieces of consonant and 9 pieces dissonant classical music. Examples of consonant music included Mozart's *Rondo alla Turca K 331*, Chopin's *Nocturne, E Flat major*, and Bach's *Contrapunctus 1.* Some of the dissonant music pieces included Schoenberg's *Variations Op. 31*, Varese's *Density 21.5*, and Webern's *Vier Stucke Fur Vi* (see Appendix B for a complete list of pieces). Images and auditory files were presented by a Dell PC, using the SuperLab Pro v. 2.0.4 stimulus presentation software.

For each piece, participants completed an Evaluation Form that has been constructed that includes 5 questions using a 9-point Likert response scale. These questions include: Do you understand the meaning the artist is presenting in this work?; Is this work meaningful to you in that it relates to your own personal experience?; Do you think your personal interpretation is the same as the artist's intended meaning?; How much do you like this piece?; and Does this piece offend you? Responses to the first three questions will be summed to create a composite score for "understanding", where higher scores indicate greater understanding. To control for familiarity effects, each participant will be asked if they have seen or heard the presented piece before.

The two individual difference surveys used were the Need For Closure Scale (NFCS) (Webster & Kruglanski, 1994) and the Empathetic Concern and Perspective-Taking Scales of the Interpersonal Reactivity Index (IRI) (Davis, 1980). The NFCS consists of 42 statements, for which participants rate their agreement using a 6- point Likert-type scale. Statements on this scale include "I enjoy having a clear and structured mode of life", "I don't like situations that are uncertain", "I dislike questions which could be answered in many different ways", "When I am confused about an important issue, I feel very upset" and "I feel irritated when one person disagrees with what everyone else in a group believes". High and low need for closure were determined by placement in the top and bottom 25% of total scores, respectively. The IRI requires participants to use a 5 point Likert-type scale to rate their agreement with 21 statements, such as "I sometimes try to understand my friends better by imagining how things look from their perspective", "Other people's misfortunes do not usually disturb me a great deal" and "I am often quite touched by things that I see happen". High and low need for empathy and perspective taking will be determined by placement in the top and bottom 25% of total scores, respectively. *Procedure.* Following completion of an informed consent form, participants were seated in front of a computer. All the participants were asked to view or listen to each piece for as long as it took to decide how much they liked it. They were further instructed that when they had come to a decision on this initial preference rating to indicate their response by pressing 1-9 on the keyboard (1=not at all, 9=very much). Response time was also recorded for this initial preference rating. This procedure is identical to Ostrofsky & Shobe (2008).

With the piece still on screen (art) or playing (music), participants were then asked to complete the Evaluation Form, upon completion of which they were instructed to press the 'N' key to move on the next art or music piece. The response time to 'N' was also recorded as an indication of total time spent with the piece. Pieces were randomly presented within separate blocks for art and music pieces, and the order of block presentation was counterbalanced across participants. Following this viewing and evaluation phase, participants completed the NFCS and

IRI.

## Results

One of the hypotheses was that individuals with high and low need for closure (NFC) will have exhibit different preferences, understanding, and observation time for different styles of art and music. To test this, art styles (abstract and representational) and music styles (consonant and dissonant) were separately analyzed. High and low need for closure was determined by responses in the top and bottom 25% of scores on the Need for Closure Scale, and is consistent with published uses of this scale (Kruglanski & Webster, 1994). 16 high NFC and 15 low NFC participants were submitted for the following analyses. To test for a possible confound regarding familiarity effects, a univariate analysis was performed to see if individuals high and low in NFC differed in amount of previous exposure to the art and music stimuli. High and low NFC did not significantly differ in previous exposure to any of the representational and abstract art or consonant and dissonant music (all conditions revealed $F < 1$), thus indicating that this study's results are more confidently related to differences in need for closure.

*Art*

To test the specific hypothesis that high and low need for closure participants will show different responses to abstract art, but not representational art, a 2 (NFC: High, Low) x (2) (Art: Representational, Abstract) mixed factorial MANOVA was computed using the dependent variables of different times of observation (initial preference rating RT and total time spent observing each piece) and understanding (ratings of understanding of artist meaning, relation to personal experience, and confidence of congruence of personal interpretation and artist meaning) and preference (initial rating and later rating). Main effects for Art were found for all dependent variables. Initial preference ratings revealed that, overall, representational art ($M=5.92$, $SE=.20$) was liked more than abstract art ($M=4.45$, $SE=.28$), $F(1,31)=690.47$, $p<.001$, partial $\eta^2=.96$, and this was true of the second preference ratings as well, $F(1,31)=705.52$, $p<.001$, partial $\eta^2==.96$ ($M_{representational}=5.84$, $SE=.20$; $M_{abstract}=4.36$, $SE=.26$). The composite rating of understanding revealed that representational art ($M=5.37$, $SE=.22$) was understood better than abstract art ($M=3.13$, $SE=.22$), $F(1,31)=445.49$, $p<.001$, partial $\eta^2=.94$. This pattern of higher responses to representational than abstract art were also evident for individual components of the understanding score which were, understanding the artist's meaning ($M_{representational}=6.13$, $SE=.24$; $M_{abstract}=3.42$, $SE=.23$), $F(1,31)=483.17$, $p<.001$, partial $\eta^2=.94$; personal experience ($M_{representational}=4.36$, $SE=.24$; $M_{abstract}=2.90$, $SE=.24$), $F(1,31)=289.79$, $p<.001$, partial $\eta^2=.91$; and congruence of their personal interpretation with the perceived artist's meaning, ($M_{representational}=5.60$, $SE=.27$; $M_{abstract}=3.08$, $SE=.22$), $F(1,31)=379.83$, $p<.001$, partial $\eta^2=.93$. Abstract art ($M=20248$ ms, $SE=2169$ ms) was viewed longer than representational art ($M=17699$ ms, $SE=1928$) before an initial preference judgment was made, $F(1,31)=92.95$, $p<.001$, partial $\eta^2=.76$; and for total observation, $F(1,31)=135.79$, $p<.001$, partial $\eta^2=.82$ ($M_{representational}=54113$ ms, $SE=4582$ ms; $M_{abstract}=61883$ ms, $SE=5624$ ms).

Main effects for need for closure were found for both the initial ($F(1,31)=4.43$, $p<.05$, partial $\eta^2=.13$) and later preference ratings ($F(1,31)=4.51$, $p<.05$, partial $\eta^2=.14$), indicating that individuals with a low need for closure (Initial: $M=5.60$, $SE=.28$; Later: $M=5.51$, $SE=28$) liked the artworks better than individuals with a high need for closure (Initial: $M=4.77$, $SE=.28$; Later: $M=4.70$, $SE=.27$).

There were also significant interactions for NFC x Art for preference ratings (initial:

$F(1,31)=8.94$, $p<.01$, partial $\eta^2=.236$; later: $F(1,31)=15.90$, $p<.001$, partial $\eta^2=.354$), understanding ratings (composite understanding: $F(1,31)=5.04$, $p<.05$, partial $\eta^2=.148$; understanding of artist meaning: $F(1,31)=6.39$, $p<.05$, partial $\eta^2=.148$; and total observation time, $F(1,31)=4.45$, $p<.05$, partial $\eta^2=.133$). Interaction contrasts comparing representational to abstract art for high need for closure (HNFC) participants revealed they preferred representational art initially ($M=5.93$, $SE=.27$) and later ($M=5.94$, $SE=.28$) to a greater degree than abstract art initially ($M=3.61$, $SE=.39$) and later ($M=3.45$, $SE=.36$), $F(1,16)=43.17$, $p<.001$, partial $\eta^2=.742$ and $F(1,16)=86.83$, $p<.001$, partial $\eta^2=.853$, respectively. Further, HNFC participants understood representational art ($M=5.44$, $SE=.32$) better than abstract art ($M=2.78$, $SE=.30$), $F(1,16)=131.48$, $p<.001$, partial $\eta^2=.898$; showing a greater perception of artist meaning, $F(1,16)=203.44$, $p<.001$, partial $\eta^2=.931$ ($M_{representational}=6.04$, $SE=.34$, $M_{abstract}=2.81$, $SE=.32$; more relation to personal experience, $F(1,16)=37.50$, $p<.001$, partial $\eta^2=.714$ ($M_{representational}=4.46$, $SE=.33$, $M_{abstract}=2.68$, $SE=.33$); and perceived congruence of personal interpretation and artist meaning, $F(1,16)=133.67$, $p<.001$, partial $\eta^2=.899$ ($M_{representational}==5.80$, $SE=.38$, $M_{abstract}=2.87$, $SE=.31$). No significant differences between representational and abstract art were observed for HNFC on time spent observing the art works, initially, $F<1$; or in total, $F<1$, indicating that they spent relatively equal amounts of time observing both styles of art work.

Interaction contrasts for low need for closure participants (LNFC) revealed no significant differences for preference ratings (Initial: $F(1,16)=1.93$, $p=.19$ partial $\eta^2=.12$; Later: $F(1,16)=1.21$, $p=.29$, partial $\eta^2=.07$), indicating that low need for closure participants equally preferred representational and abstract art. However, similar to HNFC, LNFC participants had an overall higher understanding of representational art ($M=5.30$, $SE=.33$) than abstract art ($M=3.49$, $SE=.31$), $F(1,16)=36.74$, $p<.001$, partial $\eta^2=.72$; and all the individual components of understanding (perception of artist's meaning: $F(1,16)=40.23$, $p<.001$, partial $\eta^2=.74$($M_{representational}=6.22$, $SE=.36$, $M_{abstract}=4.03$, $SE=.33$); relation to personal experience: $F(1,16)=14.43$, $p<.01$, partial $\eta^2=.51$ ($M_{representational}=4.27$, $SE=.34$, $M_{abstract}=3.12$, $SE=.34$); congruence of artist's meaning and personal interpretation: $F(1,16)=34.36$, $p<.001$, partial $\eta^2=.71$ ($M_{representational}=5.42$, $SE=.39$, $M_{abstract}=3.30$, $SE=.32$). Dissimilar to HNFC, LNFC spent more time looking at abstract art for each piece ($M=23369$ ms, $SE=3116$ ms) than representational art ($M=19680$ ms, $SE=2771$ ms), $F(1,16)=10.45$, $p<.01$, partial $\eta^2=.427$, and total, $F(1,16)=12.85$, $p<.005$, partial $\eta^2=.479$ ($M_{representational}=55520$ ms, $SE=6585$ ms, $M_{abstract}=68534$ ms, $SE=8081$ ms).

To further examine the a priori hypotheses, additional analyses were computed comparing HNFC and LNFC participants on their ratings for abstract and representation art, separately. As predicted, no significant differences were observed for representational art between HNFC and LNFC for initial or later preference rating, time on each piece, overall time spent, or understanding scores (all F's<1). However, several differences between HNFC and LNFC participants were observed for abstract art. A significant difference was observed for initial preference ratings, $F(1,31)=8.87$, $p<.01$, partial $\eta^2=.23$, and later preference ratings, $F(1,31)=12.49$, $p<.001$, partial $\eta^2=.30$. HNFC participants liked abstract art less (Initial: $M=3.61$, $SE=.31$; Later: $M=3.45$, $SE=.36$) than LNFC participants (Initial: $M=5.29$, $SE=.40$; Later: $M=5.27$, $SE=.37$). The only significant difference for understanding abstract art was that LNFC participants ($M=4.03$, $SE=.33$) reported understanding the artist's meaning significantly more so than high need for closure individuals ($M=2.81$, $SE=.32$), $F(1,31)=6.90$, $p<.05$, partial $\eta^2=.19$. There were no significant NFC differences in observation time ($F(1,31)=1.40$, $p=.25$, partial $\eta^2=.05$). Taken together, these results suggest that the NFC x Art interaction is driven by HNFC

participants prefer representational art to abstract art, whereas LNFC participants have an equal preference for these art styles. Further, both HNFC and LNFC participants have a greater understanding of representational art, but only the LNFC participants spent more time looking at abstract art. Additionally, LNFC participants have a greater preference for abstract art more than do HNFC participants, and they may have a better understanding of abstract art as well.

Additional correlational analyses were conducted to determine if, as predicted, understanding is related to preference. These analyses were conducted using all 59 participants. Preference ratings of representational art were significantly correlated with perception of artist meaning (Initial: $r=.41$, $p<.001$; Later: $r=.44$, $p<.001$), relation to personal experience (Initial: $r=.52$, $p<.001$; Later: $r=.53$, $p<.001$), and rating of congruence between personal interpretation and perceived artist meaning (Initial: $r=.40$, $p<.001$; Later: $r=.43$, $p<.001$). These relationships show that art works which are associated with personal experience and understood more are also liked to a greater degree than works that are foreign to personal experience and/or not understood. Further, pieces that were understood better were viewed longer before an initial preference judgment, as the initial preference judgment time was significantly associated with perception of artist meaning ($r=.31$, $p<.05$), relation to personal experience ($r=.29$, $p<.05$) and congruence of personal interpretation and perception of artist's meaning ($r=.36$, $p<.01$).

Preference ratings of abstract art were significantly correlated with understanding scores of perception of artist meaning (Initial: $r=.40$, $p<.005$; Later: $r=.45$, $p<.001$), relation to personal experience (Initial: $r=.43$, $p<.001$; Later: $r=.44$, $p<.001$) and congruence of personal interpretation to perceived artist's meaning (Initial: $r=.30$, $p<.05$; Later: $r=.31$, $p<.05$). Abstract artworks that were understood better were also viewed longer before an initial judgment of preference was made. Initial judgment time was significantly correlated with perception of artist's meaning ($r=.34$, $p<.005$) and congruence of personal interpretation and perceived artist's meaning ($r=.29$, $p<.05$), but not with relation to personal experience ($r=.23$, $p=.75$).

*Music*

A 2 (Need for Closure: High vs. Low) x (2) (Music: Consonant vs. Dissonant) mixed factorial MANOVA with the dependent variables of preference rating (both initial and later response), understanding score (average of responses to perception of artist meaning, relation to personal experience, and congruence of perceived artist meaning and personal interpretation), and listening time (initial and total) revealed main effects for Music for all dependent variables. Consonant music ($M=6.59$, $SE=.26$) was preferred over dissonant music ($M=3.86$, $SE=.24$) in initial preference ratings, $F(1,31)=631.47$, $p<.001$, partial $\eta^2=.96$), and later preference ratings ($M_{consonant}=6.51$, $SE=.27$; $M_{dissonant}=3.89$, $SE=.24$), $F(1,31)=597.31$, $p<.001$, partial $\eta^2=.95$. Consonant music ($M=4.81$, $SE=.35$) was understood better than dissonant music ($M=3.67$, $SE=.29$) ($F(1,31)=197.92$, $p<.001$, partial $\eta^2=.87$) with the same pattern for the understanding individual components of understanding the artist's meaning, $F(1,31)=184.38$, $p<.001$, partial $\eta^2=.86$, ($M_{consonant}=5.13$, $SE=.39$; $M_{dissonant}=4.09$, $SE=.33$); relating to personal experience, $F(1,31)=175.61$, $p<.001$, partial $\eta^2=.86$ ($M_{consonant}=4.74$, $SE=.36$; $M_{dissonant}=3.12$, $SE=.30$); and congruence of personal interpretation and perceived artist's meaning, $F(1,31)=205.74$, $p<.001$, partial $\eta^2=.88$ ($M_{consonant}=4.61$, $SE=.36$; $M_{dissonant}=3.55$, $SE=.25$). Further, dissonant music ($M=30516$ms, $SE=1938$) was listened to longer than consonant music ($M=27474$ms, $SE=2145$) before a first preference judgment was made, $F(1,31)=261.66$, $p<.001$, partial $\eta^2=.90$; as well as for total listening time, $F(1,31)=204.07$, $p<.001$, partial $\eta^2=.88$ ($M_{consonant}=64153$ms, $SE=4827$; $M_{dissonant}=68975$ ms, $SE=5178$).

Main effects for NFC showed that initial and later preference ratings approached significance. These indicated that LNFC individuals (M=5.61, SE=.30) tended to like music more than HNFC individuals (M=4.83, SE=.29) in both initial, $F(1,31)=3.48$, $p=.07$, partial $\eta^2=.11$, and later preference judgments, $F(1,31)=3.97$, $p=.06$, partial $\eta^2=.12$ ($M_{HNFC}=4.78$, SE=.30; $M_{LNFC}=5.63$, SE=.31). There were no main effects for listening time and understanding ratings ($F < 1$). Further, there were no significant interactions between music style and need for closure (for all dependent variables, $F < 1$).

To further test the hypotheses, a priori tests were conducted to determine if HNFC participants preferred less, understood less, and spend different amounts of time listening to the consonant and dissonant music. Consistent with the main effects for Music reported above, HNFC showed significant differences for preference ratings (Initial: $F(1,16)=60.62$, $p<.001$, partial $\eta^2=.80$; Later: $F(1,16)=58.07$, $p<.001$, partial $\eta^2=.79$) where consonant music (Initial: M=6.46, SE=.35; Later: M=6.33, SE=.37) was preferred more than dissonant music (Initial: M=3.23, SE=.29; Later: M=3.23, SE=.30). Also consistent with the main effects for Music, consonant music (M=4.98, SE=.51) was understood greater than dissonant music (M=3.44, SE=.38), $F(1,16)=17.97$, $p<.005$, partial $\eta^2=.54$). Within the understanding score, significant differences were found for the subcomponents of artist meaning ($F(1,16)=14.42$, $p<.005$, partial $\eta^2=.49$), relation to personal experience ($F(1,16)=23.31$, $p<.001$, partial $\eta^2=.60$) and congruence of personal interpretation and perceived artist meaning ($F(1,16)=12.15$, $p<.005$, partial $\eta^2=.44$) where consonant music (perceived artist meaning: M=5.22, SE=.54; relation to personal experience: M=4.84, SE=.47; congruence of personal interpretation and artist meaning: M=4.91, SE=.53) had higher ratings than dissonant music (perceived artist meaning: M=3.78, SE=.44; relation to personal experience: M=2.92, SE=.37; congruence of personal interpretation and artist meaning: M=3.60, SE=.36). Also consistent with the main effects, longer listening times to dissonant music approached significance, for each piece, $F(1,16)=4.27$, $p=.056$, partial $\eta^2=.22$; and total, $F(1,16)=4.15$, $p=.06$, partial $\eta^2=.21$.

Additional a priori tests were conducted to determine if LNFC participants will show equal preference, equal understanding, and equal amounts of time listening to consonant versus dissonant pieces. Consistent with the main effects reported above, LNFC preferred consonant music initially (M=6.71, SE=.40) and later (M=6.70, SE=.40) more than dissonant music (Initial: M=4.50, SE=.39; Later: M=4.55, SE=.38), $F(1,15)=30.53$, $p<.001$, partial $\eta^2=.68$ and $F(1,15)=31.23$, $p<.001$, partial $\eta^2=.69$, respectively. Also consistent with the main effects, consonant music was understood better than dissonant music overall, $F(1,15)=6.51$, $p<.05$, partial $\eta^2=.318$ ($M_{consonant}=4.64$, SE=.49, $M_{dissonant}=3.90$, SE=.45), and for each component (artist meaning, $F(1,15)=7.70$, $p<.05$, partial $\eta^2=.35$, relation to personal experience, $F(1,15)=11.13$, $p<.01$, partial $\eta^2=.44$, and congruence of personal interpretation and perceived artist meaning, $F(1,15)=6.76$, $p<.05$, partial $\eta^2=.326$). Inconsistent with the main effects reported above, no significant differences for LNFC between consonant and dissonant music were observed for listening time ($F < 1$)

Lastly, a priori tests were conducted to determine if HNFC will prefer dissonant music less, have a lesser understanding of, and spend less time than LNFC, whereas the only predicted difference for consonant music between HNFC and LNFC may be that HNFC spend less time listening. As predicted, a significant difference was found for preference rating ($F(1,31)=7.13$, $p<.05$, partial $\eta^2=.19$) where individuals with a low need for closure (M=4.51, SE=.35) liked dissonant music to a greater degree than individuals with a high need for closure (M=3.21, SE=.34). Individuals

high and low in need for closure reported relatively equal understanding scores ($F < 1$). Individuals with a LNFC ($M=33876$ ms, $SE=2785$ ms) may have listened to dissonant music pieces longer than HNFC individuals ($M=27156$ ms, $SE=2697$ ms) before they made their initial preference judgments, but this difference was not significant, $F(1,31)=3.00$, $p=.09$, partial $\eta^2=.09$).

For consonant music, the only significant difference between HNFC and LNFC participants was in initial listening time before the initial preference rating was given ($F(1,31)=5.16$, $p<.05$, partial $\eta^2=.15$) where LNFC individuals ($M=32346$ms, $SE=3253$) listened to the music pieces longer before they made their initial preference judgment than individuals with a high NFC ($M=22601$ ms, $SE=2820$ ms). No significant differences were observed for preference or understanding ratings ($F < 1$), as predicted.

Two-tailed correlational analyses were performed to determine whether preference ratings were reliably associated with understanding scores for music. For the consonant music condition, preference ratings were significant correlated with perception of artist's meaning (Initial: $r=.52$, $p<.001$; Later: $r=.49$, $p<.001$), relation to personal experience (Initial: $r=.59$, $p<.001$; Later: $r=.56$, $p<.001$) and congruence of personal interpretation and perceived artist meaning (Initial: $r=.44$, $p<.001$; Later: $r=.40$, $p<.005$), indicating that consonant music that is understood better is liked more than pieces that are not as well understood. Concerning the dissonant music condition, preference ratings were significantly related to perception of artist's meaning (Initial: $r=.31$, $p<.05$; Later: $r=.30$, $p<.05$) and relation to personal experience (Initial: $r=.38$, $p<.005$; Later: $r=.37$, $p<.005$), but not with congruence of personal interpretation and perceived artist's meaning, still suggesting that dissonant music that is understood more is liked better than less understood pieces.

Additional hypotheses discussed in the introduction included that individuals high and low in degrees of empathy and perspective taking would display differences in the understanding and preference for different styles of art and music. Participants were divided into high and low empathy categories by being placed within the top and bottom 25% of scores on the empathy scale of the Interpersonal Reactivity Index. 16 high empathy and 18 low empathy participants were submitted into the following analysis. High and low degrees of perspective taking were identically determined, which produced 16 individuals with a high degree of perspective taking and 18 individuals with a low degree of perspective taking. Similar to the need for closure analyses, the dependent variables of preference, understanding, and time, were submitted to separate 2 (Empathy: High, Low) x (2) (Medium: levels) and (2) (Perspective taking: High, Low) x (2) (Medium: levels) mixed factorial analyses for art and music. These analysis revealed no main effect for both Empathy and Perspective Taking, and no significant Empathy x Medium or Perspective-taking x Medium interactions (all $F's < 1$), indicating that empathy and perspective taking does not mediate any differences in the preference, understanding, or observation time of different styles of art and music.

## Discussion

One of the main predictions this study was designed to test was that degrees of understanding would predict preference ratings for works of art and music. Through correlational analyses, this study supported that prediction. For both representational and abstract art, preference ratings were reliably predicted by most understanding factors. These results are consistent with previous research findings that have found the degree of understanding individual artworks reliably influence the degree of preference (Millis, 2001; Russell, 2003). This

consistent observation lends strong support to the idea that the viewing of art is not merely a perceptual activity, but rather is one that has strong cognitive elements to it. For example, neuro-imaging studies have reported greater levels of activation in cortical areas such as the dorsolateral prefrontal cortex (Cela-Conde, et. al., 2007) and the left inferior frontal cortex (Hansen, et. al., 2000) for artworks that are liked relative to ones that are disliked. These are areas that have been heavily implicated in controlled semantic memory retrieval (i.e, Wagner, et. al., 2001) and working memory (i.e., Blumenfeld & Ranganath, 2006). This seems to suggest that artworks that are able to be integrated with elicited semantic representations are preferred over ones that cannot, which probably explain why representational artworks are generally liked to a stronger degree than abstract artworks; representational artworks are inherently more likely to elicit previously established semantic representations than the ambiguous abstract works.

This study also found mostly congruent results that may be similarly explained regarding the music conditions. The degree to which a musical piece can activate and be integrated with a semantic representation, and thus understood, seems to be strong indicator to the degree one likes it. The basis of this understanding may be emotional in nature. Gridley and Hoff (2006) suggested, there may be a perceptual-behavioral link that induces an emotional state by means of a mental imagery of the way the perceived sound was generated. Neuro-imaging studies on music perception may support this idea. Levitin (2006) reports a studies that showed activity in the cerebellum, an area traditionally associated with motor planning and action as well as keeping timing, when people listened to music relative to when they listened to non-musical noise, when people listened to music they liked relative to music they did not like, and also to music that was familiar relative to novel music. The author explained these findings by noting the direct neural route from the ear to the cerebellum, as well as the cerebellum's strong connections to the limbic system and frontal lobes, which process emotion and plan behavior according to the induced emotional state. Variations in loudness, rhythm and tempo have traditionally been used by musical composers to manipulate the emotion they are trying to convey in much of the same way people vary tones and timing of speech to emphasize the feeling they are trying to communicate. When the participants in my study reported understanding an artist's meaning or relation to personal experience (which influenced preference), it may of involved inferring the emotional state of the composer and relating it to times when the subject themselves experienced similar emotions. Further, the reason why dissonant music may have been reported as less understood is because of the seemingly chaotic nature of dissonant compositions. Since a dissonant musical piece is structured with extreme variability and incoherence in tempo, rhythm, and loudness, subjects may become relatively confused as to what emotion the piece is trying to convey due to a lack of a unified expression.

With the foundation of the relationship between understanding and preference ratings established, findings regarding these variables and the need for cognitive closure (NFC) can be examined. Since previous theoretical and empirical research has posited that a high degree of NFC is associated with a need for clear structure, order and predictability along with an intolerance of ambiguity during information processing relative to a low degree of NFC, it was predicted that individuals with a high NFC would not understand nor like art and music works that were not well-defined, specifically abstract art and dissonant music. Further, since the construct of NFC seems to differ most generally in this intolerance of ambiguity, it was also predicted that there would be no significant differences in understanding and preference between the unambiguous and clearly structured conditions of representational art and consonant music.

The results of this study confirmed most of these predictions. Individuals with a high NFC significantly liked abstract art and dissonant music much less than individuals with a low NFC while reporting equal levels of each variable for representational art and consonant music. Further, individuals with a low NFC reported higher levels of understanding than individuals with a high NFC, however, there were no significant differences between between LNFC and HNFC for understanding ratings for dissonant music.

Differences between HNFC and LNFC individuals for understanding and preference for abstract art may be explained by previous research has shown that individuals with a high NFC exhibit higher levels of cognitive inhibition, or the ability to effectively filter out information perceived as irrelevant to a given task while maintaining strong focal attention to information relevant to a goal, relative to low NFC individuals (Kossowska, 2007). With this finding in mind, it would be useful to suggest that the aesthetic that comes from abstract art comes not from the properties of the stimulus itself, but rather from the associations to other ideas it is constructed to have. This would mean that to successfully understand and like such a work, one must entertain weak-based connections that are not inherently established by a surface viewing/listening to a work.

Individuals with a high NFC may favor strong structure while being adverse to ambiguity in the viewing of art because higher levels of inhibition are blocking loosely based semantic networks that may be processed as irrelevant to the artwork from being activated in order to be used as an interpretive tool for understanding the work. This idea may be consistent with previous neuro-imaging research that suggests a role for inhibition in the perception of disliked artworks. Hansen and his colleagues demonstrated that artworks that were reported as disliked versus artworks that were liked were associated with activity in the right inferior prefrontal cortex, an area that has been associated with inhibitory memory processes (Depue, et. al., 2007; Hansen, et. al., 2000). Since high NFC individuals did not differ in observation time for representational and abstract artwork, it seems as though these individuals processed both conditions similarly even though abstract artwork requires deeper processing to be understood. Individuals with a low NFC, on the other hand, may be exhibiting higher levels of disinhibition, therefore eliciting more loosely established semantic networks that can enter working memory in order to understand the piece by establishing relationships with the observed artwork. Evidence to this interpretation comes from the finding that these individuals spent increased time in observing abstract art works in comparison to representational artworks. Further, even though there was no significant difference between high and low NFC in observation time, a trend existed that reflected low NFC individuals spending more time observing the artwork than high NFC individuals.

In interpreting the finding that there were no understanding differences between high and low NFC in the dissonant music condition while there were preference differences, one can conclude that the preference for music, especially dissonant music, relies on a process that extends beyond just understanding based on artist meaning and relation to personal experience that is related to the differences between high and low NFC individuals. For individuals with a low NFC, they preferred consonant music over dissonant music, similarly to individuals with a high NFC. This finding is unlike the results found in the art condition, where low NFC individuals liked both representational and abstract artworks equally. So, instead of understanding being the main factor in preference for dissonant music, a more perceptual factor may be at play. Levitin (2006) suggests that anticipation and predictability hold significant roles

in music perception that does not apply to visual art perception. It could very well be that even though dissonant music pieces are generally understood poorly, that low NFC individuals have a greater tolerance of the unpredictability of dissonant music than high NFC individuals. Low NFC individuals tended to listen to dissonant music longer than high NFC individuals, even though this finding was not significant. This supports a view of increased unpredictability tolerance being a stronger determinant of dissonant music preference than understanding. Further research should explore more thoroughly the factors that determine differences in the preference for dissonant classical music.

The aesthetic experience that takes place upon the perception of art and music is a complex activity that draw on many perceptual and cognitive mechanisms and is also subject to much individual variability. This study demonstrated that the observer plays a significant role in determining the final aesthetic of any aesthetic experience. Further research on this topic should explore the exact cognitive mechanisms that differ between high and low NFC individuals that lead to differences in art and music preference and understanding. Even though a proposal of differences in degree of semantic network activation was proposed for art and unpredictability intolerance for music, this is merely speculation and should be subjected to empirical tests along with other possible differences.

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APPENDIX A:

**Representational Style**:

*Judith slays Holofernes* – Gentileschi
*Landscape* - Dapore

*Mars and Venus* – Giovane
*The Arts of Life in America: Arts of the City* - Benton
*Kiss* - Hayez
*The Umbrellas* – Renoir
*White Fence in Fall* - Lucey
*Anguish* – Schenck
*Portrait of a Young Man* – Bronzino
*Study in Black and Green* – Alexander
*A Scene On Ice Near A Town* – Avercamp
*Presentation in the Temple* - De Gelder

**Abstract Art:**

*Death of my Father* - Allen
*Japanese Bridge* - Monet
*Mask* – Ghoshal
*Nude descending a staircase* – Duchamp
*Essence* – Frock
*I And The Village* - Chagall
*Maya with a boat* - Picasso
*The Poet* - Chagall
*Untitled 6* - Maris
*What the water gave me* - Khalo
*Persistence of Memory* - Dali
*Battle of Lights* - Stella

APPENDIX B:

**Consonant Style**:

*Sonata 13 in A d664* - Schubert
*Rondo Pathetique Op1*- Beethoven
*Contrapunctus 1* – J.S. Bach
*Toccata in C-minor BWV* - Bach

*Rondo alla Turca K 331* - Mozart
*Nocturne, E Flat major* - Chopin
*Volodos Variation* - Mozart
*Sonata For Piano No.14 In C Sharp Minor "Moonlight Sonata - Allegretto* - Beethoven
*Hungarian Dance #5* - Brahms

**Dissonant Style:**

*Variations Op.31* – Schoenberg
*Sonata For Solo Violin* – Bartok
*Density 21.5* – Varese
*Deserts* – Varese
*Vier Stucke fur vi* - Webern
*Phantasy for Violin and Piano* - Schoenberg
*Burleske for Violin and Piano* – Bartok
*Hyperprism* – Varese
*Jardin sous la pluie* - Debussy