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LAST BUT NOT LEAST

Higher prevalence of synaesthesia in art students

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Abstract. Synaesthesia may facilitate the expression of creativity. Therefore synaesthetes may be more common in the world of creative art. To test this possibility, we used behavioural and phenomenological measures to assess the existence of grapheme – colour synaesthesia in a sample of art students ($N = 99$) and a control sample ($N = 96$). We found a prevalence of about 7% in the former and about 2% in the latter. Our findings suggest that synaesthesia may indeed be more common in art students.

Synaesthesia is a condition in which extraordinary experiences occur in response to an ordinary sensory input. For example, people with grapheme – colour synaesthesia may have a red colour experience for a letter printed in black on white paper. In the general population a reliable estimate of the prevalence of grapheme – colour synaesthesia is about 1% (Simner et al 2006). However, it has been claimed that in creative artists synaesthesia is more common (Domino 1989). Because this claim is based on subjective reports and has never been verified with objective measures, it was our aim to test whether there really is a higher prevalence of grapheme – colour synaesthesia in artists. Our sample was a group of fine-art students.

Synaesthesia and art have been consistently linked to each other. Many famous individuals have been said to be synaesthetes, such as the composer Messiaen (Berman 1999), the painter and photographer Hockney (Cytowic 2002), and the writer Nabokov (1967), to name but a few. There are synaesthetic styles in 'visual music' (Ward et al 2008a), with devices such as colour – light organs as used by Scriabin (Berman 1999) and even musical paintings, as created by Kandinsky (Ione 2004). Moreover, there is evidence that synaesthetes are more likely to be involved in artistic activities (Rich et al 2005; Ward et al 2008b), and it seems plausible that synaesthesia is more prevalent in creative artists (Mulvenna and Walsh 2005).

Domino (1989) investigated synaesthesia in 358 fine-art students. He reported a prevalence of 23% as indicated by a self-report measure. However, no objective test was conducted. The contemporary gold standard to assess synaesthesia objectively is the 'test of genuineness' in which the consistency of synaesthetic colour experiences is tested (Baron-Cohen et al 1993). Studies using this objective measure revealed that the prevalence of synaesthesia is overestimated when it is based merely on subjective reports (Simner et al 2006). Therefore, in the present study, we used an objective measure to test the prevalence of grapheme – colour synaesthesia in art students.

We recruited ninety-nine art students (fifty-three male; mean age = 24.1 years, SD = 7.87 years) from the art college of Zürich, Switzerland. As a control group, the data of ninety-six visitors (forty-two male; mean age = 35.5 years, SD = 15.3 years) of an open-house event during the 175th anniversary of the University of Bern were available. All participants were tested with a computerised grapheme – colour consistency test as used in previous prevalence studies (Simner et al 2006, 2009). Participants were individually presented with 36 graphemes (A – Z; 0 – 9), one at a time, in random order. Each grapheme was accompanied, on the same screen, by a palette of 13 basic colours, the same each time but randomly arranged on each trial. Participants were required to select the

'best' colour for each grapheme. After an initial presentation, an immediate surprise retest followed, in which the graphemes were presented again in a re-randomised order. The consistency score was calculated as the number of identical grapheme–colour associations. Afterwards, participants responded to six statements concerning their experiences as in Simner et al (2006)—for example: "Whenever I see or think about letters or numbers (printed black-on-white), I automatically experience the letter or number as having another colour (eg red)". A value of 0–5 was assigned to each statement, where high scores reflect more typical synaesthetic responses. Synaesthetes were identified by adopting the criteria of Simner et al (2006) on both consistency and questionnaire scores (consistency $\geqslant 20$ and questionnaire $\geqslant 17$). However, participants were counted as non-synaesthetes if their consistency score was equal or above 20, but only by choosing one and the same colour for more than half of identical grapheme–colour associations.

Figure 1 shows the distribution of consistency scores. In the sample of art students, seven participants were classified as synaesthetes. In the control sample, however, only two participants were classified as synaesthetes, thereby replicating the results of Simner et al (2006). The proportion of synaesthetes was significantly higher for the art students

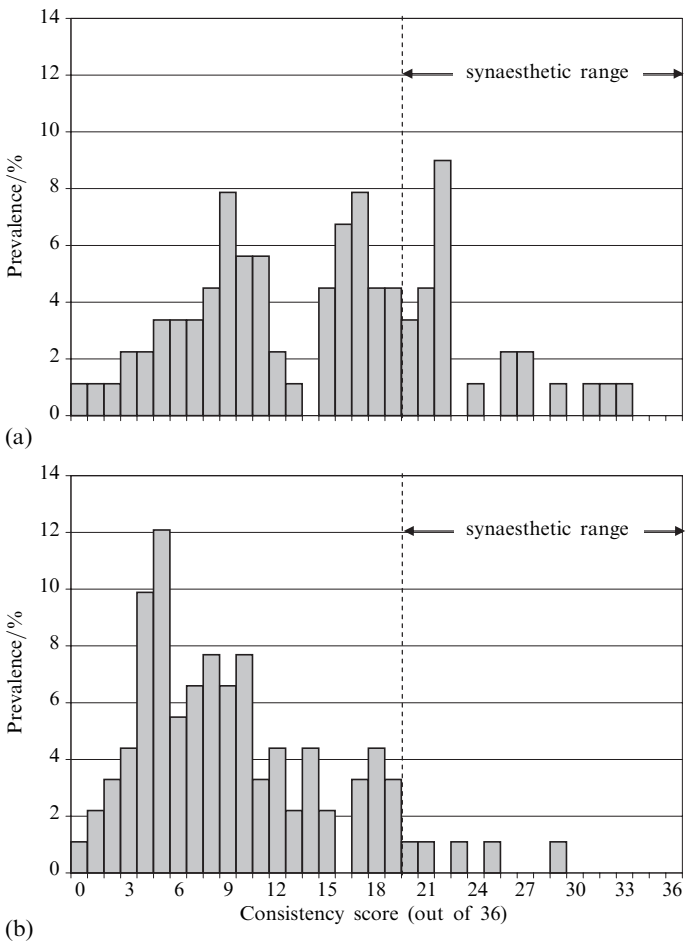

Figure 1. Distribution of the consistency scores for (a) art students ($N = 89$, mean = 14.7, SD = 7.5). Ten art students who used deliberate associative strategies were excluded from the consistency analysis, but were counted as non-synaesthetes for purposes of estimating prevalence. (b) Control sample ($N = 91$, mean = 9.4, SD = 5.9). Five control participants who used deliberate associative strategies were excluded from the consistency analysis, but were counted as non-synaesthetes for the purpose of estimating prevalence.

than in the control sample ($t_{193} = 1.66$, $p < 0.05$). Furthermore, the consistency scores were higher for the art students (mean = 14.67, SD = 7.49) than for the control samples (mean = 9.38, SD = 5.92) ($t_{178} = 5.26$, $p < 0.001$). Additionally, the questionnaire scores were also higher for the art students (mean = 10.96, SD = 5.19) than for the control sample (mean = 8.47, SD = 5.84) ($t_{193} = 3.15$, $p < 0.01$).

These results indicate a higher prevalence of synaesthesia in our sample of art students than in the more general population. Compared with Domino (1989), we found lower prevalence of synaesthetes in our sample of art students. However, as we used an objective measure to test for synaesthesia, this result can be easily explained (cf Simner et al 2006). Moreover, Domino's (1989) study was not confined to any specific type of synaesthesia, while we focused explicitly on grapheme–colour synaesthesia.

It is possible that the higher prevalence of grapheme–colour synaesthetes in art students is due to the richer world of experiences provided by the synaesthetic associations, and hence their skill and choice of interest in art as a hobby or career (Rothen and Meier 2010). Furthermore, synaesthetic predispositions may become activated through specific exercises and practices in art education. This poses the question to what degree synaesthetic experience is a learned phenomenon. So far, the evidence suggests that particular synaesthetic grapheme–colour associations can be acquired, but not the synaesthetic experiences per se (Elias et al 2003; Meier and Rothen 2009).

To conclude, our study is the first to show objective evidence for the higher prevalence of synaesthesia in art students. The particular reason, however, remains to be elucidated in future research.

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