

The influence of expertise level on the visuo-spatial ability: differences between experts and novices in imagery and drawing abilities

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Keywords Expertise • Individual differences • Imagery • Spatial ability • Visual art

Background

A number of researches demonstrated that artists or experts on visual art show high ability in visual processing of objects (Winner, 1992; Kozbelt, 2001). The aim of this study is to evaluate the performance of artists on imagery production tasks (measured using vividness of imagery, mental rotation, spatial imagery and mental synthesis) and drawing production tasks. Moreover, we expect that training in visual arts affects significantly the performance on cognitive, spatial, imagery and graphic-motor tasks. Artists compared to non-artists should perform better on drawing tasks involving perceptual ability, visuo-motor skills and ability to make good representational decisions (Cohen & Bennett, 1997).

Method

Subjects: 30 students of the “Accademia delle Belle Arti” of Rome (considered as “Artists”), 30 students of the University of Rome “La Sapienza” from non-artistic faculties (considered as “Non-artists”).

Materials: QMI (Vividness of Imagery Questionnaire, Sheehan, 1966), VVIQ (Vividness of Visual Imagery Questionnaire; Marks, 1973), MRT (Mental Rotation Test, Vandenberg & Kuse, 1978), S(MA) (“Bricks” task, BCR, Reuchlin e Valin, 1971), DMS (Directed Mental Synthesis Task, Finke et al, 1989), CMS (Creative Mental Synthesis Task, Finke et al., 1988).

Procedure: After subjects performed all imagery questionnaires and tasks, they were asked to perform a drawing tasks used in the Kozbelt’s study (2001).

Participants were then divided in 3 different groups and they had to make some drawings according to 3 different methods: the first group using the “Traditional Rendering”, the second using the “Tracing from Photo” and the third using the “Tracing from Drawing” (Cohen & Bennett, 1997).

The drawings performed using the 3 methods were evaluated by 90 independent “non-expert” judges, whereas 3 independent “expert” judges have to evaluate the subjects drawings performed according to the method proposed by Kozbelt.

Results

An ANOVA one-way was calculated considering Groups as independent factor (artists, non-artists) and imagery self-reports, imagery ability and drawing ability as dependent measures.

No significant differences between Group’s scores on the imagery self-reports were found ($p > .05$).

A main effect for Group was obtained, except for the MRT ($F(1,58)=3.561$, $p = .064$) in all imagery performance tasks ($p < .01$).

A significant effect was found for Group in all Kozbet’s drawing tasks ($p < .05$), except for the Three-lines: Rotate task with $F(1,58) = 2,332$, $p = .132$.

Non-parametric test Mann-Whitney showed a significant difference between two Groups and the drawing conditions: respectively for “Traditional Rendering” ($U=353,500$, $p < .01$), “Tracing from Drawing” ($U=636,500$, $p < .01$), and “Tracing from Photo” ($U=119,500$, $p < .05$), therefore drawings evaluated according judges ranks showed differences between experts and non-experts in drawing abilities.

Conclusions

Results obtained by expert and non-expert subjects on



imagery and drawing tasks showed significant differences between the two groups, except for imagery self-report questionnaires. Moreover experts in visual art had particular cognitive-spatial and imaginative abilities both in tasks involving only imagery activity, imagery applied on the drawing and a better performance in drawing tasks involving motor abilities, according to

Kozbelt's results (2001).

Expert subjects showed a worst performance in two tasks: the drawing "Three-lines: Rotated" and the MRT. Both tasks involved mental rotation processes on complex and abstract stimuli, probably unfamiliar in the everyday experience of participants.

