APPLICATION OF COMBINING ANTONYMOUS CONCEPTS IN A CREATIVE THINKING SKILL

Chen-Yao Kao

National University of Tainan, Tainan, Taiwan

Abstract

Forming conceptual combination plays an important role in human thinking. Many creativity theories (e.g., Mednick's associative theory, Koestler's bisociation, and Rothenberg's Janusian thinking) and creative thinking skills (e.g., morphological synthesis and synectics) are in essence conceptual combination. Janusain thinking, the main issue of this article, is defined as a creative process that actively conceives two opposite concepts simultaneously. A creative thinking skill, which is built on the theory of Janusian thinking and called the Three-Stage Janusian Thinking Training Activity (TSJTT), is presented in this article. Through providing scaffolding, this activity helps students advance step by step to attain the ultimate goal of independent creation. Hopefully, this article can make some contributions to education in creativity.

Key words: *conceptual combination, creative thinking skills, antonym, Janusian thinking*

1. INTRODUCTION

Understanding and constructing conceptual combination plays an important role in human thinking (Wikenfeld & Ward, 2001). We can see numerous examples of conceptual combination in diverse domains, such as arts, language, science, etc. In language, conceptual combination can be easily detected in everyday language use like compound phrases and also in highly creative use like metaphorical expressions. In fact, constructing compounds like "gender-specific," "head-hunt," "house-sit," "cutting edge," "computer literate," "distance learning," "field trip," "motion capture," "ideas man," "cyber-crime," "gagging order," and so forth, is a natural way to expand our lexicon (Wisniewski, 1996) and also to exhibit our linguistic creativity (Parault, Schwanenflugel, & Haverback, 2005). Creating new word combinations "serves as the back door into the lexicon" (Downing, 1977, p. 823). Of the diverse linguistic phenomena, noun-noun compounds draw much attention from researchers since this sort of conceptual combination considered richer in semantic variation than other sorts. Further, the vast majority of the noun-noun combinations under study contain concrete nouns, such as book magazines, car trucks, dancer musicians, sparrow hawks, yarn strings, etc. (Costello & Keane, 2000; Wisniewski & Love, 1998). Abstract nouns are seldom investigated in the noun-noun-combination studies. Broadly speaking, any legal syntactic structure, like preposition-preposition phrases, preposition-noun phrases, adjective-noun phrases, etc., can be viewed as a certain type of conceptual combination. This article is intended to scrutinize the conceptual combination in the form of a sentence structure containing two adjective antonyms, called Janusian sentences. Before providing the information concerning Janusian sentences, main types of conceptual combination, contrast between relational and property combination, a relevant theory regarding conceptual combination (conceptual integration theory), and description of Janusian thinking are first presented.

2. WHAT IS CONCEPTUAL COMBINATION?

Conceptual combination is a cognitive process of merging two concepts from which a new concept may derive (Chan & Schunn, 2015; Costello & Keane, 2000; Parault, Schwanenflugel, & Haverback, 2005). The new concept is called a combined or complex concept, whereas the two concepts forming the complex concept are called combining or constituent concepts (Smith & Osherson, 1984; Wikenfeld & Ward, 2001). Since conceptual combination involves enlargement and modification of concepts, conceptual combination is arguably related to Piaget's assimilation and accommodation.

Mainly based upon empirical studies on noun-noun phrases, interpretations of conceptual combination are categorized into three principal types: relational, property, and hybrid interpretations (Wikenfeld & Ward, 2001). In relational interpretations, a scenario or link is identified between the two combining concepts (e.g., water fowl, denoting birds living near or on water). In property interpretations, a property is projected from one combining concept to the other (e.g., a robin duck, a duck with a red chest). The property projected is usually an alignable difference between the two combining concepts. Alignable differences, "differences along a common dimension or predicate that plays the same role in the common structure" (Gentner, 2010, p. 762), readily show up during the comparison and alignment process. In hybrid interpretations, the combined concept is a blend of the two combining concepts (e.g., a musician dancer, denoting someone who is accomplished in both fields of music and dancing). That is to say, the referent of the combined concept involves many properties of both constituents and the properties of neither constituent dominate (Costello & Keane, 2000; Parault, Schwanenflugel, & Haverback, 2005; Wikenfeld & Ward, 2001). A hybrid interpretation can be viewed as an extreme version of a property interpretation because more than one properties of one constituent are integrated into the other (Parault, Schwanenflugel, & Haverback, 2005). Accordingly, these two types of interpretations are sometimes consolidated into the property/hybridization interpretation (Wikenfeld & Ward, 2001; Wisniewski, 1996). In addition to the three types described above, Costello and Keane (2000) added two more types: conjunctive and known-concept interpretations. In conjunctive interpretations, the complex concept is an example of both constituent concepts. Costello and Keane used the instance "a pet fish is a guppy" (p. 302) to explain conjunctive interpretations because "guppy" is an example of "fish" (the head) and also an example of "pet" (the modifier) simultaneously. In known-concept interpretations, a known concept that is related to the two constituent concepts is used as a complex concept. Costello and Keane used the instance "a cow house is a byre" (p. 302) to explain known-concept interpretations. "Byre" is related to both "house" (the head) and "cow" (the modifier). However, "byre" is an example of "house" (the head) but not of "cow" (the modifier). The referent of the combined concept is an example of the head but not of the modifier in known-concept interpretations. On the other hand, the referent of the combined concept is an example of both the head and the modifier in conjunctive interpretations. This explains the difference between conjunctive and known-concept interpretations. Parault, Schwanenflugel, and Haverback (2005) used the "exemplar naming" interpretation that subsumed both conjunctive and known-concept interpretations in the coding scheme of their study. That there may be still others types of conceptual combination existing besides those types described above. In addition, a number of interpretations fail to fall neatly into one type and are involved in two or more types. For example, the noun-noun compound "zebra lion" can yield the property interpretation of "a striped lion," or the relational interpretation of "a lion which preys on zebras."

3. RELATIONAL INTERPRETATIONS VS. PROPERTY INTERPRETATIONS

Of these general types of interpretations, relational and property interpretations are the most prevalent. These two types of interpretations are also discussed most in literature. This section thus provides more information concerning relational and property interpretations. Wisniewski's (1997a & 1997b) dual-process theory proposes the scenario-creation process and the comparison process to describe relational and property interpretations, respectively. People generally use the scenario-creation process to formulate relational interpretations for the combinations with dissimilar constituent concepts. On the other hand, people generally employ the comparison process to produce property interpretations for the combination with similar constituent concepts (Costello & Keane, 2000; Parault, Schwanenflugel, & Haverback, 2005; Wikenfeld & Ward, 2001). Simply put, the combination of similar concepts tends to result in property interpretation, whereas the combination of dissimilar concepts is inclined to bring about relational interpretations. As described earlier, relational interpretations involve a thematic link or a plausible scenario that associates the two constituent concepts. With their meanings left intact, the two constituents play different and complementary roles within this plausible scenario. The roles typically include the agent role, the object role, and the instrument role, corresponding to who performs the action, what is affected by the action, and what tool is used, respectively (Costello & Keane, 2000). Take a combination with dissimilar constituents

"a fish knife" for example. The interpretation for "a fish knife" is "a knife for cutting fish." The relational interpretation is formulated based on a *cutting* scenario in which the concept *fish* fills the object role and *knife* fills the instrument role. As for the combination with similar constituents like "a banana mango," the relational interpretation does not work well anymore because the two similar constituents play the same role in a relation. In other words, "banana mango" cannot be like the noun-noun combinations "banana lover" or "mango lover" interpreted with the *eating* relation because the two constituents are the fillers for the same object role. Without a plausible scenario being successfully created, the *shape* property is then projected from the modifier "*banana*" onto the head "*mango*" to generate a version of mangoes that is long and curved in shape compared with other kinds of mangoes. Nonetheless, the projected property needs to be modified to fit the context of the head noun. After all, banana mangoes are certainly not as long and as curved as bananas. With an increase in the similarity of the two constituent concepts, the likelihood of property interpretation is also enhanced. However, high-similarity combinations do not exclude the probability of relational interpretations; likewise, low-similarity combinations do not rule out the probability of property interpretations (Wikenfeld & Ward, 2001).

As argued by Wisniewski (1996), conceptual distinctions exist between relational interpretations and property interpretations. For instance, in "a fish knife" interpreted with a thematic relation, the modifier refers to fish and the head refers to a sort of knife. The modifier and the head noun play different functional roles in a plausible scenario. The relational interpretation basically preserves the meaning of the two constituents in the combination (Wisniewski & Love, 1998). Nonetheless, in "a banana mango" interpreted with a property as "a mongo that is long and curved in shape," the modifier refers to "a property of a banana" rather than to "a banana as a whole." There is no thematic relation between "a banana" and "a mango," but the property interpretation points out that a mango resembles a banana in a certain aspect. As mentioned above, the modifier refers to one of its properties and the property that is selected and projected onto the head noun has to be modified to fit the relevant characteristics of the head (Parault, Schwanenflugel, & Haverback, 2005). It can thus be inferred that "property interpretations use the modifier in an extended sense" (Wisniewski & Love, 1998, p. 179).

Compared with relational interpretations, property interpretations have a less "holistic" processing mechanism. Property interpretations entail three procedures: alignment, selection, and integration (Parault, Schwanenflugel, & Haverback, 2005). The elements in two constituent concepts are first aligned, a salient diagnostic property is then selected, and the selected property, which is usually an alignable difference between the two constituents, is projected from the modifier and integrated into the head. Take "a banana mango" as an example again. Alignment of the concepts "banana" and "mango" generates a common relational structure that describes tropical fruits, and yield an alignable difference connected to the common structure. A banana's shape is long and curved, whereas a mango's shape is oval. This alignable difference that is salient and diagnostic is then projected from the modifier "banana" and integrated into the head "mango" to formulate the property interpretation "a mango that is long and curved in shape."

A question may be posed concerning the property projected from the modifier "banana" to the head "mango." Why is the *shape* property projected, not the *color* property or others? For the combination "a banana mango," both interpretations "a mango that is long and curved in shape," and "a mango that is yellow in color" are plausible. However, "long and curved in shape" is more salient and diagnostic of bananas than "yellow in color." After all, there are other fruits which are yellow in color, such as lemons, apricots, and melons. On the other hand, it is very difficult to come up with a kind of fruit, except bananas, whose shape is long and curved. Therefore, the *shape* property is the salient diagnostic attribute for the concept of "banana" because it occurs frequently in instances of bananas and scarcely in instances of other fruits (Costello & Keane, 2000).

4. CONCEPTUAL COMBINATION AND CONCEPTUAL INTEGRATION

Conceptual combination in general involves cross-domain mapping and inference transfer. However, Fauconnier and Turner (2002) tried to go beyond the popular focus on cross-domain mapping and

inference transfer and proposed their conceptual integration theory. This theory presents a fundamental cognitive operation, conceptual integration or blending, which builds networks of interconnected mental spaces—input, generic, and blended spaces. Mental spaces are defined as "small conceptual packet constructed as we think and talk, for purposes of local understanding and action (Fauconnier & Turner, 2002, p. 40). The input spaces reflect salient aspects of corresponding situations or events. The generic space is the schematic frame shared by situations or events. It includes what inputs have in common. The blended space involves selective projection from inputs and dynamically develops emergent structure. The standard case of blending is generally represented by the four-space model, with two inputs, one generic space, and one blended space. However, in more complex cases of blending, more than two inputs can engage in mapping, in contrast with the two-domain models in conceptual metaphor theory (Lakoff, 1992) or structure-mapping theory of analogy (Gentner, 2010). These inputs, partially linked by cross-space mapping, project onto a separate blended space selectively. The cross-space mapping, instead of the cross-domain mapping, is used by Fauconnier and Turner (1998) because mental spaces are the integral components of their theoretical network.

According to Fauconnier and Turner (1998), the blended space is the key feature of the integration network but it is a feature overlooked by theories of metaphor and analogy. As aforementioned, the blended space develops emergent structure in a dynamic manner. A new meaning structure distinct from original meanings provided by inputs to some degree (Tendahl & Gibbs, 2008), emergent structure is constructed by composition, completion, and elaboration. Composition is a basic process wherein elements are selectively projected from inputs to the blended space. Completion is a process of incorporating background knowledge into the blended space unconsciously so as to enrich the relations of the blend. Elaboration denotes mental simulation or the imaginative running of the blend (Bache, 2005; Tendahl & Gibbs, 2008). Through completion and elaboration, the blend generates novel features not existing in inputs (Fauconnier & Turner, 1998).

Conceptual integration or blending, required for meaning construction, plays a crucial role in thought and language use. Double-scope blending is a type of the integration network in which significant frame and elements are brought in from inputs. This type of network is capable of resolving conflicts between inputs with fundamentally different content and topology and thus considered a powerful source of insight and creativity. The conceptual integration theory, though not supported by sufficient empirical evidence, is viewed by many researchers as a useful tool that can explain a wide range of cognitive activities (Tendahl & Gibbs, 2008).

5. CONCEPTUAL COMBINATION AND CREATIVE THINKING

Several creativity theories (e.g., Mednick's associative theory and Koestler's bisociation) are in essence conceptual combination. A great number of creative thinking skills also employ conceptual combination. In Eberle's (1977) idea-generating technique, SCAMPER, C stands for combing two parts or ideas. The core of Gordon's (1961) synectics is analogy and metaphor, which are major types of conceptual combination. Other thinking skills, such as morphological synthesis (combining two features in a grid pattern) and random input (making connections between a problem and a randomly chosen word to obtain a novel solution to the problem) are also different forms of conceptual combination (Starko, 2005). Moreover, Rothenberg (1990) proposed homospatial thinking and Janusian thinking, two thinking processes that "distinguish creative people from the rest of us" (p. 11). Homospatial thinking is defined as "actively conceiving two or more discrete entities occupying the same space, a conception leading to the articulation of new identities" (Rothenberg, 1978, p. 175). Through homospatial thinking, creators superimpose and blend elements from different temporal and spatial dimensions. Homospatial thinking is also considered the major process contributing to the development of simile and metaphor (Starko, 1995). From the description above, homospatial thinking obviously represents conceptual combination. Janusian thinking, the main point of this article, is described in details in the section below.

6. JANUSIAN THINKING AND CONCEPTUAL COMBINATION

Janusian thinking can be defined as a creative process that actively conceives "two or more opposite or antithetical concepts, ideas or images simultaneously" (Rothenberg, 1978, p. 175). According to this brief description of Janusian thinking, it can be justifiably inferred that Janusian thinking instantiate conceptual combination. The term Janusian thinking is named after Janus, the Roman god of gateways and beginnings, whose two faces command opposite directions simultaneously. Initially, Rothenberg (1971) used the term oppositional thinking to represent this thinking process but later replaced *oppositional* with *Janusian* because "it more accurately conveys the simultaneity of opposition and because, as a metaphor, it embodies the process it denotes" (p. 313). The features of opposition and simultaneity in the process of Janusian thinking are emphasized. During this creative process, the opposite concepts, ideas and images come together side by side, rather than in a temporal sequence. Janusian thinking does not lead to synthesis or reconciliation of opposites since their original properties or functions are not lost. During and after integration, all contradictory entities within the single framework remain true and valid at the same time. For Janusian thinking, simultaneity characterizes not only its functioning of opposites conceived side by side, but also its veracity in retaining the opposing components. The so-called *valid self-contradiction* epitomizes Janusian thinking (Rothenberg, 1971 & 1990).

Opposition can also shed light on two concomitant phenomena, surprise and stimulation. The coexistence of opposites, seemingly illogical or even preposterous, catches the audience's attention first. To realize that the antitheses of the previously held concepts and beliefs are not only functioning but also true causes much dissonance in observers' cognition. Surprise is a natural reaction in the process of regaining cognitive equilibrium. In addition, the stimulation of masterpieces derives partly from the effects of conflict. Opposition is the key ingredient in all types of conflict (Rothenberg, 1978). Conflicting elements often whet the interest of the audience. They "appeal to a special part of our mental apparatus, a part that enjoys thinking about some of life's most intriguing contradictions and paradoxes" (Grothe, 2004, p. 18). Also based on structure-mapping theory (Gentner, 1983 & 2010), Ward (2001) accounted for the phenomenon of surprise accompanying opposition-induced creativity. As he argued, conflicting properties that are identified **by the comparison-alignment process** in combined concepts generate audience's surprise. He used Harvard-educated carpenters as an example to show the difficulty in aligning the stereotypical occupational expectations of a Harvard graduate and a carpenter. This difficulty causes audience surprise and then makes them try hard to explain the conflict.

7. INCORPORATING JANUSIAN THINKING INTO A CREATIVE THINKING SKILL

The main purpose of this article is to introduce a creative thinking skill, built on the theory of Janusian thinking. This theoretically-based activity is called the Three-Stage Janusian Thinking Training Activity (TSJTT). The backbone of the TSJTT is the sentence that contains two antonymous adjectives, called the Janusian sentence (e.g., Bad habits are both easy and difficult because they are easy to get but hard to give up.). Through modifying Janusian sentences, this activity helps students advance step by step to attain the ultimate goal of independent creation. Of the types of interpretations for conceptual combination described earlier, property interpretation may have the closest relationships with the conceptual combination in Janusian sentences because adjectives are mainly used to refer to properties and because combining antonyms is processed by comparison.

7.1. The First Stage of the TSJTT

After receiving brief introduction in basics of Janusian thinking, participants are required to complete the sentence completion items shown as follows and their answers need to reflect the meaning of the two underlined antonyms in the sentences. There are no standard answers to the blanks. During this activity, participants are encouraged to make their answers as interesting and original as possible.

Example 1. Invention is both new and old because _____.

Example 2. The swan is both elegant and awkward because _____.

Answers for Reference

Invention is both new and old because creative things are usually the combination of old things.

The swan is both elegant and awkward because it is elegant on lakes but awkard on land.

7.2. The Second Stage of the TSJTT

At the second stage, participants are also presented with tasks of sentence completion. Each task takes the form of an incomplete sentence as well. However, the position of subject is left blank, as shown below. Some scaffolding has been withdrawn. There are no standard answers to the blanks. Rather, participants' answers need to reflect the meaning of the two underlined antonyms in the sentences. Participants are encouraged to make their answers as interesting and original as possible.

Example 1. _____ is both perfect and imperfect because _____.

Example 2. _____ is both complicated and simple because _____.

Answers for Reference

Vanity is both perfect and imperfect because beautiful appearance is used to cover inner defects.

Poetry is both complicated and simple because profundity of meanings is hidden in a few lines.

7.3. The Third Stage of the TSJTT

At the third stage, participants need to create whole new sentences containing a pair of antonyms by themselves. All scaffolding has been withdrawn. Participants are encouraged to make the sentences as interesting and original as possible. Some of the participants' works are exhibited below.

1. Water is both gentle and fierce because it can irrigate dry lands and also inundate fertile farms.
2. Marriage is both a beginning and an ending because harsh reality begins but colorful romance ends.
3. A teacher is both selfish and selfless because she wants to occupy all of her students' attention so as to share her knowledge generously.
4. Technology is both constructive and destructive because it expedites the advance of our civilization but does much damage to our natural environments.
5. Tongues are both dull and sharp because blunt tongues cut.
6. The coming of summer vacation is both painful and pleasant because students face the pressures of final exams and term papers before they enjoy leisure time.
7. Delicious food is both happy and sad because it satiates your desire but makes your body look miserable.

8. CONCLUSION

In this rapidly-changing modern world, the knowledge and skills needed in the future may be unavailable or unknown at the time a person studies at school. Therefore, educational institutions cannot limit themselves to offering prescribed information and concepts since they may be obsolete rather soon. One primary goal of our education should be incorporating creative thinking processes into all content areas at all grade levels (Cropley, 2001). This creative thinking activity is based upon the author's own teaching experiences and research findings. Through the introduction of this self-designed activity, this article is intended to make some contributions to education in creativity.

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