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Relation Versus Object Mapping in Creative Generation

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Introduction

When people generate new ideas, the properties of those ideas are heavily influenced by the structure of existing concepts (Ward, 1994) and by the attributes of recently encountered category exemplars (Smith, Ward & Schumacher, 1993). Here we focus on the particular aspects of existing knowledge that have the greatest impact on newly generated entities. In mapping old knowledge to a novel idea, are people more likely to preserve the individual attributes of known exemplars or the relations among those attributes, or are they equally likely to preserve attributes and relations (Gentner & Toupin, 1986)? Does the most influential aspect of existing knowledge vary depending on situational goals?

To provide answers to these questions, we asked 72 Texas A&M students to design a carpet for an embassy on an alien planet. We told them that because the carpet was to be made for a planet different from earth, the carpet they designed should be completely different from carpets here on earth. We then provided subjects with an example of a carpet, telling them that this was an example of the type of carpets found on the alien planet.

Method

Subjects were equally divided across three conditions. Those in the control condition received no additional instructions. Those in the creative condition were told to be creative and to make their carpet as different as possible from the example. Those in the copy condition were told that while they should not design their carpet to be exactly like the example, they also should not deviate greatly from the example or try to get too creative.

Subjects were shown as their example carpet one of eight different carpets. Each carpet contained four different objects (e.g. hearts, moons, stars) and between five and seven different relationships between those objects (e.g. objects arranged in a concentric design in the center of the carpet, windowpane design in which there is a central object with a smaller satellite object on each axis).

Each generated carpet was scored for the proportion of relationships and objects that the subject preserved. These variables were determined by counting the number of relationships or objects from the example carpet that were preserved in the subject's carpet and dividing by the total number of relationships or objects that were present in the

example. Creativity and divergence of the generated carpets was determined by showing 26 Northwestern undergraduate raters the generated carpets and the examples on which they were based and having them rate each one in terms of overall creativity and the degree to which the generated carpet deviated from the example (on scales from one to seven; 1-least creative/divergent, 7-most creative/divergent).

Results

An ANOVA indicated that there was a significant main effect of condition, $p < .05$, such that participants preserved the highest proportion of objects and relations in the copy condition and the lowest proportion in the creative condition, with the control condition being intermediate between these extremes. However, there was no significant effect of objects versus relations, and no interaction, indicating that participants were equally likely to preserve objects and relations, and to shift away from those example properties with condition.

Analysis of the relationship between the tendency to copy objects and relations and the rated creativity and divergence of the generated carpets revealed a complex interaction between condition, the type of property preserved, and the rated creativity and divergence of the generated carpets. Preservation of relations was moderately negatively correlated with rated divergence in all conditions, whereas the preservation of objects was moderately negatively correlated with rated divergence only in the copy condition. Correlation of rated creativity with preservation of relations and objects was low in all conditions.

References

- Gentner, D., & Toupin, C. (1986). Systematicity and surface similarity in the development of analogy. *Cognitive Science, 10*, 277-300.
- Smith, S. M., Ward, T. B., & Schumacher, J. (1993). Constraining effects of examples in a creative generation task. *Memory & Cognition, 21*, 837-845.
- Ward, T. B. (1994). Structured imagination: The role of category structure in exemplar generation. *Cognitive Psychology, 27*, 1-40.