Retrieving a Distant Analog From Memory in Daily Life is Very Unlikely, Even in Optimal Conditions of Encoding

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Abstract

Against the typical results from laboratory studies, it has been suggested that retrieving distant analogs might be easy in real-life, where we tend to encode familiar situations with expert-like schemas. In each of two experiments, we formed two groups of participants who, as determined by a questionnaire presented during a first session, had reported that they have experienced an event corresponding to a schema-governed category (Experiment 1) or to a system of schema-governed categories (Experiment 2). While the episodes reported by one of the groups belonged to the same domain as the target analog to be presented during the second session, those of the other group belonged to a different thematic domain. During a temporally and contextually separated session, the experimenters presented both groups with a target analog belonging to the schema-governed category for which participants had reported a base analog. Participants had to retrieve an autobiographical episode that they considered analogous to the situation presented by the experimenter. In line with traditional studies, we found that retrieving distant instances of relational categories is much more difficult than retrieving close instances.

Keywords: analogy; retrieval; transfer; relational category

Introduction

To explain why she declined your passion fruit ice cream, your friend tells you that she used to add passion fruit to sorbets, toppings, and cheesecakes, with the consequence that she soon got fed up with it. Which is the likelihood that this story would remind you of a personal episode in which, having discovered Supertramp during high school, you began listening to them frenetically and playing their songs, before finally getting bored of their music? Would this reminding be less likely than recalling another episode wherein having discovered peanut butter in your childhood, you began using it in toasts, milkshakes and sandwiches until you got disgusted of it?

Analogies are often used to comprehend an unknown situation (the *target analog*) in terms of a more familiar situation (the *base analog*). It is a well-established experimental finding that the retrieval of base analogs pertaining to a different domain of the target (*distant analogs*: DAs) is much more difficult than the reminding of those pertaining to the same domain (*near analogs*: NAs) (see Trench & Minervino, 2017, for a review). Recent studies

(e.g., Raynal, Clément, & Sander, 2018), however, have argued that this might not be the case for everyday analogies, where it is often the case that we are familiar with the base analog, and that both analogs have been encoded under the same lexicalized relational category.

How difficult is it to retrieve a distant analog from memory?

As illustrated with the examples above, the temporal separation between the acquisition of a base situation and the subsequent encounter with a target tends to be very large in real-life, spanning from months to years, or even decades. On top of this, the contexts surrounding the encodings of the base and the target tend to be very disparate. Hence, transfer paradigms that include both a delay and a contextual change between the encoding of base and the presentation of the target seem well suited for studying analogical retrieval as it takes place in natural settings (Catrambone & Holyoak, 1989). Studies in this line have often employed the story *The General* as the base analog, and the *Radiation problem* as the target (e.g., Gick & Holyoak, 1983). The former told about a dictator who governed a country from a fortress, which could only be captured with a large number of soldiers. A rebel General had a large enough army, but he learned that the radial roads leading to the fortress were mined. Hence, he could not send the whole army through a single road. After dividing his army into smaller groups, he located them on different roads and had them converge on the fortress at the same time, thus avoiding the detonation of the mines. The Radiation problem told about a certain patient who had an inoperable tumor in his stomach. Even though the patient's surgeon had a kind of rays that could destroy the tumor if applied at a very high intensity, rays of such intensity would also destroy surrounding tissues that had to be preserved. Participants are asked to envision ways of using the rays to destroy the tumor, but without sacrificing the surrounding tissues. When both a contextual change and a delay are introduced between the encoding of the base and the processing of the target, employment of the convergence solution is barely above 10%, and not superior than in control groups that had not received the base analog (e.g., Keane, 1987; Spencer & Weisberg, 1986). In contrast, analogs coming from near domains are highly retrieved (e.g., around 80% in Keane, 1987).

Given the representation of a target situation in working memory, there will be many potential cues to retrieve near analogs from long-term memory (LTM). For example, the Radiation problem is likely to call to mind prior knowledge about related medical problems. In contrast, DAs stored in LTM will lack this kind of transparent resemblances. However, the probabilities of retrieving a DA from memory should increase in those cases where its processing had elicited the extraction of a more general formulation, or *schema* (Gick & Holyoak, 1983). Taking the General story as an example, its abstract schema would include the need to use an intense force to overcome a central target, plus the fact that employing the force at such intensity would endanger elements that need to be preserved. Given that the subsequent presentation of the target will probably elicit the same schema, the distant analog stored in memory could be accessed by virtue of sharing that schema.

Gick and Holyoak (1983) laid the foundations for a tradition of interventions aimed at promoting an abstract encoding of base analogs. In more recent times, Kurtz and Loewenstein (2007) reasoned that if retrieval depends on the degree of match between a stored item and a target situation, the beneficial effect of schema abstraction should also apply when elaborating on the target situation at retrieval time. The assumption underlying both research programs is that the optimal condition for transfer is one wherein a person has encoded both the base and the target in terms of the abstract schema they shared. As novices do not spontaneously derive the type of schemas that support distant transfer, they need external stimulation and guidance. In contrast, the application of available schemas is rather common among experts dealing with situations within their fields of expertise, which could result in higher levels of distant retrievals (Loewenstein, 2010).

The materials employed in studies of analogical problem solving rarely fall within the fields of expertise of the population under study. Participants' generalized failures to retrieve this kind of materials have elicited the (potentially) wrong conclusion that distant retrieval is difficult and more difficult than near retrieval *at large*. But laypeople can arguably be considered "experts" in many daily schemas, which they systematically apply to situations that could become bases or targets of future analogies. Although experimental participants may not be familiar with the appropriate schema for divergent-convergent problems, they face everyday life situations with overlearned schemas such as *robbery*, *promise*, or *party* (s*chema-governed categories*: SGC; Gentner & Kurtz, 2005; Markman & Stilwell, 2001). Taking this fact into account, the possibility remains that distant retrieval is more frequent in real life than experimental studies with novices would suggest, and therefore that the actual gap between inter and interdomain retrieval is smaller than has traditionally been obtained (Hofstadter & Sander, 2013; Raynal, Clément, & Sander, 2020). To exemplify, if a young lady takes your cell-phone from your suitcase and runs away, you will automatically categorize the situation as an instance of *robbery*. If ten years before you had experienced an episode in which two boys entered your house and took your jewelry from your safe, chances are that you had also applied the category *robbery* to such experience. Applying the same SGC to these events could have promoted the highlighting and abstraction of the relational structure that renders these two acts instances of the category. Such categorizations might have also led to deemphasize the idiosyncratic surface content of the cases being compared (for computational implementations of these ideas see Gentner, Loewenstein, Thompson, & Forbus, 2009). Thus, this kind of categorization can be thought of as representing an optimal condition for remote transfer to occur (Jamrozik & Gentner, 2020; Kurtz & Honke, 2020). A further factor not considered by Raynal et al. (2018) could also contribute to narrowing the gap between the retrieval of close vs. distant analogs: as categorization leads to deemphasizing surface content, it could reduce the retrieval of close analogs. If assigning an event to a schema makes surface content lose weight in favor of relational structures, that content should no longer exert the effect that it typically exerts when analogs are not assigned to a schema (Gentner et al., 2009). Hence, two forces should concur to narrowing the surface similarity gap: (1) higher probability of retrieving distant analogs, and (2) lower probability of retrieving near analogs.

Besides employing materials for which participants had no schemas, Hofstadter and Sander (2013) have considered that the traditional experiments have another limitation that undermines the generality of their conclusions. This shortcoming relates to the fact that the knowledge acquired about the source situation during the twenty minutes or so of a typical experiment is perforce very limited. In contrast, when in everyday situations we are faced with a new scenario and have to decide what to do, the source situations we retrieve from our memories are, in general, extremely familiar.

Taking into consideration the above shortcomings of the materials employed in experiments of analogical problem solving, Raynal et al. (2018) carried out a study aimed at assessing distant retrieval in those cases where participants (a) use their own base analogs, and (b) they had encoded both the base and the target in terms of a lexicalized SGC. They presented participants with stories like the following: "I had the idea to answer that I forgot my glasses when the photographer offered me to go to his exhibition. The reality is that I had my glasses with me but I did not want to go there" (an instance of *excuse*). Participants had to report autobiographical episodes that these situations reminded them of. Near 50% of the responses consisted of distant analogs, whereas 12 % of the responses were near analogs (the rest of the reported items were non analogous episodes). Results showed not only that the surface similarity advantage disappeared, but also that the retrieval of distant analogs was more frequent than that of close analogs.

Albeit encouraging, the obtained pattern may merely be the result of having more DAs than NAs in memory: How many instances of having invoked visual difficulties for not assisting to a cultural activity could Raynal et al's (2018) participants have had available in memory? Without doubt,

many fewer cases than the sum of excuses coming from distant domains (e.g., adducing being stressed for not initiating a diet, not feeling well for not assisting to a class, being urged no to keep the house in order, and a long etcetera). Assessing the extent to which surface similarity determines the retrieval of naturally-acquired base analogs requires knowing not only the number of far and near sources that were retrieved, but also the number of instances of both types of base analogs that were available for retrieval (Trench & Minervino, 2015). Even though this is factually unfeasible, an equivalent way of controlling for the potentially uneven availability of close and distant sources in LTM could consist in documenting the availability of two source analogs in participants' LTM—one pertaining to the domain of the target and one not—, and then restricting the analysis to the retrieval of these critical analogs during the processing of the target. In those occasions where it is hard to identify participants knowing a close and a distant analog, as was the case in the present research, one can still present the target analog to two groups of participants, one who knows a close analog and another who has a distant analog in LTM. Despite this difference, the logic of the data analysis remains unchanged.

To sum up, Raynal et al. (2018) have argued that when a familiar source analog has been encoded as a case of the same lexicalized relational category as the target, distant retrieval might not be as difficult as experimental studies suggest. If this is true, the gap between intra and interdomain retrieval would decrease. This last hypothesis seems reasonable when considering that (1) there is a general consensus that encodings of base and target in such a way constitute ideal conditions for distant retrieval, and (2) the removal of surface content might reduce the retrieval of near analogs. If Raynal et al. (2018) are right, then the picture rendered by experimental studies about our general difficulty for retrieving distant analogs might stem from sampling a particular kind of transfer conditions.

In view of the theoretical and practical implications of assessing our ability for distant retrieval, we set forth to readdress Raynal et al.'s hypothesis, but controlling for the potentially uneven availability of close and distant sources in LTM. To this end, we adapted the hybrid paradigm developed by Trench and Minervino (2015, Experiment 2) so as to form two groups of participants who, as determined by a questionnaire presented during a first session, had reported that they have experienced an instance of a particular SGC (e.g., *robbery*) from one of two domains of knowledge (e.g., a *vehicle* or a *password*), prior to the experimental study. During a temporally and contextually separated session, the experimenters presented one target analog as a case of one of the SCGs for which participants had reported an instance during the prior session, thus ensuring that the base and the target had been encoded in terms of the same lexicalized SGC. While the SGC to which the target pertained was in both conditions the same as the one reported in the first session (e.g., *robbery*), the domain of the target only matched the domain of the episodes reported by participants of one of the groups (e.g., *vehicle*). Experiment 2 had the same design

and procedure as Experiment 1, with the difference that base and target analogs described more complex events wherein two different SGCs were connected by a causal relationship (e.g., *concern* causes *taking care* of something).

Experiment 1

Method

Participants and Design An initial sample of 139 students of Psychology volunteered to participate in the experiment. The final sample consisted of 96 participants (mean age = 21.8; SD = 2.92) satisfying the following criteria: (a) they reported an instance of at least two of the four generic descriptions of events that were presented to them during the first phase of the experiment (one maintaining semantic distance with the target and one not), (b) they assisted to the second phase of the experiment, and (c) they did not notice a connection between both phases of the study. While 48 were randomly assigned to the intradomain condition, the other 48 were assigned to the interdomain condition. The dependent variable was whether the target analog received during the second phase elicited the retrieval of the critical situation that had been reported during the first phase.

Materials Four sets of materials were built, each one comprising a target situation and two cues. The target analog of each set was a simple situation in which a character had experienced an instance of a SGC pertaining to a specific domain (e.g., "A friend of mine was involved in an episode of *donation*: she brought *rice* to needy people"). The two cues consisted in generic descriptions intended to check the availability of naturally-acquired autobiographical episodes belonging to the same SCG as the target (Table 1 displays a sample set). While near cues aimed at identifying situations taking place within domains similar to that of the target (e.g., having made a donation of *food*), distant cues aimed at identifying instances of the SCG taking place within domains less similar to that of the target (e.g., having made a donation of *clothes* to needy people).

Table 1: Sample of materials used in Experiment 1

Cues analogous situations (Phase 1)	Target situations (Phase 2)
Near source condition: Have you ever been involved in an episode of *unpunctuality* such as the following one: You arrived late to a take a transport?	**Both conditions**: I have a friend who has been involved in an episode of *unpunctuality*: He arrived late to take a plane.
Distant source condition: Have you ever been involved in an episode of *unpunctuality* such as the following one: You arrived late to a doctor´s appointment?	Does this situation remind you of an analogous event that you have experienced? In case it did, please describe it to us.

For the first phase, two alternative two-page booklets were built: version "A," compiling the two semantically near cues of Sets 1 and 2 and the two semantically distant cues of Sets 3 and 4, and version "B" including the alternative cues of version "A". For the second phase, a single sheet compiled the target situation of one of the sets plus two filler tasks.

Procedure After providing an informed consent, participants carried out the first phase of the experiment. This phase was orally presented to participants as a study on memory of autobiographical episodes and was administered during an introductory class on Cognitive Psychology. Whereas roughly half of participants received booklet "A", the other half received booklet "B". After each of the cues, written instructions asked participants to write down one of such episodes, in case they knew one. They had to provide as many details as possible about *what* exactly did occur, *when* did it happen, and *where* did it take place. Participants had 15 min to complete the task. Two independent judges analyzed each of the answers given by participants to determine whether or not it pertained to the same SGC (e.g., *donation*) as the cue in which it was inspired. Judges received each response along with the four SGCs that were used for constructing the sets of materials plus a "none of the above" option, having to indicate to which of them it belonged, in case they considered that it did. Responses in which at least one of the judges failed to categorize a response as instance of the critical SGC (8%) were dropped from further analysis. For those that were not discarded, judges had to determine if the situation reported pertained to one particular domain (e.g., *food* or *clothes*). The list of domains that judges received comprised the eight domains that appeared within the 4 sets of materials, plus a "none of the above" option. Responses in which at least one of the judges failed to categorize a response as instance of the critical domain (6%) were dropped from further analysis. Subsequent to judges' analysis, experimenters discarded participants failing to provide at least one distant and one near episode among their responses. Finally, participants were semi-randomly rearranged so as to obtain 30 participants reporting a base analog for Set 1 (15 providing a NA and 15 a DA), 30 participants reporting a base analog for Set 2 (15 providing a NA and 15 a DA), 30 participants reporting a base analog for Set 3 (15 providing a NA and 15 a DA), and 30 participants reporting a base analog for Set 4 (15 providing a NA and 15 a DA). Hence, each participant was assigned to one of the two conditions (near vs. far semantic distance between the reported base and the presented target), and to one of the sets of materials.

A week later, an experimenter that was not present during the first phase invited students to participate in a study about ways of telling stories. Along three days they assisted in groups of no more than three students to the Cognitive Studies Laboratory of the University[1], until completing 24

participants that had reported a base analog for Set 1 (12 NAs and 12 DAs), 24 participants that had reported a base analog for Set 2 (12 NAs and 12 DAs), 24 participants that had reported a base analog for Set 3 (12 NAs and 12 DAs), and 24 participants that had reported a base analog for Set 4 (12 NAs and 12 DAs).

After receiving a brief presentation about the story telling study, each participant received two filler tasks: one of choosing one of two endings for a story and one of selecting a character for a hypothetical story. Upon completing these tasks, each participant was confronted with the target analog corresponding to the set of materials on which the abovementioned assortment of participants was based. Participants were asked to report one analogous story that had happened to them, if they had had one, including as many details as possible about the experience. They were allotted 15 min to complete the second phase. Once they had finished, they had to turn the last page of the booklet and to respond "yes" or "no" to a question asking if they had thought that there was a connection between the memory task received in the Cognitive Psychology class of the previous week and the present story telling study. Those who answered "yes" were eliminated from further analysis. While the initial sample was composed of 139 students, the final sample consisted of 96. In the first experimental session, participants were eliminated for not reporting at least one NA and one DA (n = 8) or for reporting availability of base analogs that could only contribute to pools that had already been completed (n = 11). During the second session, participants were eliminated for not assisting to it (n = 6), for having perceived a connection between both phases of the study prior to receiving the target (n = 8), or for reporting base analogs that could only contribute to pools that had already been completed (n = 8).

Data Analysis Two judges received the transcriptions of each participant's episode reported in the first phase coupled with the episode reported by the same participant during the second phase. Judges were instructed to compute a base analog as retrieved if they considered that the episode reported by the participant in the second phase was the same as the one reported in the first phase. Judges agreed in 94,7% of the cases, resolving cases of disagreement by discussion.

Results and Discussion

Base analogs that were semantically close to the target were retrieved in 72.91% of the cases, while semantically distant sources were retrieved in only 12.5% of the cases, $\chi^2(1, N = 96) = 35.803$, $p < 0.001$. The retrieval rates of familiar NAs and DAs codified as instances of the SGC applied to the target were similar to the ones obtained in traditional studies of analogical problem-solving, in which participants are not familiar with base analogs and for which they lack schemas to assign them.

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[1] In the present study we evaluate retrieval of base analogs coming from pre-experimental, autobiographical memory. The first phase was destined to check the availability of base analogs. However, to control for any effect of the first phase on the second

one, we introduced a week delay and several contextual changes between the two phases. In the event that this activation had an effect on subsequent retrieval, its effect would have been identical across conditions.

Traditional theories about analogical thinking have considered that the concept of *analogy* refers, *stricto sensu*, to comparisons between situations that are organized by similar systems of relations. In Experiment 2 we applied the procedure of Experiment 1 to cues and targets consisting of relatively more complex events than those of experiment 1. While in Experiment 1 base and target analogs were instances of a common SGC, the situations employed in Experiment 2 comprised two different SGCs linked by a causal relation (e.g., *concern* causes *taking care*).

Experiment 2

Method

Participants and Design An initial sample of 152 students of Psychology volunteered to participate in the experiment. The final sample consisted of 88 participants (mean age = 22.7; *DS* = 3.61) satisfying the same requisites as in Experiment 1.

Materials Four sets of materials were built, each one comprising a target situation and two analogous cues. The target analogs of each set were situations in which an action carried out by a character (itself an instance of a SGC; e.g., *bad behavior*) and which pertained to a particular domain (e.g., *bad behavior* at *home*) led to a particular consequence in the same domain (an instance of a different SGC; e.g., *punishmen*t at *home*). The two cues consisted of generic descriptions intended to check the availability of naturally-acquired autobiographical episodes composed by instances of the same SCGs as those of the target, and linked by a causal link (Table 2 displays a sample set). As in Experiment 1, near cues aimed at identifying situations taking place within a domain similar to that of the target (e.g., *home*), whereas distant cues aimed at identifying combinations of said SGCs taking place within a domain less similar to that of the target (e.g., *school*).

Table 2: Sample of materials used in Experiment 2

Cues for analogous situations (Phase 1)	Target situations (Phase 2)
Near source condition: Did you ever make an effort in your studies and consequently you obtained an achievement in something related to your studies?	**Both conditions**: I have a friend that made an effort in her studies and consequently obtained an achievement in something related to her studies: She stayed at home all weekend studying and consequently she obtained excellent marks.
Distant source condition: Did you ever make an effort to improve your health and consequently you obtained an achievement in something related to your health?	Does this situation remind you of an analogous event that you have experienced? In case it did, please describe it to us.

Procedure The two phases of the experiment followed the same procedure as in Experiment 1. Two independent judges analyzed each of the answers given by participants to determine whether or not they pertained to the same system of SGCs as the cue in which it was inspired. Judges received each response along with the four systems of SGCs that were used for constructing the sets of materials plus a "none of the above" option, having to indicate to which of them it belonged, in case they considered that it did. Responses in which at least one of the judges failed to categorize a response as an instance of the critical system of SGC (5%) were dropped from further analysis. For those that were not discarded, judges had to determine if both cause and effect of the situation reported pertained to one particular domain (e.g., *school*). The list of domains that judges received comprised the eight domains that appeared within the 4 sets of materials, plus a "none of the above" option. Responses in which at least one of the judges failed to categorize a response as an instance of the critical domain (9%) were dropped from further analysis. Subsequent to judges' analysis, experimenters discarded participants failing to provide at least one distant and one near episode among their responses. Finally, participants were semi-randomly rearranged so as to obtain 30 participants reporting a base analog for Set 1 (15 providing a NA and 15 a DA), 30 participants reporting a base analog for Set 2 (15 providing a NA and 15 a DA), 30 participants reporting a base analog for Set 3 (15 providing a NA and 15 a DA), and 30 participants reporting a base analog for Set 4 (15 providing a NA and 15 a DA). Hence, each of the participants was assigned to one of the two conditions (near vs. far semantic distance between the reported base and the presented target), and to one of the sets of materials.

During the second phase of the procedure, participants were recruited until completing 22 participants who had reported a base analog for Set 1 (11 NAs and 11 DAs), 22 participants who had reported a base analog for Set 2 (11 NAs and 11 DAs), 22 participants who had reported a base analog for Set 3 (11 NAs and 11 DAs), and 22 participants who had reported a base analog for Set 4 (11 NAs and 11 DAs).

While the initial sample was composed of 152 students, the final sample consisted of 88. In the first experimental session, participants were eliminated for not reporting at least one NA and one DA (n = 18) or for reporting availability of base analogs that could only contribute to pools that had already been completed (n = 14). In the second experimental session, participants were eliminated for not assisting to it (n = 9), for having perceived a connection between both phases of the study prior to receiving the target (n = 11), or for reporting base analogs that could only contribute to pools that had already been completed (n = 12).

Results and Discussion

Near analogs were retrieved in 27.27% of the cases during the second phase, while DAs were retrieved only in 4.55% of the cases, χ^2 (1, $N = 88$) = 8.494, $p < 0.01$. Results replicate those of Experiment 1 with materials that included systems of SGCs instead of isolated SGCs. Results of Experiment 2

thus provide further evidence that having encoded a familiar base episode and a target analog in terms of lexicalized relational categories neither improves distant reminding nor diminishes the effect of superficial similarities on analogical retrieval. Although the ratio of near and distant analogs was the same as in Experiment 1 (around 7 to 1), there was a general decrease in the retrieval of the critical sources. Collapsing across conditions, mean retrieval rate of critical sources dropped from 42.71% (Experiment 1) to 15.91% (Experiment 2). One possible reason for this general drop-off could be that episodes corresponding to a single SCG (Experiment 1) constitute units involving short time slices of experience, whereas events encompassed by two connected SGCs (Experiment 2) may not. Hence, the events reported by participants of our second experiment might have not been originally encoded in episodic memory as a whole, being arranged as units during the retrieval process itself (episodic memories tend to represent relatively brief experiences, Anderson & Conway, 1993). To illustrate, a participant might have experienced an instance of having made an effort related to studying (e.g., studying for a quiz during regular vacations), as well as having obtained a high grade in such exam, but without causally linking the outcome to the effort Following with the above example, a possible strategy would consist in searching for instances of the SGC *study-related effort* and, upon retrieving an instance, checking whether it was followed by an instance of the SGC *study-related achievement.* This kind of incremental search strategy, similar to the one implemented in O'Keefe and Costello's (2008) model, may require a conscious effort, leading some participants to give up the search process and therefore fail to retrieve an analogous case. In favor of this interpretation, the proportion of participants failing to provide any kind of response during the second phase was much higher in Experiment 2 (46%) than in Experiment 1 (22%).

Collapsing across experiments, an inspection of the analogical responses provided by participants who did not retrieve the critical analogs revealed that, just as with critical source analogs, near analogs (37.7%) were far better retrieved than distant analogs (6.25%). If our previous speculation that there may generally be more far than near analogs in LTM for a given target is correct, the above data provide further support to the effect of surface similarities during analogical retrieval. However, it is important to bear in mind that the experimental paradigm employed in the present study should preclude deriving ungranted inferences from data relative to LMT items that were not detected during the first phase of the procedure.

General Discussion

Contrary to the expectation that familiar instances of schematic, lexicalized categories should be highly retrieved despite surface mismatches, results replicated the strong effect of surface similarity obtained in traditional experimental studies involving non-expert populations.

More surprisingly, the raw levels of distant retrievals were lower than those typically obtained in studies of analogical

reminding in which the experimenter has intervened to promote the abstract encoding of the base in terms of the ideal schema (e.g., in Catrambone & Holyoak, 1989, Experiment 4, retrieval was around 50%, whereas in our Experiment 2 it was lower than 5%). These studies are trying to promote encodings of the analogs that are naturally satisfied in our participants, who are "experts" in the use of the required schemas, and have applied them both to the base and the target. How to explain the difference between the results of these educatively-oriented experiments and the present, more naturalistic one? It is possible that neither our materials and conditions nor those of Raynal et al. (2018) are ideally suited for demonstrating the agreed-upon benefits of having encoded the base and the target in terms of an overlearned schema. On the one hand, the kind of events that are normally stored in episodic memory might not be particularly amenable to deemphasizing surface content in favor of an applicable schema. As episodic memory is the memory of everyday events, it preserves information about the times, location geography, associated emotions, as well as other contextual who-what-when-where-why knowledge that can be explicitly stated or conjured. This way, although cementing a new episodic memory requires its processing in terms of concepts coming from semantic memory (Tulving, 2002; e.g., a SGC is applied to particular event), this would not immediately and automatically entail suppressing the details of the experience, since it is these details what constitute the core substance for the episode to be revived in a figurative travel back in time. Laboratory studies credited with having augmented distant retrieval by promoting an encoding of the base and/or the target in terms of schemas have worked with materials associated with semantic memory.

Another aspect that should be taken into account when assessing the difficulty of distant retrieval concerns the availability of NAs that could outcompete the DA whose retrieval is being investigated, as was the case both in Raynal et al.'s (2018) study and in the present research. The reason behind the absence of competing NAs in most educatively-oriented studies may relate to the fact that they are interested in assessing distant retrieval when it is indeed necessary.

Many authors (e.g., Gentner, 1989; Trench & Minervino, 2017) have considered that our tendency to favor NAs over DAs during retrieval is adaptive, since pertaining to near domains increases the probabilities of sharing structural similarities. This putative advantage of NAs over DAs does not disappear when base and targets are cases of overlearned schemas (we can make better predictions from a bank robbery to another bank robbery than to a car robbery). It would be really alarming if people had a natural tendency to retrieve DAs when they have NAs available in memory. However, DAs would be required under particular pragmatics and pressures, such as when the available NAs have led the person to an impasse in solving a problem, or when they are not appropriate to build an argument for a particular audience. In those special circumstances in which we need to retrieve a DA among interfering near ones, a voluntary and strategic kind of search will prove useful (Olguín, Trench & Minervino, 2017).

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