

Assessing the attitudes of students toward school subjects with the semantic differential and interactive visual metaphors

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Abstract This study aims to provide preliminary evidence of the concurrent and structural validity of a novel instrument to measure students' attitudes toward school subjects. This new tool uses interactive software and measures attitudes less directly by asking students to change different visual features of objects displayed in a virtual three-dimensional space, thereby expressing their attitudes metaphorically (popularity/liking through size, importance through size, difficulty through weight, and relationship with a teacher through temperature). The results of this novel method were compared and related to the semantic differential, an already established instrument that is frequently used in the context of school evaluation and focuses on connotative meanings. The study was carried out on a sample of 147 Czech primary school students who rated three school subjects: Czech, English, and mathematics. We used structural equation modeling to analyze the measurement structure of both instruments and the relationship between them. The results showed that a single dominant factor (popularity/liking) can explain the majority of the variance shared between items. However, residual correlations suggested that two other factors are at play, namely importance (measured by the visual metaphor of size) and difficulty (measured by the visual metaphor of weight). The results did

not support a three-factor structure of the semantic differential, which is proposed by the theory of the instrument, since only two semantic differential items appeared to measure something different from popularity/liking. Furthermore, the visual metaphor of distance was the best indicator of popularity/liking, and although other metaphors related to popularity/liking as well, they showed discriminant validity in relation to other metaphors, as evidenced by their pattern of residual correlations with the semantic differential items. In summary, the results support the concurrent validity of the novel instrument utilizing interactive metaphors and also the discriminant validity of individual metaphors but question the proposed factorial structure of the semantic differential.

Keywords distance metaphor, size metaphor, attitude, school subjects, semantic differential.