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Stability of Art Preference in Frontotemporal Dementia

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We examined aesthetic preference for reproductions of paintings among frontotemporal dementia (FTD) patients, in two sessions separated by 2 weeks. The artworks were in three different styles: representational, quasi-representational, and abstract. Stability of preference for the paintings was equivalent to that shown by a matched group of Alzheimer's disease patients and a group of healthy controls drawn from an earlier study. We expected that preference for representational art would be affected by disruptions in language processes in the FTD group. However, this was not the case and the FTD patients, despite severe language processing deficits, performed similarly across all three art styles. These data show that FTD patients maintain a sense of aesthetic appraisal despite cognitive impairment and should be amenable to therapies and enrichment activities involving art.

Keywords: frontotemporal dementia, art, aesthetic preference

Involvement in the arts is an important part of many people's lives, whether trained or untrained, and at whatever age. Many healthy older adults are avid patrons of art museums and serve as docents. They also participate widely in community and professional orchestras, bands, and choruses, including groups targeting older adults such as the Young@ Heart Chorus (<http://www.youngatheartchorus.com/index.php>), and adult community bands (Association of Concert Bands; <http://www.acbands.org/>).

Music and art are also important parts of therapy for individuals with dementia (Gerdner, 2000), as a way to enhance affect, stimulate cognitive abilities, and promote social skills among patients and with loved ones. However, relatively few studies have systematically investigated general or specific effects of various dementias on artistic abilities. Interestingly, studies of music and art in dementia tend to diverge in their focus. Music researchers typically investigate changes in music memory, perception, and affective response in dementia (cf. June 2012 issue of *Music Perception* entirely devoted to this topic), but less frequently study musical production. Conversely, studies of visual arts in dementia, which are less common overall, have focused more on production than response to the arts (see Eekelaar, Camic, & Springham, 2012 for a welcome exception). Yet, it is fair to say that most adults view rather than produce art.

Our goal in this brief report is to document aesthetic responses to novel paintings in a small group of frontotemporal dementia (FTD) patients. FTD has various subtypes, but as the name im-

plies, the illness refers to the primacy of neural damage in frontal and temporal lobes. Compared to the more commonly diagnosed and studied Alzheimer's disease (AD), FTD patients as a whole have fewer memory and visuospatial problems, but more issues with language (semantic dementia and progressive nonfluent aphasia subtypes), or changes in social and interpersonal behaviors (behavioral variant), and tend to have a younger age of onset (UCSF Memory and Aging Center, 2012).

Some researchers have reported a surprising onset or improvement of artistic skill following the onset of FTD. For instance, Mell, Howard, and Miller (2003) followed an artist who had onset of semantic dementia symptoms in 1986 but continued to produce art for more than 10 years after diagnosis. Her style changed throughout the illness period, becoming less precise and more impressionistic, which the authors ascribed to "release from the constraints of formal training" (p. 1709). However, no formal judgments of artistry were collected. Another professional artist with FTD was studied by Drago et al. (2006). Paintings from prior, just at the beginning of symptoms, and after full symptoms emerged were evaluated by blinded, nonartist judges on six artistic dimensions. Although completeness and evocative quality declined over time, technique was judged to have improved over the 15 year period.

Even more surprising are reports that some FTD patients who were not interested in art prior to their illness became more involved in making art as their illness progressed (Miller et al., 1998). The works are described as creative but detail-oriented and realistic, perhaps linked to the decline of verbal ability and symbolic ability. On the other hand, a controlled study of nonartist FTD patients was undertaken by Rankin et al. (2007). Healthy older adults, as well as AD and FTD patients, were asked to make four drawings to instructions: a self-portrait, a still life, a remembered room, and their current emotion. (It should be noted that these patients were not selected for their spontaneous interest in

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art.) A panel of judges blind to diagnosis rated FTD (both semantic and nonsemantic variants) as more bizarre and disorganized than the other groups, and included distortions, particularly of faces. Thus, the relationship of FTD to artistic expression may be quite variable, but at least sometimes seems to involve artistic skills that exceed other cognitive abilities.

In contrast, few studies have examined reaction to artworks in patient populations. In a prior report (Halpern, Ly, Elkin-Frankston, & O'Connor, 2008), we examined reactions to unfamiliar artworks in early-stage AD patients and healthy age- and education-matched controls. The task was to order a set of eight art postcards by preference. Three different art styles were tested. Two weeks later, the task was repeated, and recognition memory was assessed. Patients and controls showed the same degree of stability in preference judgments, even though the patients demonstrated no explicit memory of the paintings. Naming and memory scores were not related to degree of stability among the patients. According to a comprehensive model proposed by Leder, Belke, Oeberst, and Augustin (2004), aesthetic judgment comprises five stages: perception, explicit classification, implicit classification, cognitive mastering, and evaluation. Our initial results suggested that these stages can be executed in a procedural fashion, without the conscious aspects of naming and memory.

We were interested in extending our results to FTD patients because of two possible influences on the task. On the one hand, most FTD patients have difficulty with naming, giving us an even stronger test of the importance of naming in art preference. We were particularly interested to determine whether representational styles, with easily named objects, might be more sensitive to naming impairment than styles containing less easily described scenes and objects. Second, because of the several reports in the literature of enhancement of artistic skills in FTD, we expected increased stability scores among the FTD patients, compared to AD or controls from our 2008 study. On the other hand, stability scores might be worse in FTD patients, as their paintings in Rankin et al.'s (2007) study were more dissimilar to healthy controls' paintings than were paintings by AD patients.

Method

Participants

Patients with FTD were referred by neurologists, psychiatrists, and neuropsychologists in the Division of Cognitive Neurology at the Beth Israel Deaconess Medical Center (BIDMC), Harvard Medical School. All nine FTD patients underwent an extensive evaluation in order to exclude other causes of dementia such as AD, Lewy Body disease and vascular dementia. Four of the FTD patients met criteria for probable behavioral variant frontotemporal dementia. Three FTD patients presented with progressive nonfluent aphasia. Two patients presented with semantic dementia. Brain imaging studies were available for eight of the nine participants. Informed consent was obtained from the participant with a family member present as witness. BIDMC IRB procedures were followed.

Neuropsychological tests. All FTD patients underwent comprehensive evaluation with a broad range of neuropsychological tests as part of their clinical assessments. For the purpose of the present investigation, a subset of tests was examined. These in-

cluded the Geriatric Depression Scale (Brink et al., 1982), Mini Mental State Exam (Folstein, Folstein, & McHugh, 1975), and the Boston Naming Testing (BNT; Kaplan, Goodglass, Weintraub, & Segal, 1983). These tests were administered to FTD participants during the first session.

Comparison groups. Secondary analyses used data from a subset of AD and healthy Normal Controls (NC) collected in our prior study (Halpern et al., 2008). Selection criteria for the subsets are described below.

Materials

Twenty-four 4.5 × 6.5-in colored art cards of paintings were selected from *The Art Box* (Phaidon Press Editors, 1998) from three categories: Representational, Abstract, and Quasirepresentational art, as described in our prior study. There were two control tasks. The first control task used eight 4.5 × 6.5-in black and white digitized line drawings of familiar objects (Snodgrass & Vanderwart, 1980). A second control task included 5 × 7-in black and white photographs of male faces.

Procedure

Participants were told that this was a study in art appreciation and it would involve sorting four sets of art cards. After obtaining informed consent, participants were administered the neuropsychological tests described above. Next they were shown three sets of art cards, one set at a time, and asked to sort the art cards in the order from best to least liked based on their individual preference. Two rows of four cards were displayed on a desk at which the participants were seated. Participants were told this was an untimed task, that they could change their mind at any time during the task until they were satisfied with their choices, and that there were no right or wrong answers. The Representational, Abstract, and Quasirepresentational tasks were presented in different orders for different people. All possible orders were used across the experiment, although not equally often.

Two control tasks were used for this study. One task involved sorting faces from best to least liked. This task was used in order to determine whether participants were capable of sorting stimuli according to emotional valence (only seven patients completed this task). The other control task required participants to look at eight cards with line drawings of familiar objects (e.g., truck, key) and order them in terms of their real world size from largest to smallest. This task was used to ensure that participants had preserved sequencing abilities as well as the understanding that the cards symbolize objects.

Two weeks later, all participants were asked to complete the same tasks described above, without any mention of trying to reproduce preferences from the first session. Tasks were presented in the same order in Session 1 and Session 2 for a given participant.

Results

Preference Stability in FTD Group

As in our previous study, stability of preference (from Time 1 to Time 2) was calculated by first determining the average

change in rank per item for each participant for each of the four tasks. That is, the rank order at Time 1 was compared to the rank order for the same item at Time 2. Difference Scores (Time 1–Time 2 rank) were calculated for each item. Changes in ranks were summed across the cards within an art style and the total change score was divided by 8 to give a mean rank change. If the two orders were identical, the change score was 0. The smallest possible change was .25 (an interchange of 2 adjacent ranks averaged over 8 items) and the maximum possible score was 4. Larger change scores indicated less consistency from Time 1 to Time 2.

Nine patients completed judgments of the three art styles, and the control task of ordering pictures by real-world size. Mean change scores for the art task were 1.75 for Representational, and nearly the same for Abstract (2.04) and Quasirepresentational (2.05, see Table 1). The Control task was performed nearly perfectly (0 to .75) by all except one person who scored 1.25. The one-factor ANOVA showed the main effect of task, $F(3, 24) = 10.60, p < .001$, with follow-up tests (Tukey's HSD) confirming that the Control task elicited more stable change scores than the art tasks, which did not differ from one another. A similar analysis just using the seven patients who completed the faces task compared the three art tasks to the faces tasks, and yielded no main effect, $F(3, 18) = .85, NS$.

Cross-Group Comparisons

We wanted to know how these patients compared with the early stage Alzheimer's disease patients from our previous study. The mean age of the two participant groups was quite disparate, as FTD tends to strike at a younger age than AD. For this comparison, we selected only the AD patients who were under age 80 ($n = 11$). This AD subset was still older than the FTD group (73.8 years vs. 63.7 years), but the average MMSEs were well matched (24.4 vs. 22.4) as were scores on the Geriatric Depression Scale (9.80 vs. 8.63). Years of education were nearly identical, 15.1 versus 15.2. We similarly selected control participants (NC) under age 80 ($n = 12$, mean age = 73.4 mean years of education = 13.5).

Table 1
Mean Change Scores for Each Group

Art style	FTD	AD	NC
Representational			
<i>M</i>	1.75	1.65	1.68
<i>SD</i>	.75	.59	.79
Quasirepresentational			
<i>M</i>	2.06	1.55	1.42
<i>SD</i>	.79	1.05	.61
Abstract			
<i>M</i>	2.04	1.75	1.92
<i>SD</i>	.86	.87	1.12
Faces ($N = 7$)			
<i>M</i>	1.75	—	—
<i>SD</i>	1.03	—	—

Note. Change score can range from 0 (no change in order) to 4 (maximum possible change). FTD = frontotemporal dementia patients; AD = Alzheimer's patients, $N = 11$ from Halpern, Ly, Elkin-Franklin, & O'Connor, 2008; NC = Normal controls, $N = 12$ from the same source.

Our first analysis compared the change scores for the three different art styles in the two patient groups. No main effects or interactions obtained (see Table 1 for means). This result did not change when NC participants were added to the analysis: mean change scores (averaged over the three styles) in the three groups were in a narrow range between 1.63 and 1.94. However, all groups showed superiority on the Control task, as shown by an analysis comparing the mean change score over all three art styles with the Control task. The only effect in that 3 (groups) \times 2 (tasks) ANOVA was a main effect of Task: $F(1, 29) = 134.6, p < .001$. Mean change score for the art was 1.73 and for the Control task was .26, with no interaction. This shows that all groups were very accurate in estimating real-world size of depicted objects, but made a modest number of changes in art preference over the 2-week period. To give an idea of the extent of shift, we can use as an example one patient whose change score in the Representational condition was 1.75 (near the mean of all participants in all conditions). No painting was shifted in rank by more than three places; the most and least preferred were the same over the 2 weeks.

Another perspective on the performance of the FTD group was gained by treating each patient as a single-case study, and comparing that person to the matched NC reference group, as per the suggestion by Crawford and Howell (1998). Using the recommended modified t test procedure for small normative samples, we examined mean change score averaged over all three art styles. For only one of the nine patients did the mean change score significantly differ from the NC group. This person's mean change score was 3.08 (t -score = 2.26, $p = .045$, two-tailed); p values from the t tests on data from the remaining patients exceeded .21. Thus the equality of responses in the patient groups and the controls did not seem to depend on the variant of FTD suffered by each patient, nor other variables that we measured. For none of the 11 AD patients did their score fall outside the NC reference group's performance (largest t value = $-1.47, p = .17$, two-tailed; all other p values exceeded .26).

The two patient groups did differ, as expected, on the Boston Naming Test: Mean for AD patients = 43.7 and FTD = 29.2, which are significantly different, $t(17) = 2.45, p < .01$, one-tailed. However, correlations between BNT scores and change scores were not significant in either group for any of the three art styles (one AD patient in this subsample did not have a BNT score). For the eight FTD patients for whom we had an MMSE score, that score was negatively, but not significantly, correlated with the mean of the change scores for the three art styles ($-.44$), meaning higher global cognitive functioning was perhaps associated with more stability in art preference. Our previous report showed a significant negative correlation between MMSE and mean change score, but using a much larger sample. Finally, we looked at whether age might predict aesthetic stability, given that the FTD patients were on average younger than the NC and AD groups. We correlated mean change score within each group with age. Correlations were near 0 for the NC and AD groups. In the FTD group, the correlation was quite high $r(7) = -.67, p < .05$. However, the negative sign indicates that the older FTD patients in fact showed more stability in their preferences.

Discussion

Our main finding here was that aesthetic sensibility, as operationalized by reasonably stable artistic preferences, was preserved in a small group of frontotemporal dementia patients. This finding replicates our prior result with Alzheimer's disease patients (Halpern et al., 2008). At least as judged by our preference test, we found support neither for impaired (Rankin et al., 2007) nor enhanced (Miller et al., 1998) aesthetic stability. Our results suggest that people with FTD are able to process art in a consistent manner but they do not speak directly to their capacities for artistic production. Future research could investigate relationships, if any, between production tasks such as those studied in the prior literature, and receptive art skills, as we studied here.

This replication of fairly stable art preference is notable not just because of the extension to a different brain pathology, but also because of the substantially lower performance of the FTD group on the naming test, compared to both the AD and NC groups. The lack of relationship between naming and preference stability was seen not only at the aggregate level, but also on an individual level. The range of BNT scores in the FTD group was very large: from 12 to 50. However, we found no correlations with stability scores. By way of illustration, the patient with the BNT score of 12 showed the third smallest change score from Week 1 to Week 3, averaging over the three art styles. It is particularly interesting that the representational style contained easily named elements ("man and woman sitting on a river bank") and the quasirepresentational paintings were hard to describe, given that items were in odd configurations or otherwise distorted. Yet naming scores did not correlate with stability in either style. And in fact, FTD subtype did not seem to be systematically linked to results; for instance, the patient with the highest overall stability and the one with the second lowest stability score were both in the progressive nonfluent aphasia group. All these findings support our contention that aesthetic evaluation may depend on nonconscious processing, at least in artistically untrained people, and that the integrity of linguistic processes is not essential.

Although this conclusion is based on a small sample, we offer these data as evidence that people with different types of cognitive impairments seem to derive meaning from the viewing of artworks. This was true even in the relatively impoverished environment of a testing situation and viewing unfamiliar art in small-scale reproductions, and it was true even though several participants had moderate, not mild, dementia. AD and FTD are neurodegenerative conditions undermining memory and language systems. Current findings suggest that patients with these conditions are able to evaluate art with consistent aesthetic criteria.

We note that our task did not require that viewers particularly like (or dislike) the set of paintings. Our preference task required relative, not absolute, judgments. Nor did we design the task to elicit or measure emotions in the viewer or to evaluate the ability to read emotions from the paintings. To the extent that these are important in the aesthetic evaluation of art, we might have expected some impairments in the FTD patients, as many reports suggest that emotional processing, at least as derived from faces, is impaired in FTD (Snowden et al., 2008).

Our work provides empirical evidence for the establishment and support of access programs for cognitively impaired people, such as New York's Museum of Modern Art's Meet Me at MoMA program (Rosenburg, 2009). The video clip (<http://www.moma.org/learn/disabilities/dementia#course1>) shows how patients and caregivers can enjoy and be educated about art, and even offer new insights about meaning and composition. Our argument here is that the ability both to form an aesthetic judgment (all patients understood the task) and to maintain it, forms part of the reason these programs are successful. The reasonably stable preferences also support the general assertion that these cognitively impaired people can do symbolic processing, which is important for artistic appreciation.

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