Teaching and Learning by Analogy: Psychological Perspectives on the Parables of Jesus

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Introduction

With many similar parables Jesus spoke the word to them, as much as they could understand. He did not say anything to them without using a parable. Mark 4:33-34

Interdomain instructional analogies are powerful tools for teaching and learning. An interdomain instructional analogy juxtaposes two knowledge domains that bear little or no surface similarity but share a common relational structure. Numerous research studies have demonstrated the instructional effectiveness of interdomain analogies in promoting learning, understanding, and conceptual change (Dagher, 1995; Mayer, 1989; Zook, 1991). However, teaching and learning by analogy is not without its risks, for research findings also clearly indicate that analogies place increased cognitive processing demands on learners and can encourage them to form misconceptions and faulty mental models when they transfer (or map) the wrong ideas from one domain to another—that is, when they

attempt to extend the analogy too far (Brown & Clement, 1989; Gentner & Gentner, 1983; Zook, 1993; Zook & Di Vesta, 1991; Zook & Maier, 1994). Ironically, an interdomain instructional analogy can at once facilitate meaningful learning and promote confusion and misunderstanding. By all accounts, analogies appear to function as double-edged instructional swords.

This double-edged instructional sword is the very strategy that Jesus employed repeatedly to reveal principles of the Gospel to people of his time and future generations. Jesus taught in parables, and parables are fundamentally instructional analogies. Although Biblical scholars have readily acknowledged the teaching function of Jesus' parables (Hultgren, 2000; Zuck, 1995), their analyses have routinely ignored this instructional perspective—most likely due to the lack of an adequate psychological framework to account for internal analogical learning processes. The goal of this paper is to demonstrate how emerging psychological perspectives on analogical learning processes should inform our understanding of the Gospel message that Jesus taught by parable and influence our use of instructional analogies as teaching strategies.

Thinking and Learning by Analogy

The fundamental feature of analogical thinking and, therefore, learning by parable, is relational comparison. Analogical similarity is " . . . a special kind of similarity which is the similarity of structure, the similarity of form, a similarity of constellation between two sets of structures, two sets of particulars, that are manifestly different but have structural parallels" (Oppenheimer, 1956, p. 129). When people think by analogy, they assert that two situations are similar because their underlying relationships are similar—not because their surface features are similar (Holyoak, Gentner, & Kokinov, 2001).

The word "parable" is derived from the Greek word "parabole" (Hultgren, 2000; Zuck, 1995). This word is comprised of two roots, "para," which means "beside or alongside," and "ballein," which means "to throw." Thus the Greek word "parabole" literally means "to throw beside or alongside" (Zuck, 1995), and the word "parable" refers to placing two ideas alongside each other for the purpose of comparison. The comparison usually is made between a familiar object or event and a less familiar idea, truth, or principle. Despite differences in scholarly definitions and classification categories, all parables possess the fundamental feature of analogy: nonliteral relational comparison (Sider, 1995).

Proportional and Interdomain Analogies

Proportional analogies take the generalized form of A:B::C:D (A is to B as C is to D), where A, B, C, and D are specific numerals, words, or objects. The basis for the comparison is the equivalent relationship that holds between AB and CD (A:B = C:D). As illustrated in Figure 1, to understand a proportional analogy, the thinker must induce the relationship between A and B and then transfer, or map, that relationship to C and D (Pellegrino, 1985; Sternberg, 1977; Sternberg & Nigro, 1980).

According to Sider (1995), all of Jesus' parables can be reduced to proportional analogies. For example, in the Parable of the Thief (Luke 12:39-40) Jesus places the relationship between the owner of a house and the coming of a thief equal to that of his disciples and his coming (house owner : coming

Figure 1.
Mapping the common relation in a proportional analogy.

of thief = disciples : coming of the Son of man). Jesus uses a familiar domain of thieves breaking into houses to promote understanding of a less familiar domain, the coming of the Son of man. In both domains, the underlying point, or common relation, is readiness for the unexpected (Sider, 1995).

Cognitive psychologists usually refer to the familiar domain as the "base" and the less familiar domain as the "target." Thus, to understand Jesus' meaning in the Parable of the Thief, the listener or reader needs to induce the base domain relation (the house owner should be ready for the unexpected breaking in of a thief) and map that relation to the target domain (the disciples should be ready for the unexpected coming of the Son of man).

Although Jesus' parables can be reduced to proportional analogies, they are presented in the Gospels in more complex form as interdomain instructional analogies. Whereas proportional analogies are based on a single common relation, interdomain analogies represent comparisons between different knowledge domains on the basis of a set of common relations (Holland, Holyoak, Nisbett, & Thagard, 1986). Interdomain analogies present to learners a greater number of objects and possible relations to map. The primary difficulty learners experience when processing an interdomain instructional analogy is deciding which aspects of the base domain to map to the target domain (Zook, 1991). This is a nontrivial decision because the resulting understanding, or conceptualization, of the target domain can be enhanced or impeded depending on the specific information selected for mapping.

Many of Jesus' parables would be appropriately classified as interdomain instructional analogies. Consider, for example, the Parable of the Prodigal Son. Jesus does not present a simple analogy in proportional form: prodigal son:father::sinner who repents:God. Instead, he places the primary objects of the base domain (son, father) in an embellished context of additional objects (e.g., the son's employer, pigs, an envious older brother, a fattened calf, a robe, a ring, the father's servants). Although the embellishment adds interest and a rich narrative context, it also introduces a host of object features and relations that could be potentially mapped from base to target. For example, when the prodigal son repents, his father gives him concrete gifts (robe, ring). When sinners repent, does God bring concrete rewards such as money and material goods into their lives? The answer to that question depends upon whether or not "the giving of material gifts" is
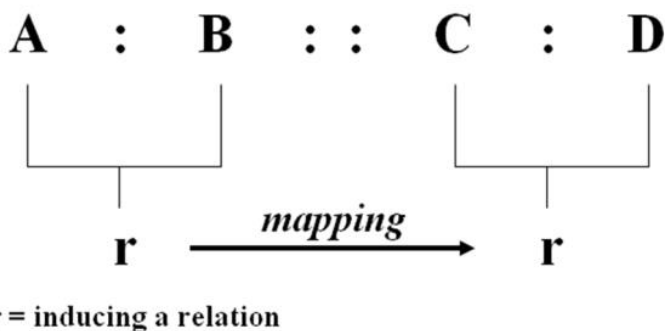
a base domain relation that is appropriate to map to the target domain.

Structure-Mapping Theory
What, then, are the mechanisms that determine if a relation induced in an analogy's base domain is, indeed, mappable to the target domain? According to Gentner's (1980, 1983, 1986) structure-mapping theory, interdomain analogies present three types of potential mappings (see Figure 2): object attributes, first-order relations, and higher-order systems of relations. Object attributes are the literal surface features of specific objects found in the base domain. First-order relations are relationships between objects. Higher-order systems of relations are sets of first-order relations that are held together, or constrained, by superordinate relations.

According to structure-mapping theory, learners are most likely to map higher-order systems of relations rather than isolated (i.e., nonsystem) first-order relations or surface object attributes. Gentner refers to this human tendency as the "systematicity principle." As a relational system is mapped, isolated first-order base relations that are not constrained by the same superordinate relation are left behind, and literal object attributes are disregarded.
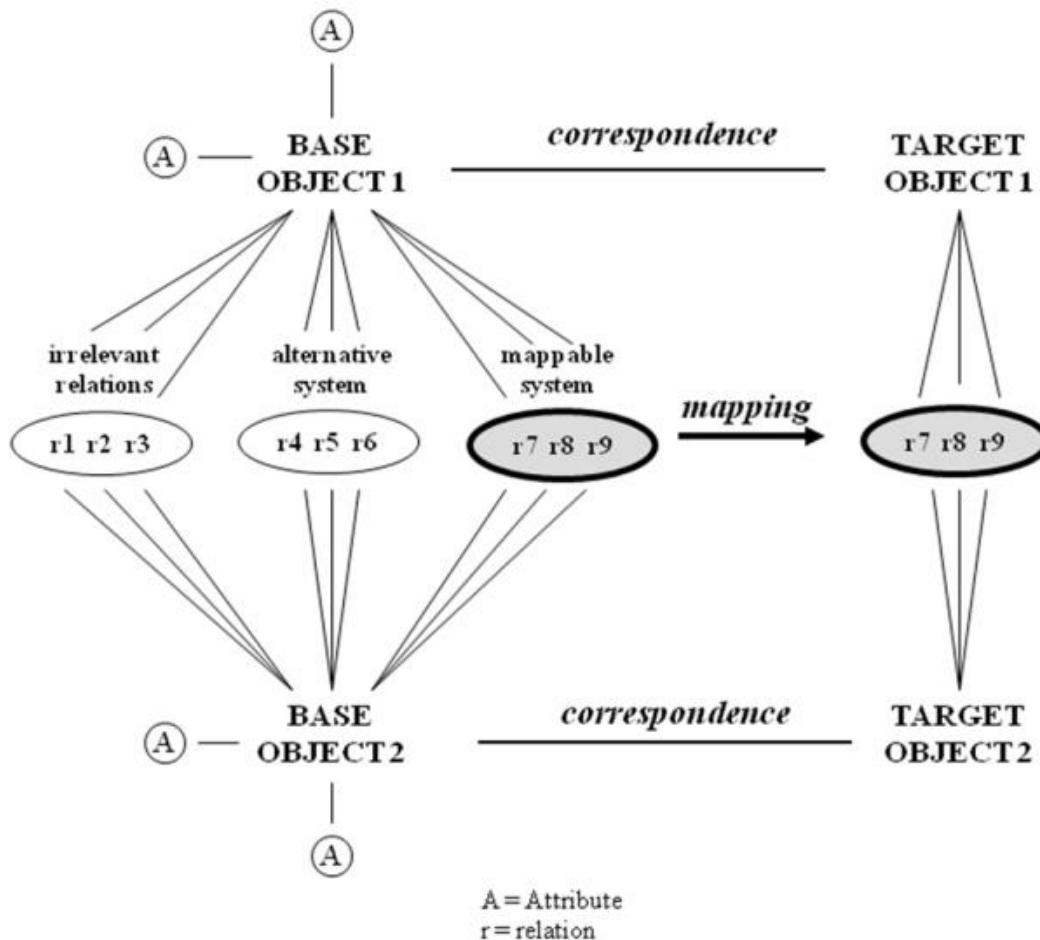
Source: Kevin B. Zook and Jean Maier, "Systematic Analysis of Variables that Contribute to the Formation of Analogical Misconceptions," *Journal of Educational Psychology* 86 (1994): 590.

Figure 2.
A schematic summary of structure-mapping theory.

Structure-Mapping and Analogical Misconception

Gentner's structure-mapping theory provides a useful framework for understanding how learners (or the hearers of a parable) might transfer their knowledge of a familiar base domain to their emerging conceptualization of an unfamiliar target domain. However, the theory also suggests several sources of misconception (Zook, 1991). Although the theory asserts that learners tend to disregard surface object attributes and nonsystem relations, some learners may, in fact, select those inappropriate features for mapping—particularly when they are completely unfamiliar with the target domain. Furthermore, complex base domains may actually suggest more than one system of relations, presenting the possibility that learners could map the relational system intended by the analogy as well as an alternative system that does not contribute to the analogy's instructional purpose.

When such features are mapped by learners, they encourage the construction of target domain misconceptions. Even when instructional analogies do not mention or emphasize base domain object attributes or nonsystem relations, learners may still draw from their own personal schemas, or prior knowledge, and select this information for mapping. Ironically, when analogies (or parables) are used for teaching, they open windows for understanding while simultaneously sowing the seeds of misunderstanding. The potential for analogical misconceptions has been documented by a number of research studies (e.g., Duit, Roth, Komorek, & Wilbers, 2001; Mason, 1994; Zook & Di Vesta, 1991). Findings from these studies suggest that when learners are confronted by a completely unfamiliar target domain, they may inappropriately map base features simply because they have no alternative source of information and must rely solely on the model provided by the base domain. The analogical model is stored in memory and becomes available for constructing inferences when the opportunity or need arises—that is, when the learner tries to use it to generate an inference (Anderson & Thompson, 1989; Donnelly & McDaniel, 1993; Mayer, 1989; Zook, 1993; Zook & Di Vesta, 1991; Zook & Maier, 1994) or solve a new problem (Gentner & Gentner, 1983). Thus, analogically based misconceptions can, in a sense, lie "dormant" until a precipitating problem or situation stimulates recall of the base domain and the learner attempts to "run" the mental model that it provides (Mayer, 1989; Newby, Ertmer, & Stepich, 1995).

Structure-Mapping Theory and the Parable of the Prodigal Son

If parables are, indeed, best considered interdomain instructional analogies, then readers should be able to analyze their potential effects on understanding and misconception by applying the assumptions of structure-mapping theory. For the purpose of the present preliminary analysis, I will apply structure-mapping theory to the Parable of the Prodigal Son. The story is recorded in Luke 15:11-31 as the last parable in a set of three: the Lost Sheep, the Lost Coin, and the Lost Son. All three analogies are used by Jesus to illustrate a single common principle, which he states explicitly after each of the first two parables: ". . . there will be more rejoicing in heaven over one sinner who repents than over ninety-nine righteous persons who do not need to repent" (Luke 15:7) and ". . . there is rejoicing in the presence of the angels of God over one sinner who repents" (Luke 15:10). Jesus offers these particular analogies in response to a criticism levied at him by the Pharisees: "This man welcomes sinners and eats with them" (Luke 15:2). Thus, the central theme of all three parables should be clear from the context and Jesus' explicit statements: God delights in people who recognize their sinfulness and come to him in repentance more than those who consider themselves righteous. With respect to structure-mapping theory, the parable suggests the following object correspondences:

base domain	target domain
father =	God
son =	repentant sinner
brother =	the self-righteous

The relational system that Jesus intends to be mapped is comprised of several first-order relations that are constrained by the superordinate concepts of unconditional love (the father toward the son) and envy (the brother toward the son). Each of the six relations identified below is consistent with—and supports—the central theme that Jesus states. Notice how each of the base domain relations can be expressed in the target domain simply by

replacing the relevant base objects (in bold) with their corresponding target objects.

base domain	target domain
son leaves his **father's** care and expectations	**sinner** leaves **God's** care and expectations
son returns to **father** in repentance	**sinner** returns to **God** in repentance
father grants forgiveness to **son**	**God** grants forgiveness to **repentant sinner**
father celebrates **son's** return	**God** celebrates **repentant sinner's** return
brother obeys and works for **father**	**self-righteous** obey and work for **God**
brother resents **father's** acceptance of son	**self-righteous** resent **God's** acceptance of repentant sinner

As the relational system described above is mapped to the target, surface features of base domain objects should be ignored. In Jesus' telling of the story, for example, several attributes of the father are noted. He is wealthy, holds property, and employs men and servants. Although these details contribute to the narrative, they do not contribute to the relational system and, therefore, should not be mapped as characteristics of God.

Finally, the story also suggests additional first-order relations that are separate (or isolated) from the mappable relational system. For example, the envious brother is older than the wayward son. Although this valid relation is made explicit in the story, it is not constrained by the relational system and, therefore, should not be mapped. For example, it would be inappropriate to infer that self-righteous folk are always older than repentant sinners because the envious brother is older than the wayward son.

As our analysis of the Parable of the Prodigal Son demonstrates, the assumptions of structure-mapping theory can provide a useful framework for considering both the learning intended by the story as well as the misunderstanding that might be generated from the story by hearers, readers, and interpreters who would make inappropriate mapping decisions. However, the theory alone does not help us predict the circumstances under which such inappropriate mappings might actually occur. To investigate this important question, I turn to Zook and Maier's (1994) six-variable model of analogical misconception formation.

Analogical Misconceptions: A Six-Variable Model
Zook and Maier (1994) developed and tested a six-variable model to account systematically for the formation of analogical misconceptions. According to the model, both learner and instructional variables interact during the mapping process (see Figure 3). Learner variables include (a) analogical reasoning ability, (b) domain-specific knowledge, and (c) processing goals. Instructional variables include (a) analogy content, (b) analogy complexity, and (c) mapping support. In the remainder of this section, I will examine each of the model's six variables and briefly explore their potential implications for parable interpretation and teaching by analogy.

Learner Variables: Analogical Reasoning Ability
Analogical reasoning ability is a general variable that refers to how well learners can execute component analogical processes such as inducing relations between base objects and mapping those relations to corresponding target domain objects (Sternberg, 1977). From studies with proportional analogies, researchers know that individuals differ greatly in their abilities to perform these component processes and, hence, their abilities to learn from interdomain instructional analogies, which share similar processing requirements (Holland et al., 1986; Pellegrino, 1985).
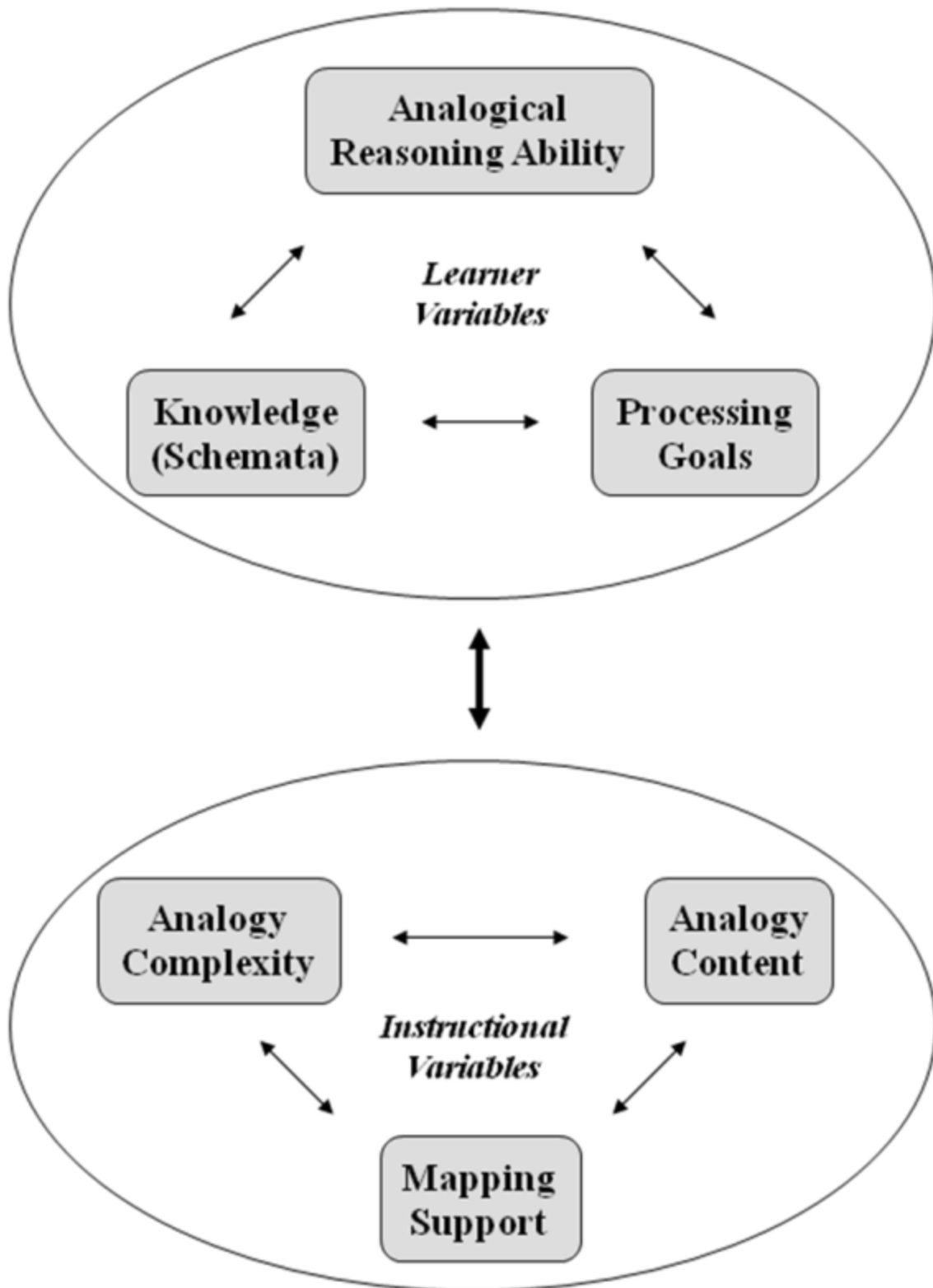
Figure 3.
Formation of analogical misconceptions: A six-variable model.

Thinking analogically requires the ability to understand abstract word meanings and induce relationships between those meanings, a general cognitive capability often referred to as verbal aptitude. Verbal aptitude appears to influence learners' mapping decisions (Zook, 1993; Zook &

Maier, 1994) and their analogical problem-solving abilities (Corkill & Fager, 1995).

A second variable related to analogical reasoning ability is learner age. Advances in analogical reasoning abilities with increasing age are a well-documented phenomenon. Children tend to demonstrate difficulties in understanding proportional analogies and solving problems analogically prior to adolescence (Bisanz, Bisanz, & LeFevre, 1984; Gentner & Toupin, 1986; Goldman, Pellegrino, Parseghian, & Sallis, 1982; Holyoak, Junn, & Billman, 1984; Sternberg & Rifkin, 1979). Young children typically base their interpretations of analogies on the salient surface features of base domain objects rather than abstract structural relationships. Eventually, children's interpretations of analogies change from this focus on literal features to a deeper relational comparison. Gentner (1988) documented this developmental change and referred to it as the "relational shift." Zook and Maier (1994) found that the relational shift has implications not only for proportional analogies and analogical problem solving, but also for learning from interdomain instructional analogies.

Parable interpretation and analogical learning are susceptible to differences in the verbal aptitudes of specific interpreters and learners. The interpreters of parables and other instructional analogies can range from well-educated scholars who possess, presumably, high degrees of verbal aptitude to less-educated individuals who read the parables in the Gospels and young children who hear parables in children's sermons and Sunday school lessons. The meanings of parables and the subsequent inferences that are constructed from them by learners who vary in age and verbal aptitude will also vary accordingly. Furthermore, the historical and current temptation to propose allegorical parable interpretations that focus on literal object similarities may be a reflection of analogical reasoning difficulty rather than special theological insight.

Learner Variables: Domain-Specific Knowledge
The ability to manipulate word meanings is useless without word meanings to manipulate! Thus, another important source of variation in the mapping process is the differential quantity and quality of domain-specific knowledge that learners possess. When educators teach by analogy, or parable, they assume that learners already possess a meaningful representation of the base domain of the analogy. Even though the analogy may be a "good" one in the sense that it suggests a deep relational comparison, learners will not be able to make use of it unless their representation of the base domain includes the critical features to be mapped (Hardiman, Well, & Pollatsek, 1984). Without pre-existing base-domain knowledge, it is impossible for learners to abstract a relational structure to be mapped. In the absence of a relational structure, or schema, learners may direct their attention more toward salient surface features that they associate with base objects (Robins & Mayer, 1993).

The domain-specific knowledge variable is particularly significant for parable interpretation. Jesus used base domain objects and events that should have been familiar and readily understandable to his first-century audience: mustard seeds, wineskins, sowing seed, forgiving fathers, and so on. As people move farther away in time and geographic context from the original cultural setting in which Jesus taught, these familiar, well-known objects become less familiar and—in some cases—completely unknown, making the induction of a relational schema all but impossible. Furthermore, some hearers and readers of Jesus' parables—both past and present—may lack a particular understanding of a base object necessary for understanding the point of the parable, though the object may be familiar. For example, consider the Parable of the Prodigal Son. Learners who do not understand the father's unconditional love for his wayward son because they have not experienced that love from their own fathers may have difficulty inducing and mapping the relational schema that Jesus intended.

Learner Variables: Processing Goals
A third variable that affects analogical mapping is the nature of the learner's purpose in processing the analogy. The results of studies by Zook and Di Vesta (1991), Zook (1993), and Zook and Maier (1994) all suggest that learners make mapping decisions based on their perceptions of the purpose of the analogy. These studies consistently found that learners were more likely to refrain from mapping inappropriate base features when the purpose of the analogy was made clear to them. Understanding the purpose of the analogy helps to provide the superordinant system constraint identified in Gentner's (1983) structure-mapping theory.

Jesus often made the instructional purposes of his parables clear by stating them explicitly. According to Zuck (1995), Jesus used several strategies to make his learning goals apparent to his listeners: (a) beginning the story with a question (e.g., Matthew 11:16; Luke 13:20), (b) beginning a story with a statement and rhetorical question (e.g., Matthew 24:44-51; Luke 14:28-30), and (c) concluding a story with a statement of the main point that made the application clear (e.g., Luke 10:36; Luke 11:5-9; Luke 16:13). Zuck (1995) notes that Jesus made the application of his parables explicit fourteen times. A reader who adopts Jesus' instructional purpose in relaying the Parable of the Prodigal Son is less likely to attend to surface features such as the robe and ring that the father gives to the son as an expression of his joy. In contrast, a reader who approaches the parable for the purpose of justifying a materialistic lifestyle may be tempted to use those surface features to make questionable target domain inferences concerning the rewards that accrue when people come to God in repentance.

Instructional Variables: Analogy Content
Analogy content refers to the target domain information to be learned and, more importantly, the base domain analog that is selected for relational comparison. In addition to helping learners connect new information to prior knowledge (Cardinale, 1992-1993; Simons, 1984), analogies also facilitate the process of knowledge restructuring (Vosniadou & Brewer, 1987). By forcing learners to consider the equivalence of two superficially disparate knowledge domains, they are encouraged to change their knowledge so it is organized around deeper relational ideas rather than salient superficial objects. Such knowledge restructuring is most likely when the surface features of the base and target are as different as possible.

Analogies that have readily apparent object correspondences have "high transparency"—that is, the learner has little difficulty understanding how the base and target are similar because the objects, themselves, are somewhat similar (Gentner & Toupin, 1986). For example, the Parable of the Prodigal Son would be considered a high-transparency analogy because fathers and sons share many of the surface features of God (often thought of as "heavenly father") and sinners (often referred to as "children of God"). Given these obvious similarities, it is not difficult to perceive the correspondence between God and the father described in the parable and sinners and the parable's repentant son. In contrast, the Parable of the Mustard Seed (Matthew 13:31-32) would be classified as a low-transparency analogy because a mustard seed shares no surface similarity with the abstract concept of the kingdom of heaven. A learner must work much harder to determine the appropriate object correspondences in a low-transparency parable such as the Mustard Seed than a high-transparency parable such as the Prodigal Son. Difficulties in establishing appropriate object correspondences in low-transparency analogies may produce subsequent mapping difficulties and target domain misconceptions.

Instructional Variables: Analogy Complexity
Analogy complexity refers to the quantity of features that are available to learners for mapping: object attributes, mappable relational systems, alternative relational systems, and nonsystem first-order relations. The greater the complexity (i.e., the quantity of base features), the greater the potential for learners to direct their attention away from the relevant relational system and, hence, for target domain misconceptions to occur (Zook, 1993; Zook & Di Vesta, 1991; Zook & Maier, 1994). Although the complexity of an analogy is determined primarily by the base analog that is selected, the learner's prior knowledge of the base domain can provide additional objects, attributes, and relations as candidates for potential mapping.

The parables of Jesus vary greatly in complexity. Some parabolic sayings are simple metaphors (e.g., "the kingdom of heaven is like yeast," "you are the salt of the earth"), and some are more embellished stories with narrative details (e.g., the Prodigal Son, the Sower). Even when the base analogs offered by Jesus are not terribly complex, they have the potential to grow in complexity in the hands of creative interpreters or preachers who use their personal prior knowledge and exegetical perspectives to suggest additional objects and relations that may be related only tangentially—if at all—to the parable's instructional purpose.

Instructional Variables: Mapping Support
Finally, the degree of mapping support provided in the instructional setting can influence learners' mapping decisions. Mapping support can take the form of direct and explicit cues concerning the analogy's purpose, cautions against mapping

inappropriate features, and identifying for learners the specific relations to be transferred from base to target. Certainly, in the Gospel parables, Jesus demonstrates mapping support frequently—although not always—by making explicit the purpose of the parable, stating the principle to be learned, or explaining the analogy thoroughly (e.g., the Parable of the Weeds, Matthew 13:36-43).

Jesus also demonstrates another powerful strategy for providing mapping support: multiple analogs. Presenting more than one base forces learners to induce a relational schema that is common to all the analogs rather than focusing on the details of a single analog. Research studies have consistently demonstrated the value of multiple analogs in facilitating learning and reducing the incidence of analogical misconception (Dagher, 1995; Gentner, Loewenstein, & Thompson, 2003; Spiro, Feltovich, Coulson, & Anderson, 1989). Interestingly, Jesus appears to use this strategy naturally at several points in the Gospels. For example, as already indicated, the Parable of the Prodigal Son actually represents the third base analog that Jesus compares to God's love for sinners. By deliberately providing three very different analogs (sheep, coin, son) for the same target domain principle, Jesus helps his hearers focus on the critical relational schema to be mapped rather than the particulars of each individual analog.

Summary and Conclusions

In this paper, I have explored a new focus for inquiry concerning Jesus' parables by demonstrating how recent theoretical ideas and research findings can help to explain and predict potential difficulties in parable interpretation and learning by analogy. The facilitative effects of instructional analogies and, by extension, the Gospel parables, has been clearly documented. However, learning by analogy—and by parable—is fraught with numerous difficulties and dangers. These dangers appear to be mediated by complex interactions between both learner and instructional variables. Given the number and complexity of variables and interactions that can influence the mapping process and, hence, analogically constructed understanding, it is not surprising that parable study remains a robust field that continues to attract people with different perspectives and, therefore, different interpretations. The empirical and theoretical evidence presented in this paper

suggests that any analogy study is incomplete unless the interpreter considers learner and instructional variables that may influence mapping processes and the resulting meanings that are constructed.

Jesus' parables are instructional analogies and, therefore, can—and should—be analyzed from an instructional and psychological perspective. Although such analyses may not radically change the interpretations that are constructed by different people who bring their different perspectives (or learner variables) to the enterprise, they at least may help readers better understand the reasons why such varied interpretations may be generated. As I have demonstrated from psychological evidence, constructing theological understanding from Jesus' parables—doing theology by analogy—is risky business, and it is made all the more dangerous when readers ignore the cognitive processes that account for analogical learning.

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