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Running head: COGNITIVE STYLE VARIABLES

Cognitive Style Variables in Subjects' Explanations of Conceptual Metaphors

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Abstract

71 University students were first asked to explain three conceptual metaphors. Then the participants' cognitive styles were classified into "analytic" or "holistic" and "imager" or "verbaliser" by means of the Riding (1991) computer assisted test of cognitive styles. The results of the experiment revealed cognitive style variables in subjects' preferred strategies to explain the metaphors: (a) "holistic thinkers" were more likely than "analytic" ones to blend their conception of the target domain with the source domain ; and (b) "imagers" were more likely than "verbalisers" to refer to stereotypical images to explain the metaphors.

Cognitive Style Variables in Subjects' Explanations of Conceptual Metaphors

In this article we report an experiment in which participants were asked to explain established conceptual metaphors. The participants' responses were classified according to scoring criteria derived from three theories of conceptual metaphor that have been put forward within the paradigm of cognitive semantics. These theories have been the subject of debate in recent years, because none of them appears to offer a comprehensive account of all metaphor phenomena.

According to writers such as Lakoff (1987, p. 288) and Johnson (1993, p. 37), metaphor establishes correspondences between two distinct domains in which the structure of a source domain is projected onto a distinct, abstract target domain. The source domain of warfare, for example, is often used to lend structure to our experience of an argument (Lakoff & Johnson, 1980, pp. 3-6). The mapping is by definition partial, not an identity (Lakoff, 1990). In this view, metaphoric projection is unidirectional, going from source to target domain (but see Engstrom, 1999). On the other hand, writers such as Fauconnier and Turner (1994, 1995, 1998) consider many metaphors as a process of "blending" or "conceptual integration" of domains. This may result in novel "mental spaces" with their own emergent structure, i.e. they may include elements that are not intrinsically part of either source or target. The idiom "To dig one's own (financial) grave." for example, reflects a "logic" which deviates from that of the source domain (one does not normally dig one's own grave in physical space). The proverbial expression "Vanity is the quicksand of reason" has its own emergent structure, too: whereas in the physical domain one is likely to be aware of the quicksand when one is trapped by it, in the mental domain one may be unaware of being misguided by vanity (Turner, 1998, p. 65).

A number of cognitive semanticists have focused on an additional facet of figurative thought: the interaction between metaphor and metonymy (e.g., Boers, 1996; Goossens, 1990, 1994; Kovecses, 1986, 1990). This has led to the view that conceptual metaphors typically have a metonymic underpinning (Barcelona, 1997). We often define a whole category by generalising from a stereotypical image (Lakoff, 1987, p. 77). The stereotypical image serves as a metonymic model within a domain (i.e., as a part standing for the whole) and is subsequently mapped across domains through metaphor (see also Glucksberg, 1993, p.18; Glucksberg, Manfredi, & McGlone, 1997; Kennedy, 1996). Such a strong “imagery” approach is obviously opposed to the treatment of metaphors as mere linguistic propositions (but see, e.g., Glucksberg, Brown, & McGlone, 1993; McGlone, 1996; Murphy, 1996; Ortony, 1988).

Of necessity, each of the metaphor theories we have briefly referred to is metaphoric itself (e.g. “Mapping,” “Blending,” “Within / Across domains”) and thus offers only a partial understanding of the abstract phenomenon under discussion. If, as maintained in the first theory (metaphor as mapping across two distinct domains), the metaphoric projection is strictly unidirectional, then what exactly triggers that association in the first place ? If, as claimed in the second theory, metaphor is a matter of conceptual integration or blending of various inputs, then how is this process confined to what is relevant to the blend ? If, as proposed by the third theory, metaphor is the projection of stereotypical images or other metonymic models, then how do we account for metaphoric reasoning that deviates from the stereotypes or that perhaps does not necessarily involve imagery at all ? Answering these and many other related questions is far beyond the scope of this article. For detailed discussions and evaluations of the cognitive semantic approaches to metaphor, we refer to Engstrom (1999); Green & Vervaeke (1997);

Katz (1998); Vervaeke & Green (1997) and Vervaeke & Kennedy (1996). For practical purposes, we propose to conceive the before-mentioned theories as complementary rather than mutually exclusive. Each describes a wide range of linguistic and non-linguistic data and, in addition, each appeals to different individuals' intuitions about the workings of metaphor. It is the latter variable that we are especially interested in here.

A lot of valuable experimental research has already been carried out into people's processing of conceptual metaphors (see Gibbs, 1994), but - to our knowledge - hardly any mention has been made of the possibility that different approaches to conceptual metaphor may be related to different cognitive styles. Cognitive styles are defined by Das (1988) as "an individual's characteristic and consistent approach to organising and processing information". A number of cognitive style dimensions have been identified in psychology (see, e.g., Bever, 1975; Holyoak, 1984; Witkin & Goodenough, 1977, 1981). Cognitive style dimensions are traditionally treated as continua (Moran, 1991) and subjects have been shown to be consistent in their cognitive styles across different tasks and over long periods of time (Guilford, 1967; Pask, 1988). Riding and Cheema (1991) make a convincing case for the existence of two principal, superordinate cognitive style continua, the "analytic / holistic" continuum and the "verbaliser / imager" continuum.

The analytic / holistic dimension (Bever, 1975; Brumby, 1982; Kirby, 1988) refers to an individual's preference for processing information either as separate parts, or as large integrated chunks. When presented with a problem to solve, the holistic individual will study the whole picture, whilst the analytic individual will focus on the separate parts of the problem (see, e.g., Oxford & Anderson, 1995: 204).

The test which is most often used to measure a person's positioning on the holistic / analytic cognitive style continuum is Riding's (1991) computer-based Cognitive Styles Analysis (CSA). The CSA measures analytic processing by presenting the subject with a simple shape and a complex shape, placed side by side. The subject's task is to decide, as quickly as possible, whether or not the simple shape is contained within the complex shape. In order to measure holistic processing, the subject is presented with two images, again side by side on the computer screen. This time the task is to decide whether or not the shapes are identical. The computer records the subject's reaction times on both parts of the test, calculates the ratio, and uses this to place the subject's performance on either end of the analytic-holistic cognitive style continuum. The analytic part of the CSA corresponds very closely to the Group Embedded Figures Test (GEFT) (see Witkin & Goodenough, 1977), which has been used to measure the ability to disembed items from their given context. Applied to the task of explaining conceptual metaphors, we could hypothesize that analytic subjects are more likely to conceive the two inputs of metaphor as distinct domains and to disembed from them the elements that are most relevant to the analogy. Holistic subjects, on the other hand, appear better skilled at rapidly judging gross similarities rather than differences but less able to ignore irrelevant contexts. When asked to explain conceptual metaphors, these subjects may therefore be more likely to include less relevant elements of the input domains or even activate other, related domains in their explanation.

The verbaliser / imager dimension (Katz, 1983; Paivio and Harshman, 1983; Riding and Douglas, 1993) refers to a subject's preference for thinking either in words or in pictures. In a comprehensive review, Ernest (1977) observed that individual differences in imagery can have a significant impact on an array of

cognitive functions. A second module of the CSA is meant to measure verbal / imagery processing. In this section of the test, subjects are presented with pairs of words and asked whether they are related by colour or type, or are unrelated. The “colour” sentences are thought to tap imaginal processing and the “type” sentences are thought to tap verbal processing. The computer records the subject’s reaction times on each task, calculates the ratio, and uses this to locate the subject’s performance on either end of the verbaliser-imager continuum. With respect to the explanation of conceptual metaphors, we may hypothesise that imagers find it easier than verbalisers to form clear stereotypical mental images from which they can then generalise. In other words, they may have more facility in associating a whole experiential domain with one typical scene, which may then form an interactive image between different domains, resulting in a metonymy-based processing of metaphor. Verbalisers, on the other hand, may be more likely to adopt a more “propositional” approach to metaphor.

The analytic / holistic and the verbaliser / imager cognitive style dimensions have been reported to be related to the ways in which subjects process novel figurative utterances (Littlemore, 1998). However, to date we have found no research into the relationships between subjects' cognitive styles and their processing of conceptual metaphors. In the present article, we report on an experiment whose aim was to examine the plausibility of such relationships. It was hypothesized that (a) holistic subjects would be more likely than analytic ones to explain conceptual metaphors through a blending process; and (b) imagers would be more likely than verbalisers to explain conceptual metaphors through a metonymy-based process.

Method

Participants

A total of 71 students of business and economics of the Free University of Brussels participated in the experiment (28 female and 43 male students, aged 19 to 21). They were familiar with the economic language used in the experiment, but their attention had not yet been drawn to its figurative nature.

Materials, Design and Procedure

The experiment consisted of a metaphor task followed by a cognitive style test. For the metaphor task, subjects were asked to explain (in the given order) three conceptual metaphors that are commonly used in economic discourse: “ECONOMIC COMPETITION IS RACING,” “AN ECONOMY IS A MACHINE” and “ECONOMICS IS HEALTH CARE” (see appendix for the three task descriptions).

The participants were presented with three conceptual metaphors in order to observe the extent to which their explanation strategies remained consistent across various cases. Subjects were given 10 minutes per task. Both authors then independently examined the responses for the following four elements:

- (a) recognition of analogies or correspondences between source and target domain (e.g. “Economic competition is like racing in the sense that entrepreneurs correspond to the athletes and mental work corresponds to physical exercise”);
- (b) recognition of ways in which the analogy between source and target domain failed (e.g., “There is no finish line in economic competition as there is in a race”);
- (c) attempts to explain the metaphor by referring to elements that are not part of the source domain or that deviate from the source domain (e.g., “Economic competition is like racing because it is like a jungle in which only the fittest survive”); and
- (d) references to a metonymic association grounded in a stereotypical image (e.g., “Economic competition is like racing because business people are always in a

hurry to get to new customers first”).

Any cases of disagreement between the two authors concerning the identification of these elements (e.g., due to ambiguous responses) were excluded. Fortunately, this was limited to only two instances, both concerning category (c).

In order to measure the subjects’ cognitive styles along the holistic / analytic and verbaliser / imager continua, Riding’s (1991) Cognitive Styles Analysis was used (see above). The subjects’ positions on the two continua were calculated automatically by the computer program.

Results

29 subjects (40.85 %) explained the three metaphors by referring exclusively to structural correspondences between source and target domain. These included the following examples. For the “ECONOMIC COMPETITION IS RACING” metaphor: the entrepreneur corresponds to the athlete; gaining economic expertise corresponds to the athlete's training; making most profits corresponds to being first in the race; mental discipline corresponds to physical discipline; ranking companies or national economies corresponds to ranking athletes. For the “ECONOMIES ARE MACHINES” metaphor: the different agents in an economy correspond to the different parts of the machine; an economist corresponds to a mechanic; applied economics corresponds to maintaining the machine; economic policies correspond to tools; money corresponds to fuel for the machine. For the “ECONOMICS IS HEALTH CARE” metaphor: the economy corresponds to a living being; the economist corresponds to the doctor; economic activity corresponds to health; lack of economic activity corresponds to illness; economic policies correspond to medicine; bankruptcy corresponds to death.

At the end of each metaphor task, the participants were also asked to list ways in which the target domain differed from the source domain (see appendix).

17 subjects (23.94 %) listed such differences between source and target for all three metaphors. Another 20 subjects (28.17 %) did so for 2 of the three metaphors. These differences included examples of the following kind. Economic competition is not really like a race, because there is no finish line in economic competition. Economies are not really like mechanisms, because economies involve unpredictable human behaviour. Economics is not really like health care, because companies or economies can last much longer than people. There was a strong correlation between the number of structural correspondences a subject found between the source and target domains, and the number of differences reported between the two domains ($r = 0.62$; $p < 0.01$).

25 subjects (35.21 %) tried to explain at least one of the metaphors by referring to elements which were strictly speaking not part of the source domain, but which rather seemed to be part of the subjects' previously established "rich" conception of the target domain. Such "deviations" from the source domains included the following examples. "Economic competition is talked about in terms of racing because it is a merciless jungle where only the fittest survive." "Economic competition is talked about in terms of racing because there can be only one winner and all the others are losers" (disregarding the source domain feature that athletes who come second or third win medals too). "Economies are talked about in terms of machines because they cannot be mended by changing some parts, the whole system has to be replaced" (disregarding the fact that many machines can be mended by replacing malfunctioning parts). "Economies are talked about in terms of machines, because they function independently of people" (disregarding the source domain feature that many machines do require a human operator). "Economics is talked about in terms of health care because economies can never recover without consulting a doctor / an economist" (disregarding the

source domain feature that many people resort to self-medication, especially in cases of minor ailments). “Economics is talked about in terms of health care because, like doctors, economists can always find remedies” (which, unfortunately, is not always true in the real world of medicine - or economics). We assume that these kinds of responses were fed by the subjects’ previously established rich conception of the target domain of business and economics, because - being students of business and economics - they were likely to regard their studies and future occupations as highly demanding and indispensable.

25 subjects (35.21 %) referred at least once to a stereotypical image or scene in the target domain that called up the association with the given source domains. These metonymic bases included the following examples. For the RACING metaphor: the image of hurrying businessmen. For the MACHINE metaphor: the image of a production process with machines along assembly lines. For the HEALTH metaphor: the image of a healthy, well-fed population as a reflection of economic prosperity.

Sometimes no explanation was given. For the RACING metaphor this was the case for 16 participants; for the MACHINE metaphor it was the case for 9 participants; and for the HEALTH metaphor it was the case for 14 participants.

Turning now to the second part of the experiment, the response patterns of the subjects on the metaphor task were found to be related to their cognitive styles as calculated by the CSA. As predicted, holistic subjects were significantly more likely than analytics to deviate from the source domain (by attributing elements to the source domain that were actually part of their rich conception of the target domain): holistic ($M = 0.56$, $SD = 0.66$), analytic ($M = 0.19$, $SD = 0.49$), $t(2.64)$ $p < 0.01$. Also as predicted, imagers were significantly more likely than verbalisers to explain the given conceptual metaphors by generalising from stereotypical

scenes (used as metonymic models): verbalisers ($M = 0.43$, $SD = 0.71$), imagers ($M = 0.77$, $SD = 0.76$), $t(-1.99)$ $p < 0.05$.

Discussion

Subjects may explain conceptual metaphors in different ways. Some exclusively reported structural correspondences (analogies) between source and target domains. This approach is in accord with Lakoff and Johnson's model of metaphor as a mapping across two distinct domains. The capacity to recognise such analogies also appears to facilitate the recognition of the partial nature of metaphorical mappings. Other subjects deviated from the inherent logic of the source domains. Since these deviations seemed due to interference from the subjects' previously established conception of the target domain, this approach resembled Fauconnier and Turner's model of blending or conceptual integration of different inputs. While the former strategy (i.e. mapping across two distinct domains) appeared more typical of an analytic cognitive style, the latter strategy (i.e. blending of domains) appeared more typical of holistic profiles. This finding corroborates the hypothesis that analytic subjects are more likely to conceive of the source and target domains of a metaphor as separate parts, while holistic subjects are more likely to treat them as an integrated entity.

Sometimes the given conceptual metaphors were motivated by references to a stereotypical image or scene. This type of response appeared more typical of subjects with an imager cognitive style than of verbalisers, an observation which corroborates the hypothesis that imagers are more likely to use specific mental pictures as metonymic models when they process conceptual metaphor.

Our experiments offer a glimpse of the possible range of individual differences in metaphor processing and cognitive styles. We should bear in mind, however, that only a few particular conceptual metaphors were used in the

experiment and that the test was confined to the task of explaining (and assessing) given metaphors. For example, it does not reveal anything about metaphor production.

Conclusions

Our results suggest people process conceptual metaphors in different ways. Subjects' approaches to the tasks sometimes seemed to involve the projection of structures across distinct domains and sometimes conceptual integration of domains. Some subjects reported metonymic bases, while others did not. Many participants applied various strategies, albeit with a preference for one. Subjects' preferred strategies matched aspects of their cognitive styles, as measured by the CSA. These preliminary findings point to the possibility that different variants of the cognitive semantic metaphor model may complement one another by accommodating different individuals' intuitions.

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Appendix

Task 1:

Economic competition is often described in terms of racing.

Some examples: “ We have to stay ahead of the competition; Our economy is lagging behind; We have to catch up with our foreign competitors; Who is winning the race for market share ? ”

Why is economic competition talked about in this way ? List as many reasons as you can.

Then try to list ways in which economic competition is NOT like racing

Task 2:

An economy is often described in terms of a machine.

Some examples: “ The exchange-rate mechanism; The economy is overheating; Macroeconomic tools; The monetary lever has rusted; Tightening the screws on the economy; Fine-tuning economic growth. ”

Why are economies talked about in this way ? List as many reasons as you can.

Then try to list ways in which an economy is NOT like a machine.

Task 3:

Economics is often described in terms of health care.

Some examples: “ Healthy firms; Chronic deficits; The economic remedy; The market cure; A financial injection; Surgery that costs jobs; Economic recovery. ”

Why is economics talked about in this way ? List as many reasons as you can.

Then try to list ways in which economics is NOT like health care.

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