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Analogical Reasoning

Teaching Notes

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Overview & Theoretical Background

This teaching note describes 5 "demos" that can be used to teach students about the importance of knowledge transfer and learning. *Knowledge transfer* is the ability to apply a useful concept or idea learned in one situation to another situation in a meaningful way.

This unit addresses the fundamental question of whether people (and managers in particular) can apply concepts learned in the classroom to real world (business) situations. Research suggests that much of what we learn in the classroom is not very portable. Meaning that while we often actually have learned theanswers to tough business problems, we fail to retrieve the relevant information at the right time. This problem is known as the *inert knowledge problem* which argues that much of what we learn is stored in a way that is not immediately accessible.

Knowledge transfer can be of two kinds: *positive transfer* and *negative transfer*. Positive transfer occurs when a learner correctly applies the lessons (or solutions) of a previous situation to a new, or novel-appearing situation in a way that is correct and useful (as determined by objective standards). For example, suppose a student learned how to take derivatives in a math class and then applied this technique in a real business situation that required taking a derivative. Negative transfer occurs when a learner applies a lesson learned in one situation to another situation that is not appropriate or not useful. For example, suppose that a management student studied a Disney case in a marketing course and then used the marketing lesson to analyze a negotiation that involved Great America theme park. Whereas Disney and Great America are both theme parks, marketing and negotiation are fundamentally different skills or disciplines.

The examples above raise the issue of *surface-level* versus *structural-similarity*. In other words, in order to transfer knowledge learned in one situation to another that is dissimilar on its surface, the learner needs to engage in analogical reasoning, to "map" one problem (or situation) onto another problem or situation. Mapping that occurs just at the surface or superficial level, is not typically very useful. Rather, most useful types of analogical reasoning involve mapping structural similarities.

The ability to access the right knowledge at the right time depends very much on how the learner has encoded (or learned) the knowledge. To return to our example, if the student has encoded the marketing concepts in a mental "Disney" file, this is not nearly as useful as encoding the knowledge in a "marketing channels" file (or whatever fundamental, underlying principle is at play here).

The purpose of this exercise is to introduce students to analogical reasoning and improve their ability to learn and store structural knowledge.

Running the Demos

There are six variations of the demos that can be run in the class. They are described below:

I. Tumor & Fortress Demo

Learning goal: demonstrate the inert knowledge problem and validate difference between surface- and structural-similarity.

1. To run this demo, display the picture of the man with the cancerous tumor (see Exhibit 1).
2. Next, display the picture of the problem with the high-dose ray (see Exhibit 2). Then display the picture of the problem with the low-dose ray (see Exhibit 3). Then, stop and ask the students to independently suggest a solution for the man with the cancerous tumor (only give them a few minutes).

3. Collect students' responses and then ask them what solutions they came up with. (I like collecting responses so that I can begin to build my own database of common types of suggested solutions.)
4. Eventually, one student might offer what is considered to be the "elegant" solution, which involves using several low-dose rays of radiation to attack the tumor (see Exhibit 4).
5. The instructor should mention that very few people (less than 10%) successfully solve the tumor problem (with the elegant solution).
6. The next step in this demo is to present the fortress problem to students (see Exhibit 5). Read the dilemma that is faced by the "good general". Ask students to independently suggest solutions (again collect these for your database).
7. Then ask students to share some of their solutions; they should be much quicker at suggesting what is regarded to be the "elegant" solution, which involves sending small numbers of troops on different roads and arranging to converge on the fortress at the same time (see Exhibit 6). Having said this, raise the bar high for students who do not walk through the exact logic and specifics of the elegant solution. It is unacceptable to simply say, "divide and conquer". Rather, students need to coherently and systematically explain their solution.
8. Next inform students that although solution rates for the Fortress problem are higher when it has been immediately preceded by the Tumor problem, solution rates are far from perfect (around 30%). This suggests that students did not map the tumor problem and solution onto the fortress problem and solution. This is an example of what is meant by the inert knowledge problem. Had the fortress problem concerned a medical or cancer issue, knowledge transfer of the solution would have been higher. Thus, these two problems have little or no surface (superficial) similarity; rather, their similarity is at the deep, structural level. Point out that this is indeed the challenge that faces the manager or business leader: namely, lessons learned in one context might have very different superficial characteristics and when this is the case, knowledge transfer will be much lower.

II. Debrief for Demos

At this point, the students will hopefully be asking what can be done at the time of encoding (at the time of initial learning) to maximize the ability to transfer knowledge (i.e., minimize the inert knowledge problem). Point out that there are two widely-recognized solutions:

1. *Become an expert*

   Whereas this solution might generate a laugh, explain that you are very serious. According to researchers, it takes 10,000 hours of focused full-time study and experience to become an expert. This usually amounts to about 10 years of intense study and practice (Chase and Simon, 1973).

   Novice learners' mental representations of various problems, ranging from math to English to physics to analogy are weakly structured, meaning that they often lack causal relationships. In one clever study, the difference between experts' and novices' mental representations was revealed by simply asking them to categorize problems not actually solve them. Chi, Feltovich and Glaser (1981) asked advanced PhD physics students (experts) and undergraduates with only one semester of mechanics (novices) to categorize 24 physics problems (categorization basically amounted to putting the problems into different piles based upon "similarity"). The novices inevitably used surface features to categorize the problems (e.g., friction, rotational things, and blocks on inclined planes). In contrast, the physics PhD students used deeper, structural features to categorize problems (e.g., law of conservation of energy, Newton's 2nd law, and momentum principles).

   At this point, it may be useful to stop and pause and ask students about how this applies to management and business.

2. *Analogical encoding via comparison*

   The second strategy that can increase knowledge transfer is analogical encoding via comparison. What this amounts to is the following (see Exhibit 7):

   a. Learners exposed to a new idea or concept should be presented not just with one example, but rather, with 2-3 examples that all illustrate the same underlying principle. The surface features of the different examples should not be similar. For example, students should be encouraged to think about how the tumor problem is similar to the fortress problem and highlight those commonalities.
   b. The second step is to articulate the similarity between the encoding problems. This is best done in terms of articulating an over-arching principle that does not contain irrelevant surface information. For example, a student comparing the tumor and fortress problems might say, "*both problems involve how to attack a threatening entity at the center. Both of these problems make reference to a force that could neutralize/destroy this evil force (rays and troops), but the problem is the dosage (number of troops). Too many will hurt healthy tissue (trip landmines); too few will not be enough to kill the cancer (capture the evil king). Thus, the solution is to send in*

a small number of rays (troops) from different angles (roads) and arrange to converge on the tumor (fortress) at exactly the same time."

c. The third step is to attempt to recognize the principle in a future, novel situation.

III. Contingent Contract Demo

1. This demo involves giving each student in the class a printed copy of the slide titled, "case materials" (see Exhibits 8a *Asian Merchant* case and 8b *Poor Brothers* case). I suggest printing each story on its own page. Thus, *Asian Merchant* is on page 1 and *Poor Brothers* is on page 2.
2. Half of the class should get a page 3 that asks them to compare and contrast the two cases and articulate their similarities. (This will be referred to as the "compare" group.) The instructions that we use in our research are: "*What is going on in these negotiations? Think about the similarities between these two cases. What are the key parallels in the two negotiations? Please describe the solution and say how successful you think it is.*"
3. The other half of the class should have a page inserted between the cases that asks them to analyze case 1 and then to read and analyze case 2. (This will be referred to as the "separate cases" group.) The instructions we use in our research are: "*What is going on in this negotiation? Please describe the solution and say how successful you think it is.*"
4. Students should be given about 15-25 minutes to complete this. Ask them to submit it (again, so you can build a small database that will help with future debriefs).
5. At this point, you can do one of two things:

   a. Send the students off to do a negotiation task (suggest doing *Moms.Com* or *Oceania* or *Cascade Manor* from the DRRC teaching set). Make sure that the students negotiate with someone who was in the same instructional condition (i.e., "compare" group students should negotiate with others who also compared cases; and those who analyzed the cases separately would negotiate with others who analyzed the cases separately).

      When students return from the negotiation, analyze their results and ask them if they thought about the test cases. Hopefully those who engaged in analogical learning will say, "Yes". And hopefully, those are the students who were able to fashion elegant contingency contracts in *Moms.com*, *Oceania*, and *Cascade Manor*.

      In the event that you do not observe the predicted effect in your own class, do not despair. You can tell students that a huge repository of data has indicated that there are indeed profound differences in the performance of these two types of instructions on negotiation performance. Specifically, the "compare" group scored higher in terms of: (a) the quality of their descriptions of the original *Asian Merchant* and *Poor Brothers* case; (b) their actual performance in negotiation situations; and (c) the quality of their own examples drawn from long-term memory (see Exhibit 9).

   b. Ask the students to think of examples from their own life (previous job experience, etc.) that illustrate the case concepts. Ask students to share their own previous experiences and to explain how and why they embody the ideas in the case.

      Gently evaluate how apt each example is. In our research, we have scored students on the aptness of their examples using the following scale:

      0 = no evidence that the deep structure of the case was understood and articulated (*e.g., "each party will pay what they think is fair after the event*")

      1 = some evidence that the deep structure of the case was understood and articulated (e.g., "*both are negotiating with regard to their risks, and are willing to pay a price if they are wrong")*

      2 = Strong evidence that the deep structure of the case was understood and articulated (*e.g., "they are similar in that there are uncertain future events, and different beliefs in the outcome of those events. The strategy is to create a bet that hinges on the outcomes of uncertain future events"*)

IV. Logrolling Demo

This demo focuses on another negotiation skill: logrolling (tradeoffs).

This demo should be run using the same methodology as that described in the "Contingent Contract" demo. The instructor should print copies of Exhibits 9a *Annual Meeting* case and 9b *Videogame Sales* case and students should either analyze the cases separately or compare the cases and outline the similarities (using the same instructional language as described in the contingent contract demo).

The instructor can then do any or all of the following:

1. Have the students negotiate using an exercise that contains the opportunity for mutually-beneficial tradeoffs through logrolling (e.g., New Recruit,

Moms.Com, Oceania, Cascade Manor, Cartoon, etc.)

2. Have the students recall examples from their own business experiences (or the newspaper) that are "similar" to the cases. The instructor can score for deep understanding.

V. Sunk Cost Demo

The theory and concept of "sunk costs" is considered to be of paramount importance in management education and training. Researchers and scholars argue that most individuals are confronted with sunk cost situations and need to know how to best extricate themselves from such situations. In this demo, the instructor/teacher uses one of three methods for introducing and explaining the concept of sunk costs. Students are then asked to provide an example of a sunk cost from: (a) their own life; (b) the newspaper or popular media; and (c) from a book or movie. The instructor then rates the aptness of the three recalled examples.

The three instructional methods are referred to as:
(a) concept only;
(b) concept + one example and
(c) concept + two examples.

It is predicted that the group that gets the concept of sunk cost in addition to two examples will be better able to recall a good example of a sunk cost from their own life, the newspaper, and a book or movie.

The instructor has two options for how to introduce the three different instructional methods. The key is to not inform the students that there are indeed three different instructional methods being compared (that comes later; see Exhibits 11a, 11b and 11c).

Option 1: is the simplest and involves creating three different, printed sheets of instructions that can be given to students in or outside of class with the strict instruction to not compare with others and to work independently.

Option 2: if the instructor is teaching two or three sections of a similar or identical course, each section could receive a different instructional set.

Regardless of which option is chosen, the instructor should collect the students' responses and score them using a 0-1-2 scale, with similar coding as indicated above.

0 = example does not embody or explain idea of sunk costs
1 = example may hint at the idea of sunk costs, but is not clear and elegant
2 = example is a highly articulated example of sunk costs

During the subsequent lecture, the instructor should strategically choose some of the best examples to share with the class.

VI. Proverb Demo

In this demo, the objective is to show students how the human mind often remembers information by relying on literal (or surface-level) similarity, rather than structural-level (deep similarity). This simulation will also reveal the inert knowledge problem.

The instructor should follow these guidelines:

1. *Overview & Instructions*: Instructor says, "*In this demonstration, I am going to show you several proverbs or quotes. All you need to do is read them. However, you are not allowed to write them down or discuss them with others in the class. Rather, just enjoy the experience of reading them."* (Instructor should create slideshow using the 18 proverbs from Exhibit 12a.)

2. *Slideshow*: Then, the instructor can begin a slide show of proverbs (again, displaying each for 3-5 seconds). I suggest the instructor simply type each of the stimulus proverbs onto its own slide in a PowerPoint file that can be shown in a slideshow (Exhibit 12a).

3. *Filler task*: Following the proverb slide show, the instructor should insert a slide that asks students to "*silently count backwards from 998, in multiples of 3, e.g., 998, 995, 992, etc*." Note: the only purpose of this instruction is to attempt to prevent a recency effect.

4. *Prime proverbs & Recall test*: Next, the instructor should say, "*I'm going to pass out a sheet of paper that contains new proverbs* (see Exhibit 12b). *Your instructions this time are to recall any proverb from the original slideshow that the current proverb reminds you of). You should use the sheet of paper, numbered 1-18* (Exhibit 12b). *If no proverb comes to mind, then just leave that number blank and do not return to it, after looking at it once. It is ok to write down the same proverb more than one time if something reminds you of it."*

5. *Recognition test*: following the recall test, the instructor should then give students the original list of stimulus proverbs (Exhibit 12a) and the recognition test (Exhibit 12c) and ask students to indicate which proverb is a good match for the original.

6. *Answer key*: after collecting students' recall and recognition, the instructor should display Exhibit 12d which lists the original proverb and the typical surface match and the better, analogical match.

Discussion Points and Take-always

Ideally, students should come to the conclusion that they did much better in the recognition test than in the recall test. The reason is that our minds search by literal similarity. When we learn new information, we are exposed to superficial as well as structural meaning. At the time of learning, it may not be clear to us what information is superficial and what is truly structural. The problem is that often the information is stored in a mental file that can be retrieved only if there is a superficial match. For example, we may realize that the proverb, *"Those who live in glass houses shouldn't throw stones"* is actually structurally more similarly to the proverb, *"The kettle should not call the pot black"*, but the problem is that we are more likely to be reminded of the proverb, *"A rolling stone gathers no moss"* when we hear the *"glass houses and stones"* proverb.

It is not a big leap to conclude that when learning any new subject matter, that there is a danger of storing (encoding) information in a largely non-retrievable fashion. This is the inert knowledge problem.

If the instructor has not already reviewed the two theoretical-practical methods by which to minimize the inert knowledge problem and make knowledge more portable, the instructor should re-introduce the concepts of expertise and analogical encoding.

Exhibit 1

This poor guy has a cancerous tumor

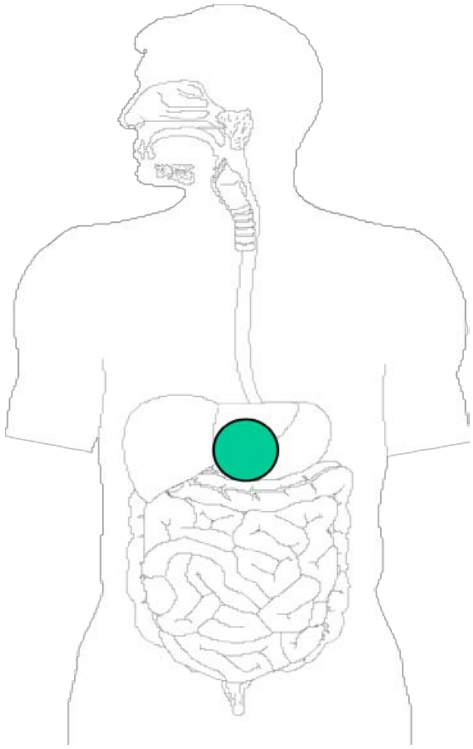
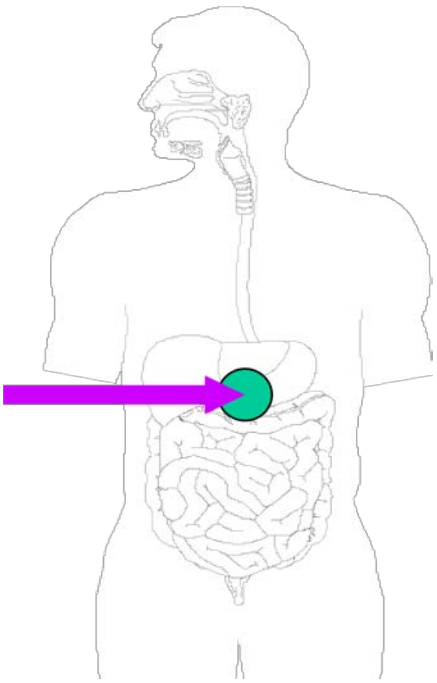


Exhibit 2

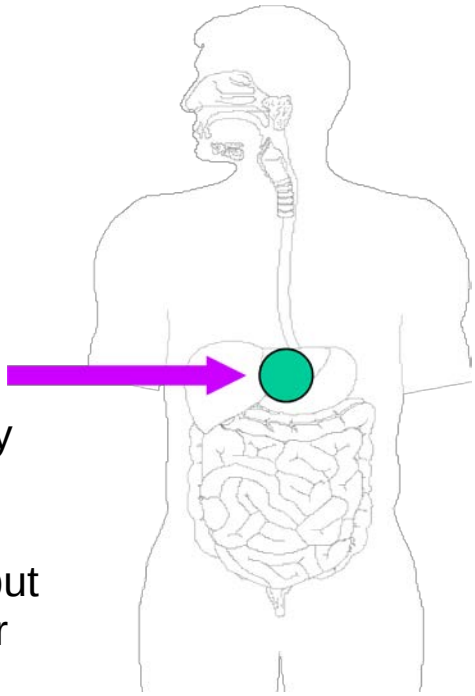
Treatment Plan A: High Intensity Ray



High intensity ray will kill tumor, but will also destroy surrounding healthy tissue

Exhibit 3

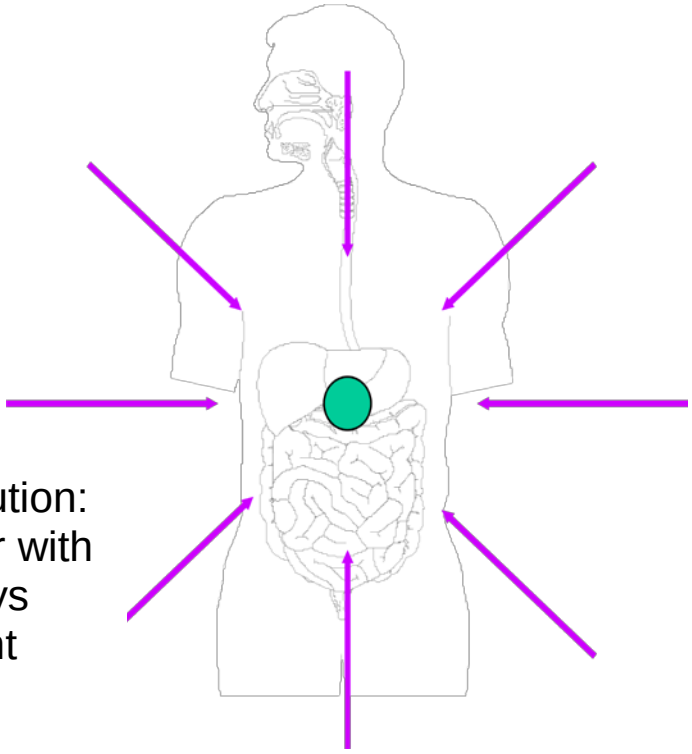
Treatment Plan B: Low Intensity Ray



Low intensity ray will protect surrounding healthy tissue, but will not kill tumor

Exhibit 4

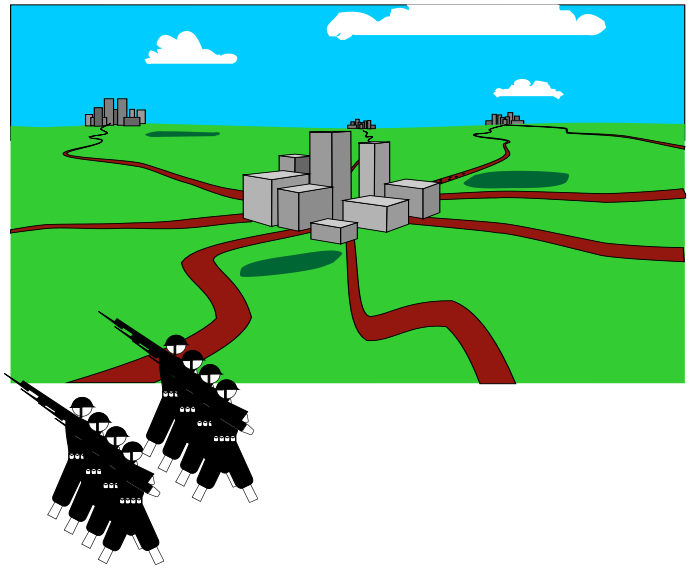
The Tumor Problem: Elegant Solution



Elegant Solution: Attack tumor with low-dose rays from different angles

Exhibit 5

The Fortress Problem



- An evil King is holding the fortress hostage…
- The good soldiers must invade and capture the evil king…
- Problem: if they send a lot of troops, this will trip the landmines planted on the roads…
- If they send fewer troops, they won't have sufficient force to overtake the evil King…

Exhibit 6

The Fortress Problem Solution

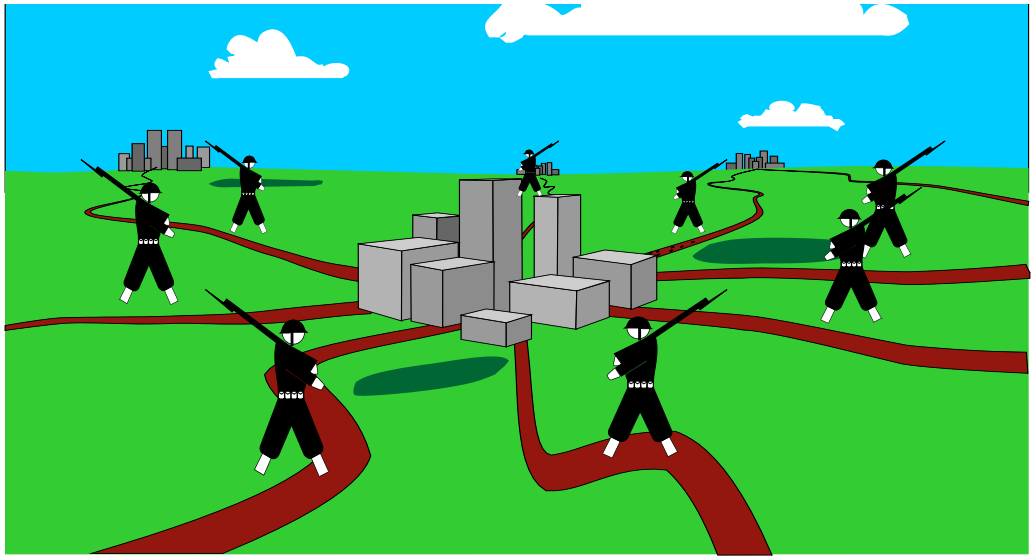
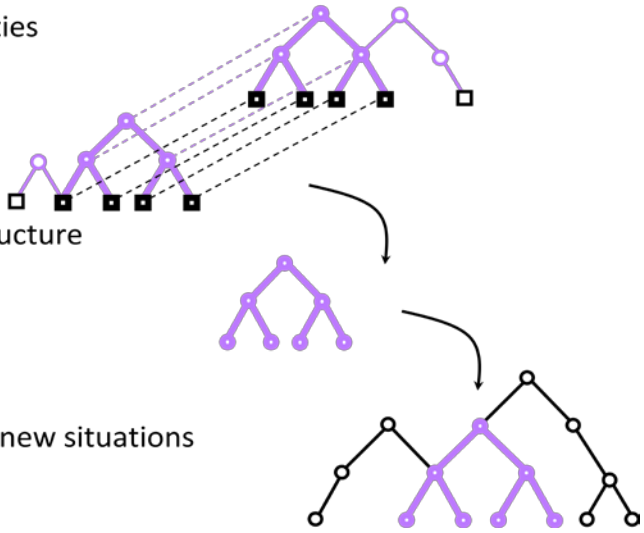


Exhibit 7

Analogical Encoding

- Highlight commonalities
- Abstract common structure
- Recognize schema in new situations



Source: Loewenstein, J., Thompson, L. & Gentner, D. (1999). Analogical encoding facilitates knowledge transfer in negotiation. *Psychonomic Bulletin & Review*, *6* (4), 586-597.

Exhibit 8a

Asian Merchant

Syd, a recently-promoted head buyer of a small retail clothing chain in the US, had bought some wholesale leather boots from a large Asian manufacturer. All aspects of the deal had been successfully negotiated except the shipment of the boots. Although Syd thought there might be potential difficulties in dealing with a large multinational conglomerate, she had decided to purchase boots from this company – rather than from several smaller available manufacturers – because of their aggressive pricing. The sales representative from the Asian company told Syd that they would pay to ship the boots by boat. Syd was concerned because the US has announced that a trade embargo would likely be placed on all goods from that country in the near future. The Asian sales representative told Syd not to worry because the boat would arrive at the US dock before the embargo occurred. Syd, however, thought that the boat would be late and that the multinational conglomerate's policy to ship goods was not friendly to the needs of small businesses. Syd wanted the merchant to pay to ship the boots by air freight (which was substantially more expensive). The Asian sales representative refused because of the higher cost. They argued about when the boat would arrive. Syd considered breaking off the deal and buying the boots from her next best option, a small manufacturer. However, she did not like their product line as well and also wanted to try to establish a relationship with the large multinational conglomerate.

Finally, after a lengthy discussion in which it seemed that the negotiations might break off unsuccessfully, Syd suggested a new proposal to the sales representative from the Asian manufacturer. They would send the boots by air freight but both sides would watch when the boat actually docks in the US. If the boat happened to arrive on time (as the sales representative believed it would), Syd would pay for the added cost of air freight. However, if the boat were to arrive late (as Syd believed it would), the Asian manufacturer would pay the air freight bill. Syd and the Asian manufacturer were pleased with this proposal and each party got the arrangement they wanted.

Exhibit 8b

Poor Brothers Story

Two fairly poor brothers, Ben and Jerry, had just inherited a working farm whose main crop had a volatile price. Ben wanted to sell rights to the farm's output under a long-term contract for a fixed amount rather than depend upon shares of an uncertain revenue stream. In short, Ben was risk-averse. Jerry, on the other hand, was confident that the next season would be spectacular and revenues would be high. In short, Jerry was risk seeking.

The two argued for days and nights. Ben wanted to sell immediately because he believed the price of the crop would fall; Jerry wanted to keep the farm because he believed the price of the crop would increase. Jerry could not afford to buy Ben out at the time, but the strain on their family relationship over their disagreements was becoming too large. Ben had always trusted Jerry's instincts in the past, but this time felt Jerry was being overly optimistic. In an effort to settle the matter and close up the growing rift between them, the two brothers agreed to meet with a family business advisor. Following the consultation, Jerry proposed a possible agreement to his brother: They would keep the farm for another season. If the price of the crop fell below a certain price (as Ben thought it would), then they would sell the farm and Ben would get 50% of the farm's current value, adjusted for inflation; Jerry would get the rest. However, if the price of the crop were to rise (as Jerry thought it would), Jerry would buy Ben out for 50% of the farm's current value, adjusted for inflation, and would get to keep all of the additional profits for himself. Jerry was delighted when his brother told him he could agree to this arrangement, thereby avoiding further conflict.

Exhibit 9a

The Annual Meeting Case

The Sales and Marketing divisions of a large health maintenance corporation were trying to decide where to hold their annual meeting. There were substantial disagreements between the two divisions that were beginning to create conflict between them. The Sales division wanted to go to a lodge in the mountains. They had researched this possibility already and were anxious to reserve a location as soon as possible. The Marketing division, on the other hand, wanted to go a major city. They had already generated materials on the potential exposure of their company in several urban markets in preparation. The two divisions considered the compromise of holding two annual meetings, but both the added cost and the hectic travel schedules of the executives involved made this option unfeasible. There was added pressure from company leaders to hold a single annual meeting given the potential benefits of building better working relationships across divisions which had a history of tense and competitive relations. Indeed, one objective of the annual meeting was to foster better relations between the two divisions.

One member of the Sales division was appointed to negotiate with one member of the Marketing division, concerning the location of the annual meeting. As the division planners gained trust in each other, important understandings emerged. The Sales division desired to run the annual meeting as a retreat to talk about important company issues, which required having a location suitable to focusing on the work at hand. The Marketing division saw the annual meeting as an opportunity to promote the company image. The two divisions resolved to create a well-publicized annual meeting located in the mountains, and agreed to maintain open lines of communication between divisions.

Exhibit 9b

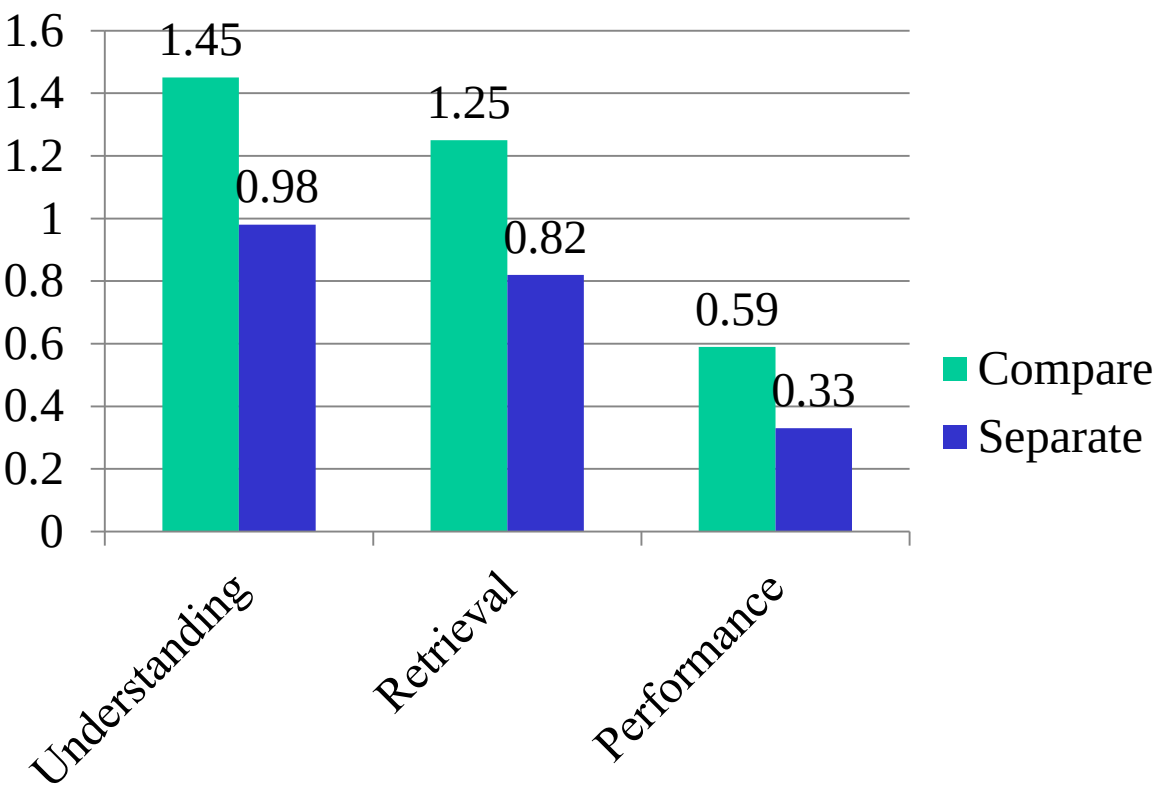
The Videogame Sales Case

Vortex, Inc., a small video-arcade software firm, had a promising new line of Special Forces videogames. Keppel and Co., a major manufacturer of video-arcade equipment in Europe, was working with Vortex to produce the hardware needed for the Special Forces games. They were negotiating over how to share revenues from their joint product. The deal was mostly going smoothly – Vortex wanted to broaden the market for its products and Keppel needed a boost in sales to meet their shareholders expectations for the year. However, the two companies were struggling with how to split sales revenues. Keppel was demanding a high percentage from sales to finance the added expense of a custom-made action control for Vortex's games. Further, Keppel knew that it had the greatest resources to get Vortex's Special Forces games on the market. On the other hand, Vortex was also demanding a high percentage from sales on the grounds that what was being sold was their games, they had the patent on the new action control, and Keppel was simply one of several available manufacturers. Having negotiations at a standstill was bad for both companies because Keppel needed to increase their sales by the end of the year and Vortex needed to get their products out while they were still state of the art.

The breakthrough came when negotiators from Keppel and Vortex began discussing the differing needs of their companies. The negotiation teams reached the following agreement:

Vortex would give up some of its share of revenue for the remainder of the year to cover Keppel's production costs and to aid their current financial situation. In return, Keppel would give up a comparable share of revenue in future fiscal years for these products, and Vortex would still maintain their patent on the new control device.

Exhibit 10



Source: Gentner, D., Loewenstein, J., Thompson, L., and Forbus, K. (in press). Reviving the inert knowledge problem: Analogical encoding supports relational retrieval of past events. *Cognitive Science*.

Exhibit 11a

Sunk Costs (explanation-only)

Sunk costs refer to a situation in which a person (or team) has invested money or other scarce resources into a course of action, but the chosen course of action is not producing a return. Rather than throw good money after bad, the manager needs to accept the loss and remove him or herself from further losses.

Exhibit 11b

Sunk Cost + one example

Sunk costs refer to a situation in which a person (or team) has invested money or other scarce resources into a course of action, but the chosen course of action is not producing a return. Rather than throw good money after bad, the manager needs to accept the loss and remove him or herself from further losses.

An example of sunk costs would be a manager who invested a significant amount of his savings in a certain stock (that looked promising at time 1). Unfortunately, the price of the stock started to fall and continued to fall.

Exhibit 11c

Sunk Cost + two examples

Sunk costs refer to a situation in which a person (or team) has invested money or other scarce resources into a course of action, but the chosen course of action is not producing a return. Rather than throw good money after bad, the manager needs to accept the loss and remove him or herself from further losses.

An example of sunk costs would be a manager who invested a significant amount of his savings in a certain stock (that looked promising at time 1). Unfortunately, the price of the stock started to fall and continued to fall.

Another example of sunk costs would be a manager who hired a subordinate for a technical job. At the time of the interview, the subordinate appeared to have the requisite qualifications. Yet, very soon after being hired, it became clear that the subordinate lacked the necessary critical skills. Several attempts were made to remediate the situation including sending the new hire to skills courses and spending inordinate amounts of time mentoring this person, but by all standards, his performance was still sub optimal. Even though the company had spent over $50,000 hiring this person, they decided to terminate his employment and accept it as a sunk cost. This allowed the company to move on and to find someone who could do the job competently.

In both of these examples – the stock market and the incompetent employee – the initial decision seems sound. Yet, subsequent data and feedback indicate that the investment is producing a loss.

Exhibit 12a

Stimulus Proverbs

(to show in original PPT slideshow)

	Stimulus Proverb
1	Fortune favors the bold
2	A friend in need, is a friend indeed
3	Don't look a gift horse in the mouth
4	Too much curiosity killed the cat
5	Those who live in glass houses shouldn't throw stones
6	An apple a day keeps the doctor away
7	Rome was not built in a day
8	Don't put all your eggs in one basket
9	Don't bite off more than you can chew
10	Don't judge a book by its cover
11	One rotten apple spoils the whole bunch
12	Fish or cut bait
13	A penny saved is a penny earned
14	Don't kill the goose that lays the golden eggs
15	Haste makes waste
16	Don't lock the stable after the horses are stolen
17	Let sleeping dogs lie
18	One man's meat is another man's poison

Exhibit 12b

Recall Test

	New Proverb	**Write down which proverb comes to mind from original slideshow (or leave blank)**
1	A good book is a good friend	
2	An ounce of prevention is worth a pound of cure	
3	Waste not, want not	
4	Beggars can't be choosers	
5	Fight poison with poison	
6	When the cat's away, the mice will play	
7	There are other fish in the sea	
8	Lay up something for a rainy day	
9	Fortune and misfortune are next-door neighbors	
10	All roads lead to Rome	
11	The cage is ready, but the bird has flown	
12	Misery loves company	
13	A rolling stone gathers no moss	
14	Don't burn bridges behind you	
15	One bite leads to another	
16	A chain is only as strong as its weakest link	
17	Don't bite the hand that feeds you	
18	Leave well enough alone	

Exhibit 12c

Recognition Test

	New Proverb	**Write down which proverb comes to mind from original slideshow list (or leave blank)**
1	A good book is a good friend	
2	An ounce of prevention is worth a pound of cure	
3	Waste not, want not	
4	Beggars can't be choosers	
5	Fight poison with poison	
6	When the cat's away, the mice will play	
7	There are other fish in the sea	
8	Lay up something for a rainy day	
9	Fortune and misfortune are next-door neighbors	
10	All roads lead to Rome	
11	The cage is ready, but the bird has flown	
12	Misery loves company	
13	A rolling stone gathers no moss	
14	Don't burn bridges behind you	
15	One bite leads to another	
16	A chain is only as strong as its weakest link	
17	Don't bite the hand that feeds you	
18	Leave well enough alone	

Exhibit 12d

	Stimulus Proverb	**Surface Match**	**Analogical Match**
1	Fortune favors the bold	Fortune and misfortune are next door neighbors	Nothing ventured, nothing gained
2	A friend in need, is a friend indeed	With friends like these, who needs enemies?	Misery loves company
3	Don't look a gift horse in the mouth	You can lead a horse to water but you can't make him drink	Beggars can't be choosers
4	Too much curiosity killed the cat	When the cat's way, the mice will play	Don't open Pandora's box
5	Those who live in glass houses shouldn't throw stones	A rolling stone gathers no moss	The kettle should not call the pot black
6	An apple a day keeps the doctor away	The most beautiful apple has the worm	An ounce of prevention is worth a pound of cure
7	Rome was not built in a day	All roads lead to Rome *or* When in Rome do as the Romans	A thousand mile trip begins with one day
8	Don't put all your eggs in one basket	You can't make an omelet without breaking eggs	Don't burn bridges behind you
9	Don't bite off more than you can chew	One bite leads to another	His eyes are bigger than his stomach
10	Don't judge a book by its cover	A good book is a good friend	All that glitters is not gold *or* Beauty is only skin deep
11	One rotten apple spoils the whole bunch	The apple does not fall far from the tree	A chain is only as strong as its weakest link
12	Fish or cut bait	There are other fish in the sea	Put up or shut up
13	A penny saved is a penny earned	Penny-wise, pound foolish	Lay up something for a rainy day
14	Don't kill the goose that lays the golden eggs	What's good for the goose is good for the gander	Don't bite the hand that feeds you
15	Haste makes waste	Waste not, want not	Time is money
16	Don't lock the stable after the horses are stolen	You can lead a horse to water, but you can't make him drink	The cage is ready, but the bird has flown
17	Let sleeping dogs lie	A dog is man's best friend	Leave well enough alone
18	One man's meat is another man's poison	Fight poison with poison	Different strokes for different folks

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