

THE IMAGINAL ROLE OF SCHEMA INSTANTIATION
IN TRANSPORTATION

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To the Faculty of Washington State University:

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Chair

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THE IMAGINAL ROLE OF SCHEMA INSTANTIATION IN TRANSPORTATION

Abstract

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When people engage with narratives, often they experience the sensation of being “lost” in the story. This is the process of transportation, which has been described as a “melding of attention, imagery, and feelings” (Green & Brock, 2000). However, no further explication has been given to the precise psychological mechanisms that underlie this process.

The purpose of this thesis was to isolate the origin of the mental imagery that partially constitutes transportation. In theory, this might be a product of schema instantiation, or the application of episodic information to generic memory structures. To test this theory, subjects in two groups read a short story. Those in the experimental group also performed a secondary task designed to limit the encoding of and thus memory for story details (episodic information).

Findings indicate that, although the task did significantly interfere with memory of story details, greater memory for story details was only nearly-significantly correlated with transportation. However, further analysis of only the experimental group uncovered a significant relationship, suggesting that the error was in the experimental design.

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INTRODUCTION

The unfolding of narrated events has a tremendous but transient influence over our psyches. Yanal (1999) refers to this as a “paradox of emotion and fiction,” since we have a tendency to attach real emotions to characters and events we know are not real. Perhaps as a result of our psychological attachment to narratives, we often experience the sensation of “being there” when we engage with narratives in books, films, and television programs. This process is known as “transportation into a narrative world,” or simply “transportation.” Green and Brock (2000) conceive of transportation as a “distinct mental process, an integrative melding of attention, imagery, and feelings” (p. 701). While transportation has been studied directly and indirectly in such contexts as persuasion (Green & Brock, 2000; Green & Brock, 2002; Wheeler, Green, & Brock, 1999); cultivation (Busselle, Ryabovolova, & Wilson, 2004), perceived realism (Green, 2004), emotions (Oatley, 2002), and media enjoyment (Green, Brock, & Kaufman, 2004), little attention has been paid to the psychological processes that underlie transportation.

In cognitive research, particularly of memory, schema theories have developed over the course of more than two centuries to explain a broad category of phenomena. Schemas have been defined roughly as generic memory structures that we use to make sense of new situations (see Bartlett, 1932; Graesser, Gordon, & Sawyer, 1979; Schank & Abelson, 1977); and the process of applying incoming episodic information to a schema has been labeled “schema instantiation” (Darden, 2002). Interestingly, the literature on schemas and narrative share a number of parallels. Most notably, both are regarded as imaginative processes. The primary difference is that while transportation

in thought to depend on imagery (Green & Brock, 2000), schema instantiation is itself considered to be an imaginative process (Schank & Abelson, 1977; Brewer, 1987). I argue that schema instantiation constitutes the imaginative process that leads to transportation.

Before the mind can begin the process of schema instantiation and transportation, however, attention must be directed toward a narrative. Green and Brock (2000) suggest that transportation consumes all available cognitive resources such that connections to the real world disappear and only the narrative world exists. In this sense, transportation requires the complete dedication of cognitive resources to the narrative. Without this focus of attention, the incoming episodic information cannot be applied to the relevant schema, the schema cannot be instantiated, and transportation cannot occur. Thus, any reallocation of cognitive resources would likely result in a loss of transportation. This effect hinges on the limited capacity model (Lang, 2000), and is central to my hypothesis.

The literature review discusses models of narrative representation, schemas and instantiated schemas, transportation, imagery, and finally the limited capacity model.

LITERATURE REVIEW

Event and discourse structure. Brewer (1996) distinguishes between two levels of narrative discourse presentation: event structure and discourse structure. Event structure is the series of events organized in the order they occur in the story world. Discourse structure is the manner in which those events are presented in the text. An easy way to differentiate the two is to consider a flashback. In the event structure, the past event is placed prior to the present. In the discourse structure, it is the opposite, with the past event occurring after the present.

Since story endings exist to provide closure (at least that is usually the intention), there must be something left unclosed before the ending. Brewer (1996, pp. 262-264) describes three discourse structures that are crucial to entertainment stories and that story endings satisfy: surprise, suspense, and curiosity. In a surprise structure, a crucial expository element from the event structure is excluded from the discourse structure. Later revelation of the withheld information produces surprise in the reader. In a suspense structure, an initiating event—defined as an event having the potential for a good or bad outcome—is introduced early in the discourse structure with “considerable intervening material” presented before the outcome. The initiating event prompts the reader’s concern, which is protracted by the intervening material until it is resolved in the outcome. The curiosity structure is similar to the surprise structure in that an important element from the event structure is withheld from the reader. However, in a curiosity structure, the author provides the reader enough information to know that the event has been omitted, thus sparking the reader’s curiosity. Curiosity is resolved when the outcome reveals the withheld information. These discourse structures require

narrative event outcomes to take effect. Conversely, narrative event outcomes cannot have much of an (entertaining) effect without these discourse structures. “In essence, a narrative account requires a story that raises unanswered questions, presents unresolved conflicts, or depicts not yet completed activity...” (Green & Brock, 2000, p. 701). I will argue that event and discourse structure are largely imaginative processes that may facilitate transportation.

Surface code and textbase. Humans generate cognitive representations of narrative discourse (and discourse structures) in a number of ways, and researchers tend to agree on at least six (Graesser, Olde, & Klettke, 2002). Of these, the most basic levels of representation are the surface code and the textbase. The surface code represents all of the specific wording and syntax present in the text. In referring to a downhill skier successfully negotiating a difficult slope, the statements “he did it” and “shifting his weight at precisely the right moment, the skier turned into the bottom of the chute” convey roughly the same basic meaning in context, yet have very different surface representations. The former has a far more simple surface code than the latter. However, changes in the surface code can affect the other levels of representation drastically. For example, the latter statement includes additional details that may lead to a more vivid mental representation of the moment. Conversely, the moment could be described in great detail using jargon specific to physics, physiology, and geology, for example, so that the narrative-ness would weaken.

The next level of representation is the textbase, which consists of the specific propositions presented in the text. The second quoted statement from the previous paragraph contains a number of such propositions. For instance, the statement

proposes that the skier is a male, he is on a steep ski slope, he turns, and he descends to the bottom of the slope. Thus, the statement “the skier made the final turn of the chute and finished his descent” represents roughly the same textbase, yet here, the surface code is hardly the same. Any number of surface codes can represent the same textbase, but not vice-versa. In a way, the textbase is the generic representation of the surface code. As such, the surface code tends to fade more rapidly than the textbase over time (Graesser & Nakamura, 1982). This makes sense since we can typically remember the premises (textbase) of an old story sufficiently to retell it; however, unless care has been taken to memorize the story word-for-word, the surface code changes with each telling.

Situation models. Situation models are the third level of narrative representation Graesser et al. (2002) discuss, which occur at a deeper level than the surface code and textbase. Zwaan (1999) also describes a difference between situation models and what amounts to the surface code. Situation models are used to understand narratives from moment to moment as mental representations, or “microworlds,” of what the story is about (Graesser & Miemer-Hastings, 1999). Roskos-Ewoldsen, Davies, and Roskos-Ewoldsen (2004) define situation models as “...abstract representations where mental tokens represent objects, goals, locations and other components of the situation” (p. 352). Such components were delineated by Zwaan, Langston, and Graesser (1995) in an event-indexing model. They showed that situation models depend on five event indices: temporality, spatiality, causality, protagonist, and intentionality. In other words, situation models are built on the time, place, causal order, central character, and his/her/its goals of the narrative moment. When any one index changes over the course

of a narrative, the reader's situation model must be updated to accommodate the new information. A flashback is a good example of a shift in temporality. If the flashback is set in a location different from that of the present moment, the spatiality index must be updated. If an event in the flashback gives rise to a character's behaviors in the present, then the causality and intentionality indices for the present must be updated when the story returns to the present. Each update represents a new situation model. Thus, a situation model is the representation of the state of a narrative at the moment of comprehension. It is why, when experiencing a narrative, we tend to refer to past events in the past tense and future events in the future tense (Zwaan, 1999).

A good analogy through which to understand the mental process of updating a situation model is through the MPEG (Moving Picture Experts Group) digital video compression format. When a digital video is stored in an uncompressed format, each pixel is represented individually. To store uncompressed video at the standard of thirty-two bits per pixel, DVD-resolution (720-by-480 pixels), and twenty-four frames per second, a two-hour video would require about 240 gigabytes of disc space, or slightly more than twenty-five DVDs. However, films of durations considerably greater than two hours can be found on single DVDs. The key is compression. Among many standards for compressing video, MPEG is very common. The primary algorithm behind MPEG video compression locates and removes visual data from frames that are spatially-redundant with those in previous frame. That is, if the camera is stationary so that the background remains static, and visual changes occur only in the foreground, the algorithm will encode only the pixels that change, thus reducing the storage requirement. Similarly, a situation model can be considered the moving picture of a

simple MPEG video, the indices can be considered data blocks, and the shift from one event to the next can be considered the progression of a frame. Thus, if a narrative event shares common indices as the previous except for, say, spatiality (e.g., the protagonist steps outside), only the spatiality index will be updated. If each index were re-represented for each new event (analogous to uncompressed video), even if only one or two changed, the process would be rather inefficient.

The four levels of narrative representation not yet discussed—thematic point, agent perspective, genre, and pragmatic context—are not necessary for the current discussion of narratives and will not be discussed further.

Schemas. Schema theories have long existed in one form or another (i.e., Head, 1920; Kant, 1781/1963; Piaget, 1926); however, most modern schema theories (some of which I discuss individually in the following section) are rooted in Bartlett's (1932/1972) theory of memory (Iran-Nejad & Winsler, 2000). In a series of experiments aimed to better understand the processes of remembering, Bartlett predicted and found that, over time, people tend to forget certain classes of details while remembering others. In two such experiments, subjects reproduced either short text excerpts or drawings at determined intervals. In addition to glaring inaccuracy in recall, a common finding was the subjects' tendency to simplify each progressive reproduction, eliminating "individual characteristics," while maintaining the general structure (note the similarity between this finding and Graesser and Nakamura's, 1982, finding regarding surface code and textbase). Bartlett theorized that the elements that endure in memory, or the general structural elements that endured in his experiments, are those based on prior experience—what Head (1920) referred to as a "storehouse of past impressions" (p.

607)—and constitute schemas (or schemata). However, a schema does not form from a singular experience. As van Dijk and Kintsch (1983) suggest, taking a plane only once does not create a schema for that experience, but simply a situation model. “Later experiences of the same kind will complete, correct, and further fill in such an experience-based schema” (p. 344). Once generated, schemas are used to generate efficient responses to new stimuli that share generic elements with the memory structures upon which the schemas are built. As Neisser (1976) wrote, “...schemata are plans for finding out about objects and events, for obtaining more information to fill in the format” (p. 55), with “format” being equivalent to “schema.”

Bartlett was critical of Head’s conceptualization of schemas as the pure semblance of past knowledge stored in set chronological configurations. Rather, Bartlett regarded schemas as “living, constantly developing, affected by every bit of incoming sensational experience of a given kind” (p. 200). Moreover, were schemas structured chronologically, as Head argued, then retrieving and applying a schema to a stimulus would result in an appropriate response only after processing the entire chronological series of related stimuli. Conversely, Bartlett considered schema construction to be an active process in which a new stimulus modifies a schema uniformly rather than simply being tacked on to the end of a series. This is similar to Piaget’s (1952) concept of schema “accommodation,” and Neisser (1976) encapsulates the concept succinctly: “The information that fills in the [schema] one moment in the cyclic process becomes a part of the format in the next...” (p. 56). Applying this to the postural reactions principle to Head’s theory (i.e., turning on skis), Bartlett argued that even in making the appropriate changes in posture to maintain a regular motion, the activity is neither

entirely novel nor an exact repeat of one previous (sheer novelty would suggest the nonexistence of schemas; literal duplication would suggest a schema structure akin to Head's). Instead, the motion is informed both by past experience and the particular stimuli present in the setting in which the motion occurs.

Bartlett conceded that Head's schema theory has at least one practical application: they would serve simple organisms devoid of all higher brain function or limited in sensory variety and range. In such organisms, schemas operate as the circular and automatic responses to stimuli, as when a bee stings, even if it means its own death. However, as the complexity of brain function increases and more and broader sensory avenues become available to an organism, such simplistic responses become not only unproductive, but even unwise. As Bartlett wrote, "All of this growth of complexity makes circularity of reason, mere rote recapitulation and habit behaviour often both wasteful and inefficient" (p. 206; note that "circularity" here is not the same as when Neisser, 1976, refers to the process as "cyclic"). That is, were a bee given the brain and sensory function of a human, it would sting only when death were certain if it did not; however, it would also have a far greater ability to avoid such situations altogether. Moreover, responses to stimuli would incorporate features more complex than the simple fight or flight reactions that tend to govern the behavior of lower life forms. Thus, Bartlett's schema accounts more completely for the complexity of human action than Head's.

Craik (1943) observed that such models greatly benefit the enabled organism, allowing greater calculation in action. He wrote,

If the organism carries a "small-scale model" of an external reality and of its possible actions within its head, it is able to try out various alternatives, conclude

which is the best of them, react to future situations before they arise, utilize the knowledge of past events in dealing with the present and the future, and in every way to react in a much fuller, safer, and more competent manner to the emergencies which face it (p. 61).

To apply Bartlett's schema theory to narrative engagement, consider a new science-fiction film. A moviegoer with considerable experience with viewing science-fiction films will have a schema for that genre, and likely one for any subgenre. Early in the discourse structure, sufficient elements reveal the film to be of a particular schematized subgenre. The moviegoer will then apply the schema automatically to the new film so that s/he can make sense of what is happening and generate outcome expectations. If the film is a true representation of the schematized subgenre, the moviegoer's expectations will come to fruition and the film will further solidify the schema. The more likely scenario is that subtle (or not-so-subtle) elements of the new film will contrast the corresponding elements of the schema. If the new film is overly-divergent from the schema, an alternate schema will replace it or a new schema will be formed. If the discrepancies are slight, they may be incorporated into the current schema, especially if such discrepancies are encountered in other narratives (the following section reviews these processes more thoroughly). Then, those elements become generic of the subgenre schema and are used to make sense of and generate outcome expectations for later films of that subgenre.

As it would seem, schemas differ quite substantially from situation models and mental models as modes of mental representation. While situation and mental models represent very specific information about events (i.e., the five indices of the event-indexing model), schemas include no such information and are "not contextualized within a specific time or place (Roskos-Ewoldsen et al., 2004).

Modern schema theories. Although Bartlett's (1937/1972) schema theory resembles modern theories more closely than do any of his contemporaries' (see Iran-Nejad & Winsler, 2000; Thorndyke & Yekovich, 1980), a few modern theorists have been quick to point out inadequacies in Bartlett's theory. In particular, Brewer and Nakamura (1984) argue that Bartlett's theory cannot account for recall of specific or episodic memory. Indeed, Bartlett's theory predicts that such instances cannot be schematized; however, humans often have very specific memories of events that occurred many years in the past. In this regard, Bartlett's theory is surely lacking; however, not all modern theories can account for these phenomena either. Since the current study is concerned primarily with the use of schemas to understand present experiences rather than to catalogue those that have already past, the long-term memory of specific information will be addressed only briefly. However, to describe the functions of schemas fully, their general role in remembering should be discussed. The following section introduces briefly two of the more recent developments in schema theory considered to be within the same class of knowledge as schemas (see Brewer & Nakamura, 1984; McClelland, Rumelhart, & Hinton, 1986), and which can be referred to equally as schemas: scripts (Graesser et al., 1979; Schank & Abelson, 1977) and frames (Minsky, 1975; Neisser, 1976). Additionally, I will discuss a model of schemas as nodes in an associative network.

Schank and Abelson (1977) developed the notion of scripts as human cognitive processes to be applied to artificial intelligence, premising that artificial intelligence is best designed to emulate human cognitive language processes. In human cognition,

scripts provide a series of expectations about a familiar situation so that a person may function with cognitive efficiency when experiencing that situation (Riesbeck & Schank, 1989; Schank & Abelson, 1977, 1995). In a sense, scripts are like a recipe for a particular situation which, although not prescriptive, can provide a considerable breadth of usable information to make sense of a situation without having to analyze each detail of the situation individually. Scripts are also similar to stereotypes, which among a number of characteristics, may help to simplify a complicated world in what Snyder and Miene (1994) refer to as “cognitive orientation.” Furthermore, stereotypes produce expectations through which humans can interact with unfamiliar others (Stephan & Stephan, 1996). Even Schank & Abelson (1977) draw this distinction, defining scripts as “stereotyped sequence[s] of actions’ (p. 41).

For example, in viewing the new science-fiction film described previously, the moviegoer will apply a script appropriate to the subgenre of the film. If the film is about an alien invasion, the moviegoer will use an “alien invasion” script, rather than, say, a “robot war” script. In the script, a number of elements and their interrelations are known. For example, the moviegoer might expect the aliens not to present a threat (or even their presence) until the moment of the invasion. Additionally, the moviegoer might expect a number of stock characters. There might be the character who, before knowing their true intentions, is excited by the prospect of contacting the aliens; there might be the character who is afraid and hateful of the aliens at the onset; and, of course, there might be the hero character who usually figures out how to eliminate the aliens. Such movies that operate within this script are “Independence Day,” “War of the Worlds,” “Mars Attacks” and “Signs,” to name a few. There are a number of additional elements

that may typically represent the “alien invasion” script; however, there is no universal script as the contents of a script depends solely on prior experience. Having not seen any of the films listed above, a person would likely have a significantly different script for that subgenre than someone who had seen them.

Graesser et al. (1979) defined a script specifically as “a schema that underlies a frequently enacted activity...” (p. 319) and further developed a script-pointer-plus-tag (SP+T) model (Abelson, 1981; Schank & Abelson, 1977) to accommodate some of the specific and episodic information Bartlett’s theory could not. When the memory of a particular situation is represented with an SP+T, the generic information is assigned a pointer, and the information unrelated or inconsistent with the script is assigned tags. Furthermore, the SP+T model predicts that discriminative memory (i.e., remembering whether an event did or did not occur) should be better for unrelated and inconsistent (atypical) information than for generic (typical) information immediately after encoding, but that discriminative memory for atypical details tends to fade over time and often results in false positive memories of typical script elements. These predictions have received broad support (Connolly, Hockley, & Pratt, 1996; Graesser, 1981; Graesser et al., 1979; Lampinen, Faries, Neuschatz, & Toglia, 2000; Neuschatz, Lampinen, Preston, Hawkins, & Toglia, 2002; Shapiro & Fox, 2002). This delay-effect is likely due to a dominance of a script over its relevant tags in recall (Davidson, 1994; Graesser & Nakamura, 1982). However, the SP+T model creates a problem of its own. Since only information unrelated to or inconsistent with a script is tagged in the SP+T model, and since only tagged information is remembered discerningly, it follows that non-generic

but script-consistent information will not be remembered at all in the long-term (Iran-Nejad, 2000).

A more recent development, the schema-copy-plus-tag (SC+T) model, (Graesser & Nakamura, 1982), which is an extension of Woodworth and Schlosberg's (1954) "schema plus adjustment" model, is roughly identical to the SP+T model; however, it accommodates the script-consistent, non-generic information left out of the SP+T model. Graesser and Nakamura (1982) label this kind of information as related to but atypical of the script. Although Graesser, Kessler, Kreuz, and McLain-Allen (1998) also consider the SC+T model to be an elaboration of Schank and Abelson's (1977) SP+T model, there is no discernable difference between it and Graesser et al.'s (1979) adaptation of the SP+T model. Similarly, the predictions of this model have received support (Graesser et al., 1998). Furthermore, support was found for the tagging of information that is related to but atypical of a schema (Graesser & Nakamura, 1982).

Minsky (1975) developed the frames model while conducting research in computer vision (an origin akin to that of scripts!). Neisser (1976) viewed frames as analogous to computer programs, which he defined as "recipe[s] for selecting, storing, recovering, combining, outputting, and generally manipulating" information. Like Schank and Abelson's (1977) scripts, the frames model is based on phenomena of human psychology. Unlike scripts, Minsky (1975) describes frames as memory structures through which a new situation can be understood. A frame consists of a network of related nodes that represent "a stereotyped situation" (p. 212). The topmost node consists of the fixed actuality of what the frame represents. Below the "top levels" are "terminals" that consist of specific information to fill in the frame (p. 212). Note that this

kind of specific information is different from that which the SP+T model accommodates. In the moviegoer's "alien invasion" schema, the top levels of the frame might be "Earth," "hostile aliens," and "fight," since these elements must be present in order for there to be an alien invasion. The terminals would contain such information as "America," "green aliens," and "space battle," since these elements might be present in some, but not all alien invasion films.

The composite of top levels and terminals is stored in long-term memory. However, in order for a frame to be stored, every terminal must contain information. What fills the terminals, Minsky (1975) posits are "default assignments," which are attached loosely so they can be replaced if new information is discovered that fits the frame better. The function of default assignments, Neisser (1976) points out, is to make predictions when encountering a new situation for which there are still unknown elements. When the unknown elements are revealed, they either replace (if they differ from) or strengthen (if they agree with) the default assignments.

If it turns out that a whole frame does not represent a new situation adequately, an "information retrieval network" finds a replacement (Minsky, 1975). Thus, while the top levels of a frame are generally unchanging, situations change and so must the frame-in-use. In this way, frames are somewhat analogous to situation models.

Minsky (1975) also describes "subframes," which are used to make sense of the substructures of a situation. In the "alien invasion" frame, there might be a "humans fight back" subframe consisting of the same general structural elements as the frame, only applied to a specific situation within the larger structure of "alien invasion." In this

subframe, the top levels might be “humans,” “fight,” and “weapons;” and the terminals might be “intense,” “patriotic,” and “outmatched.”

Associative networks are very similar to Minsky’s (1975) definition of frames as “a network of nodes and relations” (p. 212). However, there is a distinct difference between the concepts. In a frame, all of the nodes are encapsulated within the frame. In an associative network, each node represents a different memory construct and is connected to related nodes by “associative pathways” (Roskos-Ewoldsen, Roskos-Ewoldsen, & Dillman Carpentier, 2002), but is not located within a particular structure. Each node has an “activation threshold” which, when exceeded, causes the node to fire. Consequently, each associated node requires less activation to fire, and what occurs is the phenomenon of spreading activation (Collins & Loftus, 1975). Although associative networks are studied primarily in priming research, many schema theorists have conceptualized schemas as connected nodes in an associative network (Iran-Nejad, 2000). Bartlett (1932) even discussed schemas in terms of trace and trace-excitement, which, on first glance is comparable to associative pathways and spreading activation. However, this is not the case, as Bartlett clearly argues against associative memory representations. Other theorists have also discounted associative schemas (e.g., Schank & Abelson, 1977; Graesser et al., 1979). Network models of memory have found support in priming (Anderson, 1983) and advertising (Hunt, Kernan, & Bonfield, 1992) studies, but I am unaware of any evidence supporting their use in narrative comprehension as schemas.

Schema instantiation. When a schema is used to represent the episodic information of and generate expectations for a new situation, it undergoes the process

of schema instantiation. Brewer (1987) wrote, “An instantiated schema is a specific cognitive structure that results from the interaction of the old information of the generic schema and the new information from the episodic input” (p. 188). If the episodic input is represented in a situation model, as van Dijk and Kintsch (1983) maintain, schema instantiation is found at the intersection of schemas and situation models. However, instantiated schemas are conceptually more similar to situation models than schemas since they comprise specific information. Brewer (1987) draws the similarity between mental models, which he renames “episodic models” and instantiated schemas; however he also takes care to distinguish between the two. The primary difference is that instantiated schemas are “the specific knowledge structures that are derived from the generic knowledge represented in *global schema*; while *Episodic models* are...represented in *local schemas*” (p. 193). Local schemas differ from global schemas in that they represent specific generic knowledge.

Schema instantiation occurs at the moment of experience. However, describing the process simply as the application of episodic information to a schema occludes part of the picture. Indeed, Roskos-Ewoldsen et al. (2004) suggest that schemas may be used to fill in details of situation models. For example, if all the characters in a film speak with southern accents, but no reference is made as to the location, it would not be unreasonable for a person to presume the film is set in the South. Without explicit episodic information to fill in the spatiality index of the situation model, the relevant schema provides it. Although different from the first process described, this is also a schema instantiation since it is the interaction of schema and situation model.

When a person engages a narrative and is “in the moment,” it seems probable that the experience is part the product of an instantiated schema, since the instantiated schema informs the person as to what is going on at the narrative moment. This relates to Zwaan’s (1999) assertion that situation models orient people to narratives temporally and spatially, giving them the “...ability to make a mental leap from their actual situation, reading a book on the couch, to an often fictional situation at a different time and place” (p. 17). Similarly, transportation theory explains the phenomenon of “being there,” which I discuss now.

Transportation. Humans have a tremendous fascination with stories. Part of this attraction is likely the result of what amounts to getting “lost” in a story (Nell, 1988). While Zwaan (1999) attributes this phenomenon (at least, partially) to the mental processing of situation models, other researchers (Green & Brock, 2000; Green, Brock, & Kaufmann, 2004) have explored the phenomenon from a different theoretical standpoint: transportation. Green and Brock (2000) describe transportation as “distinct mental process, an integrative melding of attention, imagery, and feelings” (p. 701). Gerrig (1993) had formed a similar conceptualization of narrative involvement:

Someone (“the traveler”) is transported, by some means of transportation, as a result of performing certain actions. The traveler goes some distance from his or her world of origin, which makes some aspects of the world of origin inaccessible. The traveler returns to the world of origin, somewhat changed by the journey (pp. 10-11, as quoted in Green & Brock, 2000, p, 701).

This description provided the base for Green and Brock’s (2000) theory, to which they added that transportation is a convergent process in which all mental processes and resources are directed at what is happening in the narrative. This focus of attention, then, results in a loss of connection to the real world and the potential for experiencing

strong emotions and motivations, even with full knowledge that the narrative world is fictional. Thus, transportation offers an explanation for why, when engaging a narrative, a reader might fear for the protagonist in the face of imminent danger or rejoice when the protagonist achieves a hard-fought victory.

Additionally, transportation cannot occur without some kind of narrative (Green, 2004). Without a narrative, the sensation of “being there” occurs as presence (Minsky, 1980; Lee, 2004; also referred to as telepresence, virtual presence, and mediated presence, depending on the domain) and is likely the result of sensory stimulation, lacking such higher-level cognition as schema instantiation. Lombard, Reich, Grabe, Bracken, and Ditton (2000) defined presence as “the perceptual illusion of nonmediation” (p. 77). That is, when experiencing presence, people lose awareness of the media through which they perceive a virtual world. An example of presence is the feeling people have while riding a virtual roller coaster ride. However, while they might feel as though they are actually on the real ride and not simply sitting in front of a large screen, strapped to a hydraulic system, they do not undergo the same imaginal and affective experiences they might were they transported into a narrative world. One reason for this is that on a virtual roller coaster there exists no protagonist with which to identify and empathize, which Green and Brock (2000) maintain is an element of transportation. A similar experience to presence is flow, which involves a person’s complete absorption in an activity (Green & Brock, 2002)

Imagery. Mental imagery plays an important role in both schema instantiation and transportation. Referring to their “restaurant” script, Schank and Abelson (1977) write,

Often, descriptive visual information is given in a story, but even if it is not, the listener hearing about a restaurant will typically call to mind the impressions of the shapes, colors, relative positions and other properties or objects implicitly or explicitly in the scene (p. 44).

Vivid mental imagery is clearly present in this description of what amounts to schema instantiation, and, considering what we know about schema instantiation, this description seems accurate. Long before the concept of instantiated schemas came into existence, Bartlett (1932) theorized that images were integral to “pick[ing] items out of ‘schemata’” (p. 209), much as the episodic information encountered in a new situation “picks” schema elements in the instantiation process. From Bartlett’s theory, Brewer and Pani (1983), came to the conclusion that, in certain domains, “instantiated schema should be highly imageable” (in Brewer, 1987, p. 189).

In a study of reading comprehension in school children, Hibbing and Rankin-Erickson (2003) demonstrated that an expository text on an unfamiliar topic (in this case, the Holocaust) was more imageable and easier to understand if readers first watched films about the topic. This suggests that mental imagery for a narrative increases as background knowledge (or the schema) increases.

Similarly, reference to imagery is evident in the transportation literature. Green and Brock (2002) describe a transportation-imagery model to explain the persuasive power of narratives. The model postulates that persuasion occurs to the extent that images evoked in a text are activated by the reader, and that such mental attributes as “imagery skill” mediate this effect. In this model, imagery is paramount, and it explains, for example, why Harriett Beecher Stowe’s *Uncle Tom’s Cabin* had such a powerful impact on the “behavior of hundreds of millions of people for many decades” (p. 318), and contributed to the Union victory of the American Civil War in a number of ways

(Brock, Strange, & Green, 2002, p. 3). Furthermore, Nell (1988) found that vivid imagery and narrative involvement are positively correlated.

Limited Capacity Model. Lang (2000) uses the term “resources” to describe the capacity of the human mind to process information. In her Limited Capacity Model (LCM), she proposes that mental resources are limited and must be shared among three separate subprocesses: (a) encoding, (b) storage, and (c) retrieval.

Encoding refers to the transfer of information from the environment to the brain and comprises three additional subprocesses which involve (a) sensory reception by the involved sense organs, (b) passage of that information to sensory stores, and finally (c) the transfer of selected information to working memory. Lang (2000) suggests that, in contrast to working memory, sensory stores are limitless in capacity. Thus, a selection process must pare the information into chunks manageable by the working memory. Graham (1997) and Ohman (1997) suggest that the selection of information for encoding represents (a) the needs and goals of the individual processing the information, and (b) any change perceived in the source of the information. The information that is encoded then becomes a mental representation.

From the working memory, the mental representation is transferred to long-term memory in the process of storage. During this process, the information enters associative networks where the “new” information is linked to related “old” information. Schema formation, for example, is a kind of storage, where episodic details may be used to augment generic details, thus altering the schema.

Finally, information must be retrieved when its use becomes necessary. This is largely the result of processing new information (Lang, 2000). In order to make sense of

incoming information and provide memory in which the new information can reside, old information must be retrieved for processing. This process resembles schema instantiation because schema instantiation involves the retrieval of generic information and the application of episodic information to it.

In Lang's (2000) model, the subprocesses of encoding, storage, and retrieval share and must compete for resources from a single pool. A good way to conceptualize this is to think of a student taking a mathematics exam. In solving a particularly vexing problem, his/her resources will be dedicated to the retrieval of the equations and proofs necessary for the solution. If the neighboring student is cheating from his/her exam, he/she might not notice the intrusion because too few resources will be available for such monitoring of the external environment. What I described is an example of one task interfering with another (here considering environmental observation to be a task), which Lang (2000) might refer to as a secondary task.

Lang and Basil (1998) tested the effect of a secondary task on resource allocation and found that engagement in a primary task (watching television with the goal of remembering the message) interfered with a secondary task (pushing a button at certain cues). This suggests that the resources necessary for the encoding of the cues were diverted to encoding the message of the television program.

THEORY AND HYPOTHESES

Since schema instantiation is the application of episodic details of a depiction to generic relevant knowledge structures, it requires both the possession of the schema and attention to the episodic input. Without a relevant schema, no sense can be made of the depiction. Likewise, without attention to the specific details of the depiction, it is represented in memory only by the schema, lacking any distinct characteristics that the depiction may possess beyond the schema. Thus, I arrive at my first hypothesis:

H1: Subjects who perform a secondary task while reading a narrative will instantiate fewer schemas than subjects who read the narrative without performing a secondary task.

If the discourse structures of surprise, suspense, and curiosity are necessary for the enjoyment of narratives, there is a requirement of active expectation generation, which I argue is based on schema instantiation. The reasoning for the requirement claim exists in the following facts: for one to be surprised, one must have had an expectation of one outcome, only to be presented with an entirely different one; for one to experience suspense, one must have the expectation that a particular expository element may lead to a particular good or bad outcome; and for curiosity, one must have the expectation that an undisclosed expository element will be revealed at some point. Without those expectations, the respective discourse structures would not lead to enjoyment. Additionally, in the absence of such discourse structures, there is no reason to instantiate schemas relevant to the discourse structure. That is, while there may be schemas to make sense of individual scenes, the lack of an involving discourse structure provides no information with which to “try to figure it out.” In their transportation-imagery model, “adherence to narrative format” is a mediating factor of

transportation. They write that, while involved with a narrative, "...we wonder how a story will turn out and/or how the events lead to a particular story ending... Without this suspenseful adherence to story format, opportunity for transportation may be diminished" (p. 328).

The source of such story expectations must originate in schemas and apply to the story through instantiation. For example, the film *Independence Day* has a suspense discourse structure in which the fate of Earth is uncertain. However, a viewer who has seen similar films (particularly of the Hollywood variety) might possess a "good will overcome evil" schema to which s/he might apply such episodic details as the personality traits of the characters, the positions of the alien spacecraft, and so on to arrive at some sort of "happy ending" expectation. As Schank and Abelson (1977) suggest that people naturally create vivid mental depictions of narrated situations, I argue that the process of expectation generation is similarly imageable.

However, narrative engagement does not call for schema instantiation only when generating outcome expectations. The seemingly simple process of reading a book is highly imageable. To this, Schank and Abelson's (1977) suggestion has even greater application. Since books comprise words and seldom offer visual depictions of their contents (i.e. the cover, illustrations in picture books, etc.), it is up to the reader to provide images. Furthermore, as Hibbing and Rankin-Erickson (2003) demonstrated, the creation of schemas led directly to greater mental imagery for a narrative related to the schema. Since mental imagery is a central component of transportation, I arrive at my second hypothesis:

H2: The more a subject instantiates schemas, the more that subject will experience transportation into the narrative.

The connection between schema instantiation and transportation is demonstrated elsewhere. Gerrig (1993) postulated that during transportation, people undergo the mental process of *anomalous replotting* in which they are “actively thinking about what could have happened to change an outcome” (p. 177, in Green & Brock, 2000, p. 702). While this process is different from generating outcome expectations, it is nonetheless an example of schema instantiation. In order to imagine an alternative outcome, a person would have to apply schematic information to the episodic information present the moment before the original outcome, and then “replot” the remainder of the story with the “alternative outcome” instantiated schema.”

Yet another case demonstrates the connection. In an experiment, Green (2004) found that transportation was higher for subjects when they had greater knowledge (based on personal experience) of information presented in a narrative. While she did not implicate schemas in her discussion, this result indicates that schema instantiation supports transportation. Since schemas are built on prior experiences, a more complete schema would likely lead to more complex schema instantiation when presented with relevant episodic information. This, in turn, would lead to increased imagery and greater transportation. While the preceding claims support the hypothesis that instantiated schemas and transportation are related, this shows a causal order.

Figure 1

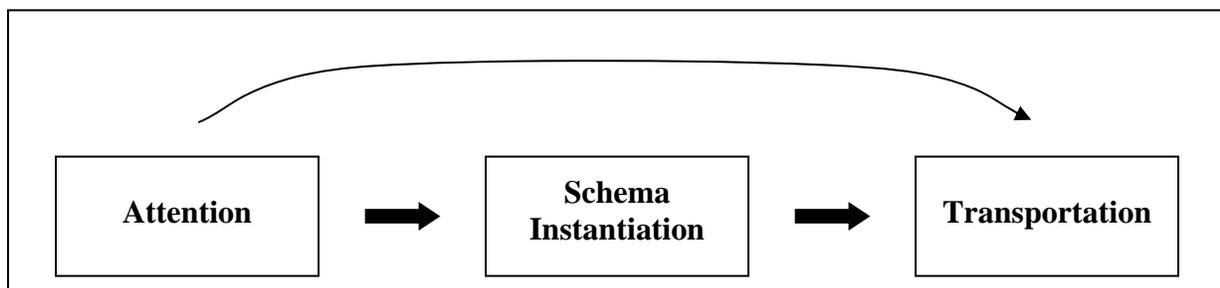


Figure 1 shows the basic form of the model Hypotheses 1 and 2 predict. By no means does this model depict the complete process whereby transportation manifests; many other elements would be present in a model explaining transportation (more) completely. For example, perception, sensory storage, and resource allocation would occur before “Attention,” and working memory storage would occur between “Attention” and “Schema Instantiation,” since attention by itself is insufficient to provide the episodic information necessary to instantiate a schema. Furthermore, there might be additional mental processes that occur after schema instantiation but prior to a transportation effect. This model simply predicts direct positive relationships between attention and schema instantiation and between schema instantiation and transportation, and an indirect positive relationship between attention and transportation.

METHOD

The nature of this experiment was very straightforward. Subjects were undergraduates (N = 83) enrolled in communication courses at Washington State University who were compensated with partial course credit. Thirty-nine of them were in the control group and 44 were in the experimental group.

The stimulus material was the short story “Loser” by Aimee Bender (see Appendix A), which appeared in the July 1998 edition of *Harper’s Magazine*. It was selected over other widely-published short stories primarily for its length (1657 words), and that it told a complete story in such limited space.

The questionnaire consisted of two scales: one to measure transportation and one to measure schema instantiation. The transportation scale was based on Green and Brock’s (2000) transportation study with some modification, (see Appendix B). It included fifteen statements referring to mental and emotional involvement with and perceived reality of the story. Adjacent to each statement was a seven-point Likert scale with “1” indicating “strongly disagree” and “7” indicating “strongly agree.” The scale was calculated as the average of all the items, with a higher score indicating a higher level of transportation.

The schema instantiation measure (see Appendix C) was essentially a test for memory of specific story details, which had to be developed exclusively for the stimulus material. To accomplish this, I first created a list of all the specific story details I could identify. In total, I identified forty-four. From this list, I generated thirty-one open-ended questions. For example, one of the characters, Mrs. Allen, owns a large green emerald called the “Green Star.” The question based on this detail was “What is the mother’s

gem called?" I used "gem" and "the mother" because "emerald" and "Mrs. Allen" were the answers to two of the other questions. This questionnaire went to pretest to determine the items for the experimental questionnaire.

The pretest consisted of subjects (N = 57) divided into two groups. Both groups read "Loser" after being told that they would later be quizzed on the details of the story. The first group (N = 29) completed the questionnaire immediately upon finishing the story. The second group (N = 28) completed the questionnaire one week later. The purpose of the delay was that subjects in the second group would likely lose some of their memory for story details and rely considerably on their schemas to answer the questionnaire, thus producing generic responses. Of the thirty-one questions, I eliminated those that the first group answered correctly less than ten percent of the time, and those that both groups answered correctly more than ninety percent of the time. This left seventeen questions. In addition to the correct choice, four incorrect choices for each question were determined by their frequency in the second group's responses. Thus, the schema instantiation scale consisted of seventeen questions, each with five choices. Correct responses were coded as "1" and incorrect responses as "0." The scale was calculated as the average of all the items and represented as the decimal percentage of correct responses, with a higher score indicating more correct responses.

The experiment took place from 5:15 to approximately 5:45 each evening for four evenings, with a control and an experimental group running concurrently in adjacent rooms. Additionally, the room assignments were alternated to balance any effects due specifically to the room (i.e., slight differences in lighting, seating arrangement, etc).

Both the control and experimental groups were given instructions to read the stimulus material, after which they would complete a questionnaire that asked them questions about details from and their level of involvement with the story. The experimental group was given additional instructions for a secondary task of circling in the text all references to people (names, pronouns, etc.). The purpose of the task was to limit the amount of cognitive resources available for encoding of episodic details while keeping their attention on the text. Additionally, I could determine if a subject had completed the task simply by scanning the text they used. After reading “Loser” both groups completed the questionnaire with the two scales counter-balanced. The idea here was that the schema instantiation scale might interfere with the transportation scale by creating a “secondary transportation.”

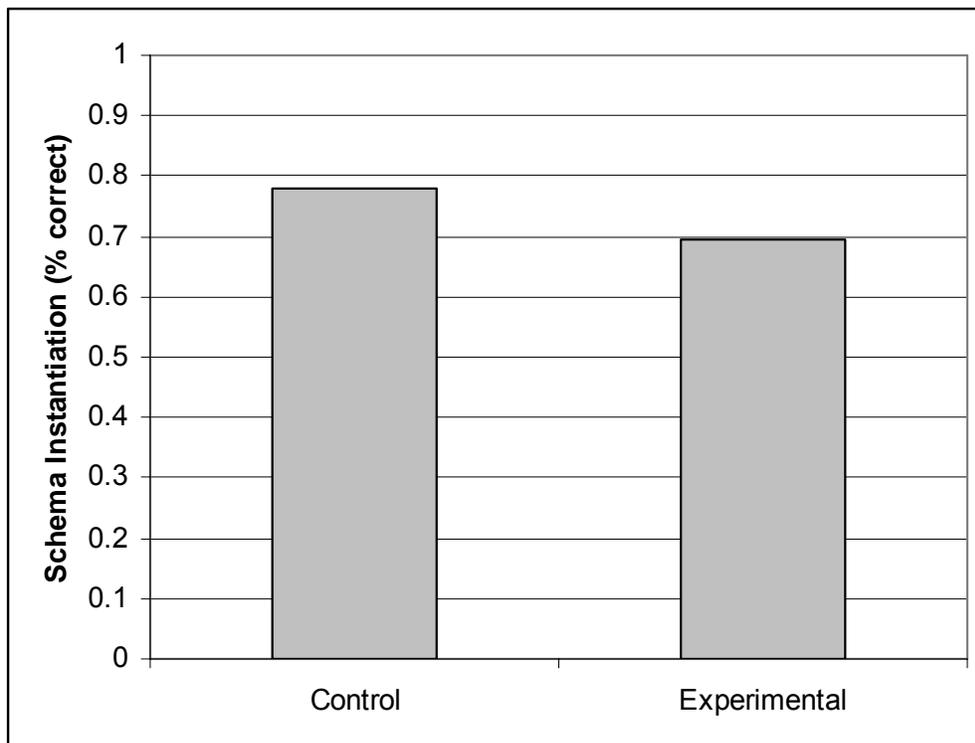
RESULTS

Findings indicate that the secondary task interfered significantly with subjects' ability to encode specific story details. Control subjects scored better ($M = .78$) than experimental subjects ($M = .70$) on their responses [$t(81) = 2.94, p = .004$]; see Table 1], with a significant difference of eight percent (See Figure 2). This supports H-1.

Table 1

t-test for Equality of Means of Schema Instantiation Scale						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2.937	81	.004	.08309	.02829	.02680	.13939

Figure 2



The transportation scale had a Chronbach's alpha of .875 with no items removed. All but three of the items were recoded so that a higher number (from 1 to 7) indicated higher transportation. Surprisingly, although the experimental group correctly recalled fewer of the story details than the control group, there was no significant difference between the groups in terms of transportation [$t(81) = .58, p = .56$]. Additionally, there is no significant (two-tail) point-biserial correlation between schema instantiation and transportation ($r = .15, p = .18$). Thus, I fail to support H-2.

In further analysis, I removed three items from the schema instantiation scale that had non-significant item-total phi coefficients. Using this scale, H-1 is still supported [$t(81) = 2.91, p = .005$]; see Table 2] with difference between the scores for the control ($M = .78$) and experimental ($M = .68$; see Figure 3) groups remaining significant.

Table 2

t-test for Equality of Means of Schema Instantiation Scale						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2.912	81	.005	.09636	.03309	.03053	.16220

The transportation scale was modified similarly. The two items with the weakest item-total correlations ($r = .101$, and $r = .257$) were removed, bringing Chronbach's alpha to .897, which is the highest possible for this scale. Of note, the stronger item-total-correlated item had the greater impact on the alpha. Using this scale, there was still no significant difference between the groups in terms of transportation [$t(81) = .77, p = .44$]. However, using the modified scales, there is a near-significant weak positive correlation between schema instantiation and transportation ($r = .21, p = .057$).

Nonetheless, at the 95-percent confidence interval, I still fail to reject the null hypothesis for H-2.

While I was unable to support H-2, I was able to isolate a significant moderate positive correlation between schema instantiation and transportation by limiting the correlation to the experimental group (N = 44, $r = .31$, $p = .041$; see Table 3) and using the modified scales. In isolation, these data support H-2.

Figure 3

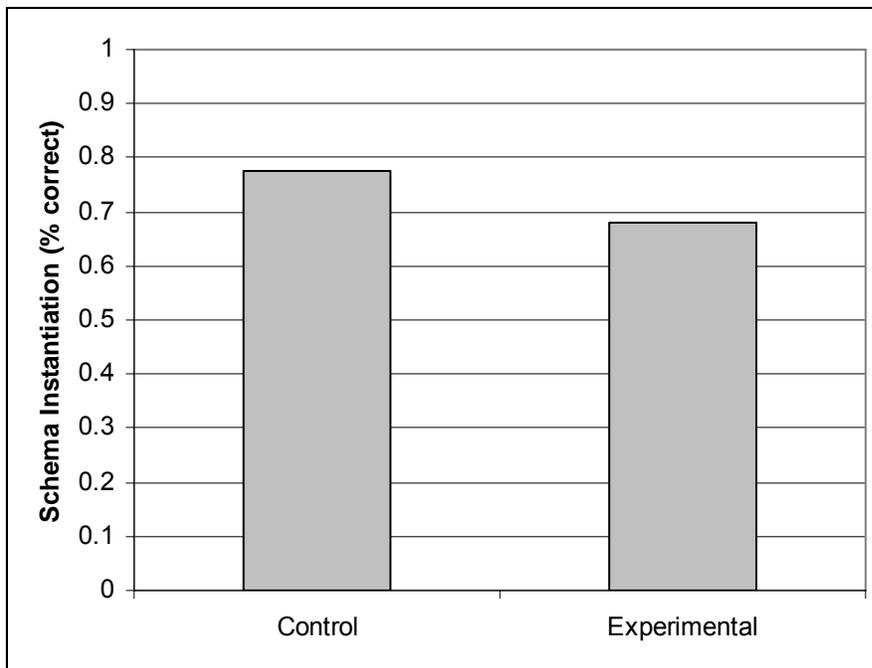


Table 3

		QS3	TP3
QS3	Point-biserial Correlation	1	.310(*)
	Sig. (2-tailed)	.	.041
	N	44	44
TP3	Point-biserial Correlation	.310(*)	1
	Sig. (2-tailed)	.041	.
	N	44	44

* Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

I used two-tail correlations in testing H2 because I could not be certain that the relationship between schema instantiation and transportation would be positive or exist at all. While I had no theoretical reason to expect the relationship to be negative or null, it is possible that there was something I overlooked or prematurely assumed in constructing H2. Consider the difference between reading to learn and reading to enjoy: In the experiment, subjects were informed that they would be tested on story details. It is not unlikely that this information oriented some subjects toward reading the story as a learning task. However, I would argue that the dependent variable, transportation, is typically a product of reading for enjoyment. Thus, by potentially orienting subjects to the reading as a learning task, I may have skewed the transportation measurement. This could explain my failure to reject the null hypothesis, and why, necessarily, my correlations were two-tailed. However, regardless of the information that subjects would be tested, the laboratory setting automatically removed subjects from their natural reading setting (assuming they have a natural reading setting). This would also explain the null findings.

Looking at schema instantiation, the control group had noticeably less variance ($SD = .11$) than the experimental group ($SD = .16$). In general, without the cognitive load of a secondary task, subjects in the control group remembered roughly the same details from the story. Indeed, there is no identifiable correlation between schema instantiation and transportation when considering only the control group ($r = .012$, $p = .94$). While there were no apparent differences in the extent to which subjects in the experimental group completed the task (based on a cursory examination of the texts they used), I

would imagine a thorough analysis of the texts might show that subjects who circled fewer people-references scored better on the quiz. Such a finding could explain the greater variance. Consequently, the few high scores in the experimental group further reduced the total variance such that, when considering all subjects, schema instantiation and transportation were not as significantly related (as compared to the experimental-group-only correlation). That is, had the task resulted in a low schema instantiation score for all experimental subjects, there would have been greater variance between groups. This suggests a flaw in the secondary task design.

While the intended effect of the secondary task was to limit cognitive capacity uniformly across all subjects in the experimental condition, the observed effect was that of considerable limited capacity in some subjects and little to none in others. Indeed, referencing the modified schema instantiation scale, three subjects had perfect scores, two of whom were in the experimental group. On the other end of the scale, thirteen of the lowest sixteen scores were also in the experimental group. Such variance was not the intention of the task; however, it allowed for the isolated support of H-2. Additionally, while the task seemed unsuccessful in its intended role, the support for H-1 suggests that it nonetheless decreased attention to story details significantly. That it failed in one sense, but worked in another suggests that, with some adjustment, the task might perform as intended.

A flaw in the creation of the final scale from the pretest might also explain the results of the experimental group. Although schema instantiation scores of this group were significantly lower than those of the control group, the difference was not as large as I had expected. Had the task completely restricted the encoding of episodic details,

subjects in the experimental group would have had schema instantiation scores closer to chance, which, with five options per item, would have been twenty percent. Their average score of seventy percent (and low score of only forty-seven percent) was thus very likely due to considerable encoding of episodic details. In the pretest, subjects correctly recalled far fewer of the details (especially in the group that completed the questionnaire a week after reading the story). This created the expectation that experimental subjects would also perform quite poorly on a test of story details. However, while the pretest questionnaire tested for story recall (in the form of open-ended questions), the experimental questionnaire tested merely for recognition (in the form of multiple-choice questions). Conway, Cohen, and Stanhope (1991) found that immediately after exposure to a stimulus, recall scores are significantly lower than recognition scores. Furthermore, this difference increases with time, with amount of recall dropping considerably more than amount of recognition. If a time lapse has a similar effect on memory as cognitive loading (with a secondary task), then it is unsurprising that the experimental group fared almost as well as the experimental group on a recognition test. More thorough pretesting might have prevented this problem.

Another method to elicit a stronger effect would be using a considerably different task that is better targeted. Since the specific cognitive resources I had hoped to limit with the task was that of memory, perhaps a task that more directly interferes with memory would have been more appropriate, i.e., filling what is referred to as the phonological loop with essentially noise. The phonological loop was developed by Baddeley, Thompson, and Buchanan (1975, cited in Baddeley, 2002) to explain the word length effect, the observation that serial recall of a list of words is inversely

proportional to its length. The more words there are in a list, the harder it is to remember them all. The phonological loop is a component of working memory, and is thought of as a process of sub-vocal rehearsal. The fact that there is a word length effect suggests that the loop has a capacity. Thus, a task that is intended to interfere with the encoding of text details might best be designed as a word list memorization task that would effectively fill the phonological loop and prevent the rehearsal of the words present in the text. This, in turn, would prevent story details from being stored in long-term memory. However, such a task might also limit the reading of the text to the extent that subjects might as well have not read anything.

Two additional limitations I faced related to the instruments of measurement. First, many of the items in the transportation scale referred to mental involvement, an increase in which is normally correlated with an increase in transportation. However, the secondary task required that the subjects in the experimental group were mentally involved with the task. For example, one of the statements was “While I was reading the story, activity in the room was on my mind.” Here, the subjects in the experimental group reported higher transportation ($M = 5.73$) than those in the control group ($M = 5.36$). This is another reason for more thoughtful design of the secondary task; however, here the instrument, rather than the subjects, is the mediating factor.

Second, further analysis of the schema instantiation scale revealed that some of the items may have been bad; in other words, they may not have been measuring the same construct as the other items. The likely cause of this was inadequate scale development such that some items were a good test for memory of story details while others were not. For a replication of this experiment, the schema instantiation scale

might base items inclusion on the extent causal connections with other items. Such connections have been found to increase memory for story details (Lorch, Sanchez, van den Broek, Milich, Murphy, Lorch Jr., et al., 1999; Trabasso & van den Broek, 1985). This effect might then be balanced with a better secondary task to produce greater between-group variance. In this study, I modified and analyzed the schema instantiation scale primarily for the sake of speculation. Without reproduction, my assertions with regard to specific items cannot be assumed.

The one significant finding that stood even when the scales were not modified has at least one important implication. As predicted, the subjects in the experimental group recalled fewer details from the story than subjects in the control group; however, the task did not interfere directly with memory since there was no memory requirement; it was primarily a retrieve-and-compare task. This further supports Lang's (2000) Limited Capacity Model.

CONCLUSION

This study explored the psychological underpinnings of transportation, the process that Green and Brock (2000) describe as a “distinct mental process, an integrative melding of attention, imagery, and feelings” when a person engages with a narrative.

Specifically, this study sought to draw a connection between imagery and transportation, manipulating attention to that end.

Mental imagery of story details was equated to the intersection of episodic information and generic knowledge (or schemas), which Darden (2002) refers to as instantiated schemas. Schemas themselves fall under a number of labels, including Bartlett’s (1932) schemata, Schank and Abelson’s (1977) scripts, and Minsky’s (1975) frames. When a person engages with a narrative, they apply the relevant schema for that narrative. Mental imagery for the narrative then results when generic people, places, situations, etc., within the schema are assigned specific traits that originate in the text itself as specific details. Since mental imagery is a component of transportation, it would seem that attention to the specific details would facilitate transportation. I predicted this relationship, but found no clear support without post-hoc modification of the instruments of measurement. However, further testing and, especially, further refining of the instruments, might reveal a significant relationship.

Continued research into this area might explore methods for limiting the encoding of story details in such a way that it is represented in the mind of the reader as only a set of schemas, and lacking of any episodic information (in Graesser & Nakamura’s, 1982, schema-copy-plus-tag model, this would be represented by a schema without tags). Such a limitation might result in the variance between groups necessary to

support my prediction. Additionally, further development of the scales, and particularly the schema instantiation scale, might lead to additional significance in the predicted relationship.

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APPENDIX

A. Transportation Scale

When you think of the experience you just had reading the story, how would you describe it? Please indicate how much you agree or disagree with each statement below by filling in the appropriate bubble.

	strongly strongly agree disagree
When the story ended, I felt like I came back to "reality" after a journey.	<input type="radio"/>
While I was reading the story, activity in the room was on my mind.	<input type="radio"/>
The text came to me and created a new world for me, and the world suddenly disappeared when the story ended.	<input type="radio"/>
I could picture myself in the events of the story.	<input type="radio"/>
It was easy to focus on the details of the story.	<input type="radio"/>
The story world was merely "a place I read about" rather than "a place I visited in my mind."	<input type="radio"/>
I was mentally involved in the story while reading it.	<input type="radio"/>
The events in the story have changed my life.	<input type="radio"/>
The story affected me emotionally.	<input type="radio"/>
After the story was over, I found it easy to put it out of my mind.	<input type="radio"/>
I became emotionally involved in the story while I was reading it.	<input type="radio"/>
I wanted to learn how the story ended.	<input type="radio"/>
I found myself thinking of ways the story could have turned out differently.	<input type="radio"/>
My body was in the room, but my mind was in the world created by story.	<input type="radio"/>
The story world was more real or present for me than "reality."	<input type="radio"/>

B. Schema Instantiation Scale

The following multiple choice questions refer to details from the story. Please read each question carefully and fill in the bubble that corresponds to the correct answer.

1. How did the young man's parents die?
 - they died in a car accident
 - they drowned in the ocean
 - they were murdered
 - they died in a plane crash
 - they died in a bus accident

2. How old was the young man when his parents died?
 - 3
 - 4
 - 7
 - 8
 - 11

3. Who adopted the young man?
 - his grandparents
 - his neighbor
 - the town where he lived
 - a foster home
 - his uncle

4. What was the first thing the young man found with his talent?
 - a basketball
 - a lost dog
 - a pair of earrings
 - a set of keys
 - a hairbrush

5. What color was the kidnapped child's shirt?
 - red
 - green
 - yellow
 - blue
 - orange

6. How old was the kidnapped child?
- 4
 - 6
 - 8
 - 10
 - 12
7. What kind of a gem did the mother have?
- a diamond
 - a ruby
 - an emerald
 - a sapphire
 - a jade stone
8. Where does the mother keep the gem?
- in a display case
 - in a safe
 - on the mantle
 - in the window
 - on her necklace
9. What does the young man want to do with it?
- see it
 - polish it
 - lick it
 - smash it
 - steal it
10. What did the young man receive as a gift from his uncle?
- a basketball
 - a cap
 - a pair of sneakers
 - a magnifying glass
 - a watch
11. What did the young man request to help him find the kidnapped child?
- a photo of the kidnapped child
 - the kidnapped child's shirt
 - the mother's gem
 - a compass
 - a magnifying glass

12. How many kidnappers were there?

- 2
- 3
- 4
- 5
- 6

13. What are the kidnappers doing when the young man finds them?

- eating dinner
- playing poker
- sleeping
- sitting in the back yard
- watching television

14. What is the kidnapped child's response to being rescued?

- he is thankful
- he is quiet
- he is sleepy
- he cries
- he laughs

15. How does the young man carry the kidnapped child?

- on his shoulders
- on his back
- over his shoulder
- like a bride
- like a baby

16. Where does the young man sleep at night?

- in a tiny room
- in a small bed
- on a couch
- on a futon
- in a closet

17. What does the young man think he hears as he lies in bed?

- ocean waves
- voices
- footsteps
- crying
- music