

## Short article

## Verb aspect and perceptual simulations

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Two experiments investigate the influence of verb aspect on situation representations. The results demonstrate that comprehenders use verb aspect as a cue to regulate the activation of ongoing simulations of situations over time. Experiment 1 measured word-by-word reading as well as sensibility judgements on sentences in which a target object word had been replaced by a picture. For the past imperfective sentences, participants were faster to process the picture, the two words following the picture, and the sensibility judgements when objects were pictured in use rather than not in use. However, this in-use facilitation was limited to processing of the picture for the past perfect sentences. Experiment 2 served as a control to ensure that the use effect and its interaction with verb aspect were a result of contextual manipulations rather than surface features of the pictures themselves. The results are interpreted within the framework of perceptual simulations during language comprehension.

**Keywords:** Language comprehension; Representations; Perceptual simulations; Grammar.

The situations that we experience are composed of vastly different temporal structures. For instance, stapling an article is over as soon as it begins, whereas reading that article may take hours, with possible breaks, and may never even reach completion. Although we know that stapling an article is inherently instantaneous, and reading is inherently a durative process, it is also possible to use language to skew perspectives on the temporal properties of described situations. When we say, “The boy was building a doghouse”, listeners

represent a durative situation in which the onset has already occurred, but the end point has not yet been reached. If we change the grammatical form and instead say, “The boy had built a doghouse”, then listeners represent a situation without duration (collapsed) in which the end point has already occurred. This use of grammar to impose perspective shifts on the temporal flow of a situation is termed grammatical verb aspect.

The examples above highlight the distinction between the perfect and imperfective aspects

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Q2 (Comrie, 1976; Dowty, 1986; Vendler, 1957). The second sentence (“The boy had built a doghouse”) is an example of the perfect aspect, which takes an outside-the-situation perspective and views the situation as a completed whole. Although the situation may have duration and multiple stages, the perfect aspect limits access to its internal structure. Instead, the situation is represented as finished, and emphasis is given to the continued relevance of a situation’s resultant state.<sup>1</sup> In contrast, “The boy was building a doghouse” is an example of the imperfective aspect, which takes a within-the-situation perspective and views the situation as ongoing. In this case, the internal structure and the various stages of the situation are available for representation. The onset of the situation has occurred before the current point on the narrative timeline, while the end point has not yet occurred. Thus, the situation is implied to be in a middle stage of completion (Comrie, 1976).

There is empirical evidence that readers and listeners take aspectual cues into account when comprehending language. For instance, Madden and Zwaan (2003), Magliano and Schleich (2000), and Morrow (1985) all found that the use of the imperfective aspect yields a representation of the situation that is not yet completed, whereas the perfective or perfect aspect yields a representation of the completed situation. In addition, various studies have demonstrated how verb aspect can influence the availability of described situations and their features. Characters in short narratives are subsequently more accessible when their actions are described in the imperfective rather than the perfect aspect (Carreiras, Carriedo, Alonso, & Fernández, 1997). Likewise, typical locations of situations are primed by imperfective verbs, but not by perfect verbs (Ferretti, Kutas, & McRae, 2007). Typical instruments used in situations are more available when situation descriptions make use of the imperfective rather than the perfective aspect (Truitt & Zwaan, 1997). Even the overall activation level of a

situation over time is greater for situations described in the imperfective rather than the perfective aspect (Magliano & Schleich, 2000).

## Simulations

A growing body of recent research supports the idea that comprehenders understand language by activating simulations that incorporate perceptual information (Barsalou, 1998; Zwaan & Madden, 2005). For instance, Zwaan and colleagues have demonstrated that comprehenders are faster to verify pictures when they match the perceptual constraints of the preceding sentence, such as shape (Madden & Zwaan, 2006; Zwaan, Stanfield, & Yaxley, 2002) and orientation of objects (Stanfield & Zwaan, 2001). According to the simulation view of language comprehension, the words in a phrase or sentence activate lexical-level simulations (general word meanings) that are combined to yield situation-specific simulations of the larger phrase or sentence. These situation simulations are partial reactivations of traces of our experience, and, therefore, they necessarily imply a spatio-temporal perspective and perceptual-motor constraints on the described situation. When these perspectives and constraints depicted in the presented image overlap with those of the perceptual simulation activated by the sentence, then the overlap between them will produce processing facilitation. Thus, when reading about walking in the rain or writing a letter, comprehenders simulate the experience of the described situation, including temporal and spatial features of the situation and instruments used during the situation. In this case, readers’ representations should be more likely to include instruments as they are in use (open umbrella, uncapped pen) rather than instruments that are not in use (closed umbrella, capped pen). This is termed the use effect and is tested in the present study.

Although it is clear that perceptual simulations are activated during language comprehension,

<sup>1</sup> The perfect aspect (e.g., past perfect: “The boy had built a doghouse”) is sometimes confused with the perfective aspect (e.g., simple past: “The boy built a doghouse”). Both aspects convey the situation as collapsed and completed, but the perfect aspect focuses attention on the resulting state of the situation and was thus preferred given the representational aims of the present study.

exactly how linguistic cues such as verb aspect influence these simulations remains unclear. Verb aspect probably constrains what phase of a situation is focused in the simulation, but also perhaps the time frame of the simulation. Specifically, the use effect may be stronger or longer lasting when situations are described as ongoing (imperfective aspect) rather than completed (perfect aspect). The perfect aspect ("He had put the letter in the mailbox") allows only limited access to the internal structure of a situation and treats the situation as a completed unit. Alternatively, the imperfective aspect ("He was putting the letter in the mailbox") allows full access to the internal structure of an ongoing situation. Thus, situation-related entities may remain more accessible when a situation is described in the imperfective aspect, as the imperfective aspect denotes situations that have not yet ended.

## EXPERIMENT 1

To investigate how verb aspect influences the simulation of situations during sentence comprehension, we asked participants to read imperfective (past progressive: was playing) and perfect (past perfect: had played) sentences, word by word, with the critical instrument word replaced by a picture of that instrument in use or not in use. Key-presses to advance through words/pictures were measured, as well as sensibility judgements to the sentences. This replaced-word presentation (rebus sentences) produces normal comprehension, as both the words and pictures have been shown to activate representations in a general-purpose conceptual system rather than a lexical-specific system (Potter, Kroll, Yachzel, Carpenter, & Sherman, 1986).

It should be noted that there are many forms that can be contrasted within the aspectual framework. The past perfect and past progressive forms were chosen for several reasons. First, our investigation was focused on descriptions of situations, which typically occur in the past tense, so past tense forms were preferable to present and future

tenses. Second, the aim was to maximize the difference between the representations of objects in situations that are ongoing and completed. Although the past tense offers several alternatives for the aspectual distinction (e.g., was playing, played, had been playing, had played), the pair that maximizes the distinction of interest in the present study is the past perfect/past progressive pair (was playing/had played).

Our hypothesis is twofold. First, if participants automatically activate perceptual simulations of these situations during reading, then we expect to observe a use effect (i.e., pictures of objects in use will be more easily integrated than pictures of objects not in use). Second, if verb aspect constrains perceptual simulations, the use effect may be stronger or longer lasting when situations are described as ongoing (the imperfective aspect) rather than completed (the perfect aspect). According to the simulation framework, an individual word in a phrase or sentence activates a word-level simulation that is then integrated with the surrounding words into a more complex situational-specific simulation (see Barsalou, Santos, Simmons, & Wilson, in press). It remains to be seen at which stage grammatical cues such as verb aspect have their influence. If an initial simulation of the object is required to access the contextually appropriate concept of the object picture regardless of verb aspect, then a main effect of use should be observed during processing of the picture, and interactions of this effect with verb aspect should arise subsequently as more global sentence context is considered. Thus, it is important to track the use effect not only during integration of the picture, but also during the words following the picture and the sensibility judgement after the sentence.

## Method

### *Participants*

A total of 30 undergraduate students enrolled at University of Florida participated in the experiment as part of a course requirement. All participants were native English speakers.

### Materials

A total of 40 experimental sentence pairs were constructed, each describing an object being used (see Appendix for sample stimuli). Sentence pairs described the situations in both the past imperfective and past perfect aspect. The sentences were rather homogeneous, with 25 of 40 experimental items situating the target object as the direct object of the verb ("Fred was using/had used his umbrella . . .") and 15 of 40 experimental items as the object of a prepositional phrase ("John was working/had worked on his laptop . . ."). These were always followed by a short prepositional phrase (. . . in his library), relative clause (. . . that his girlfriend gave him), or rationale clause (. . . to keep his suit dry). Two images, depicting the object in use and not in use, were also constructed to correspond to each experimental sentence pair. The pictures were colour photographs and line drawings, which occupied a square of about 3 inches on the centre of the screen. This yielded two sentences and two pictures for each target object. Four lists were created to counterbalance the presentation of picture version (in use, not in use) and sentence version (perfect, imperfective). In addition, 50 filler sentences were created following the sentence structure of the experimental sentences. In 45 of these filler sentences, the object word was replaced by a picture of an object that did not fit with the rest of the sentence. In the remaining 5 sentences, the contextually appropriate object word was replaced with a picture of that object.

### Procedure

Participants were informed that they would read sentences, view pictures, and make judgements about the meaningfulness of sentences. On a given trial, a fixation cross appeared, centred on the screen until the participant pressed the space bar to begin the sentence. The first word of the sentence then appeared where the fixation cross had been. The participant pressed the space bar to progress from word to word (or picture) in the sentence. After the final word of the sentence was presented, a question (Did that make sense? Press "Y" or "N") appeared on the screen until a

sensibility judgement was made. If the sentence was a meaningful, well-formed sentence, the participant was to press the J key (labelled "Y"). The 40 target sentences as well as 5 of the filler sentences required yes responses. For the 45 nonsensical sentences, the participant was to press the F key (labelled "N"). There was no time limit to respond. However, participants were instructed to make their responses as quickly and accurately as possible, keeping their fingers on the response keys throughout the experiment. No feedback was provided, and the fixation cross for the next trial appeared once the participant responded. A total of 4 practice trials preceded the list of 90 experimental and filler trials. The experiment was run on a PC using the E-Prime stimulus presentation software (Schneider, Eschman, & Zuccolotto, 2002).

### Results

Participants' times to press the space bar to progress to the next word were analysed for the picture as well as the two words following the picture. Only two words after the picture were analysed because the sentences varied in length, not always having a third word after the picture (6 of the 40 experimental sentences did not have a third word). In addition, time and response accuracy on sensibility judgements were analysed. Although list was included as a between-subjects factor in all analyses for both experiments, effects for the list variable are not reported, given the lack of theoretical relevance (Pollatsek & Well, 1995; Raaijmakers, Schrijnemakers, & Gremmen, 1999). Incorrect responses were not included in the reported analyses of response times for the sensibility judgements. No outliers were removed prior to analysis because none fell outside 3 standard deviations of the condition means. The data from Experiment 1 are displayed in Table 1.

### Online sentence processing

The effects of use and aspect were tested at 3 points during online sentence reading. First, response times to the pictures that replaced the object words were analysed. The analysis of

Table 1. Means for online sentence processing and sensibility judgements in Experiment 1

		Processing times (ms)			Sensibility judgements	
		Picture	Word after	2nd word after	RT (ms)	Accuracy
Imperfective	In use	702 (169)	390 (45)	329 (71)	511 (151)	.95 (.08)
	Not in use	751 (145)	413 (56)	358 (75)	614 (228)	.95 (.06)
Perfect	In use	713 (151)	399 (71)	342 (74)	525 (198)	.97 (.07)
	Not in use	753 (151)	400 (65)	333 (58)	519 (171)	.95 (.07)

Note: Standard deviations in parentheses.

variance (ANOVA) showed a main effect of use,  $F(1, 26) = 9.69$ ,  $p < .01$ ,  $MSE = 6,384.91$ ,<sup>2</sup> indicating that objects pictured in use were processed more quickly than objects pictured not in use. The effect of verb aspect was not significant, nor was the interaction between use and aspect (both  $F_s < 1$ ), indicating that having read the verb in the perfect or imperfective aspect did not differentially influence space bar presses to the pictured object. Indeed, separate analyses of the perfect and imperfective sentences both showed the same main effect of use: perfect,  $F(1, 26) = 7.05$ ,  $p < .05$ ,  $MSE = 3,327.19$ ; imperfective,  $F(1, 26) = 4.78$ ,  $p < .05$ ,  $MSE = 8,248.25$ .

Second, reading times on the word following the picture were analysed. This ANOVA showed a marginally significant main effect of use,  $F(1, 26) = 3.10$ ,  $p < .10$ ,  $MSE = 1,297.69$ , suggesting that words following the objects pictured in use were processed more quickly than those following objects pictured not in use. The interaction between verb aspect and use did not reach significance,  $F(1, 26) = 1.22$ ,  $p = .28$ ,  $MSE = 1,891.83$ , but separate analyses for the imperfective and the perfect sentences showed that only the imperfective sentences showed a significant effect of use on the word following the picture: imperfective,  $F(1, 26) = 5.84$ ,  $p < .05$ ,  $MSE = 1,063.40$ ; perfect,  $F < 1$ .

Finally, reading times on the second word after the picture were analysed. This ANOVA did not show a significant main effect of use,  $F(1, 26) = 1.10$ ,  $p = .31$ ,  $MSE = 2,434.71$ , but

rather an interaction between verb aspect and use,  $F(1, 26) = 5.38$ ,  $p < .05$ ,  $MSE = 2,343.65$ . Once again, separate analyses for the imperfective and the perfect sentences showed that only the imperfective sentences yielded an effect of use on the second word following the picture: imperfective,  $F(1, 26) = 4.31$ ,  $p < .05$ ,  $MSE = 3,120.18$ ; perfect,  $F(1, 26) = 1.11$ ,  $p = .30$ ,  $MSE = 1,658.17$ .

### Sensibility judgements

The effects of use and aspect were also tested offline during sentence sensibility judgements. All of the experimental sentences required yes judgements (sensible) but we expected the responses to be faster when the preceding sentence depicted an in-use object, especially for imperfective sentences. The ANOVA showed a main effect of use,  $F(1, 26) = 5.38$ ,  $p < .05$ ,  $MSE = 12,997.57$ . This effect was qualified by an interaction between use and verb aspect,  $F(1, 26) = 11.05$ ,  $p < .01$ ,  $MSE = 10,128.38$ . Mirroring the online reading-time data, separate analyses for the imperfective and the perfect sentences showed that only the imperfective sentences showed an effect of use on sensibility judgements: imperfective,  $F(1, 26) = 13.34$ ,  $p < .001$ ,  $MSE = 13,443.32$ ; perfect,  $F < 1$ .

In summary, reading times and sensibility judgements yielded the predicted use effect, indicating that pictures of objects in use are more easily integrated into ongoing representations of situations as sentences are comprehended. However,

<sup>2</sup> For counterbalanced designs only subject analyses should be performed (Raaijmakers, 2003; Raaijmakers, Schrijnemakers, & Gremmen, 1999).



this effect diminished almost immediately in the case of the perfect sentences, as the use effect was only significant on button presses to the pictures themselves. The imperfective sentences yielded a longer lasting effect of use, as the effect was measurable on the pictures themselves as well as the two subsequent words. Furthermore, the use effect persisted during sensibility judgments that were presented after the imperfective sentences. Before the implications of these findings are discussed, we address a potential concern in a follow-up experiment.

## EXPERIMENT 2

Because one of the analyses from Experiment 1 compared responses across two separate pictures, another experiment was run to ensure that the manipulated content of the sentences, rather than surface features of the pictures themselves, was responsible for the effects observed in Experiment 1. Therefore, Experiment 2 presented both versions of the pictures in the absence of their sentence context. The pictures were instead presented after the name of the object, and participants indicated whether the pictured object matched the label. While this design differs from Experiment 1 in that the images are compared to their lexical label rather than embedded in a sentence context, this task is sensitive enough to reveal potential differences in ease of representation between the picture pairs.

## Method

### *Participants*

A total of 30 undergraduate students enrolled at University of Florida participated in the experiment as part of a course requirement. All participants were native English speakers, and none had participated in Experiment 1.

### *Materials*

The same 40 experimental picture pairs and 50 filler pictures from Experiment 1 were used. Each picture was associated with a label rather than a

sentence. The experimental picture pairs as well as 5 of the filler pictures were associated with the correct label (picture of an open or closed mailbox for “mailbox”) whereas the remaining 45 filler pictures were associated with incorrect labels (picture of a bottle for “flower”). Two lists were created to counterbalance the presentation of picture version (in use, not in use) for experimental items.

### *Procedure*

Participants read object names and responded whether a subsequent image depicted the same object as the preceding label. On a given trial, a fixation cross was presented until the participant pressed the space bar. Then an object label was presented for 750 ms, followed by a picture of an object. The picture remained on the screen until the participant responded as to whether the picture and the label matched using the F and J keys.

## Results

The data from Experiment 2 are reported in Table 2. Incorrect responses were not included in the response time analyses. In addition, response times above or below 3 standard deviations from a participant’s condition mean were removed prior to analyses. This constituted removal of less than 2% of the data. Neither the response time nor the accuracy ANOVA showed a significant effect of use (both  $F_s < 1$ ). This confirms that differences observed in Experiment 1 were due to the sentence context rather than the pictures themselves.

## GENERAL DISCUSSION

During both online and offline processing we observed a use effect, in which pictures of objects

**Table 2.** Means for response times and accuracy in Experiment 2

	RT (ms)	Accuracy
In use	656 (155)	.958 (.042)
Not in use	658 (120)	.952 (.043)

*Note:* Standard deviations in parentheses.

in use were more easily integrated than pictures of objects not in use. More importantly, we found that the use effect interacted with verb aspect. The preference for in-use pictures was only sustained when situations were described as ongoing (the imperfective aspect) rather than completed (the perfect aspect). For the perfect sentences, the effect of use was only manifest during online integration of the pictures into the sentence context. After the pictures were processed, having seen the in-use picture only facilitated further sentence processing and sensibility judgements for the imperfective sentences.

This pattern of use effects has clear implications for the simulation view of language comprehension. It provides supporting evidence that participants automatically activate perceptual simulations of described situations during online reading. Whether due to sentence wrap-up processing or reactivation of the sentence meaning for the sensibility judgement, facilitation of the decision by in-use pictures supports the idea that simulations are also used during offline processing of the situation. An effect of use is only expected if the perceptual shape of objects is activated upon reading the sentence, as the shape of the pictured object matches or mismatches a representation activated by the comprehender. Thus, models that do not assume perceptual specification of this representation would have a difficult time predicting these data, although a post hoc explanation can usually be furnished.

Experiment 2 helps to further clarify the use effect. When object labels were used rather than situation descriptions, no simulation of a situation was activated, and no differences in responses to the pictures were observed. Thus, the differences between the perfective and imperfective conditions in Experiment 1 cannot be attributed to surface features of the pictures, but rather to a match between the picture and the activated simulation of the described situation. These use effects are consistent with a growing body of evidence for

the simulation view of language comprehension (see Zwaan & Madden, 2005).

In addition to the effects of use, the effects of verb aspect observed in the present study are particularly informative for the simulation view of language comprehension. The observed interaction between verb aspect and use demonstrates how grammatical cues can help to guide perceptual simulations. The ongoing simulation is quickly deactivated in the perfect sentences, whereas it remains active in the imperfective sentences. Thus, verb aspect acts as a cue to regulate the duration of active simulations of described situations. The idea that the imperfective aspect maintains activation of the ongoing situation is consistent with claims from theoretical linguistics as well as previous investigations of verb aspect. For instance, when probed during short narratives, participants were more likely to understand situations as still ongoing when the imperfective aspect had been used rather than the perfective (Magliano & Schleich, 2000). Likewise, participants were more likely to locate targets in the path room rather than the goal room after reading sentences in the imperfective such as “She was walking past the study to the bedroom”, whereas the opposite was true after reading sentences in the perfective such as “She walked past the study to the bedroom” (Morrow, 1985). In addition, the imperfective aspect has also been shown to increase the availability of people (Carreiras et al., 1997), instruments (Truitt & Zwaan, 1997), and locations (Ferretti et al., 2007) of described situations, as well as the situations themselves (Magliano & Scheich, 2000).

It is interesting that the perfect sentences exhibit the use effect only during online integration of the pictures. This suggests that an initial lexical-level simulation of the object being used is required in order to access the local concept of the pictured target object (i.e., mailbox), regardless of verb aspect.<sup>3</sup> Barsalou and

<sup>3</sup> This same reasoning applies to the integration of other relevant event concepts, such as verbs themselves. When a verb (kick) is encountered, we assume that a lexical-level simulation of the action of kicking is initially activated, regardless of whether the verb occurred in the imperfective (was kicking) or perfect (had kicked).

Q4 colleagues (in press) explain that both lexical-level and situational-level simulations are activated as soon as a word is encountered in a sentence. However, the lexical-level simulation peaks earlier than the situational-level simulation, producing a main effect of use during the processing of the picture in the current study. As soon as the local concept is integrated into the situational- or sentence-level simulation, this use effect disappears. The ongoing situation is deactivated, as an ongoing situation is not compatible with more subtle qualities of the global sentence context because of the aspect of the preceding verb. This dual simulation process is also consistent with Zwaan and Madden's (2005) explanation of linguistic representations and referent representations, both of which are grounded in our sensory-motor systems.

According to this reasoning, if the sentences up until the point of picture presentation were more constraining, such that the pictured object was highly expected, then the integration of the lexical concept into the situational-level simulation might have already occurred at the time of picture processing, such that the situational-level simulation is facilitated and can be activated more quickly. In this case, no use effect would be observed on the picture for perfect sentences. This idea illustrates the temporal interplay between syntax and semantics in activating a simulation of a situation and remains an important avenue for future research.

It should also be noted that the deactivation of the ongoing simulation observed in the perfective sentences does not mean that the situation is deactivated altogether. The situation may be represented as completed rather than ongoing, so that a resulting state remains active, which does

not favour an in-use or not-in-use picture. In the current study we were interested in testing the simulation of the ongoing situation using pictures of objects in use or not in use, rather than testing the temporal phase of a situation using pictures of the middle and completed temporal phases of a situation.<sup>4</sup> If we presented pictures of objects "being used" (burning match) or "already used" (burnt match) in the current experiment, then we might expect facilitation for "already used" pictures in the perfect sentences, yielding a cross-over interaction on the use effect, rather than an attenuation of the use effect in the perfect sentences. This would demonstrate that a simulation is indeed active for perfect sentences, albeit a simulation that focuses the end point of the situation rather than the ongoing situation. We have found initial evidence for this idea in our lab, and the idea is also consistent with several studies demonstrating that situations described in the perfect or perfective aspect are represented as completed (Madden & Zwaan, 2003; Magliano & Schliegh, 2000; Morrow, 1985).

## CONCLUSION

The current study investigates how verb aspect influences simulations during sentence comprehension. To test for effects of verb aspect on the simulation of described situations, we employed both online and offline measures of comprehension. The results demonstrate that comprehenders use verb aspect as a cue to regulate the activation of ongoing simulations over time. A simulation of the ongoing situation remained active throughout online and offline processing of sentences in the past imperfective, as evidenced by the lasting

<sup>4</sup> We designed our materials such that in-use pictures would be compatible, and not-in-use pictures would be incompatible with an ongoing situation, but we did not intend that the in-use and not-in-use pictures would have any temporal qualities. Though temporal stage of a situation was not intended to factor into our materials, it could be that some not-in-use pictures in the current study were incompatible with the end state of a situation because they clearly depicted a beginning state. Upon inspection of the current set of materials, there were only three experimental items in which the not-in-use picture was incompatible with an end point of a situation (unburned candle for "had burned", full pitcher for "had poured", and empty salt shaker for "had refilled"). However, the removal of these items did not strengthen the use effect for the perfective sentences.



facilitation of in-use pictures over not-in-use pictures. For the past perfect sentences, the use effect was limited to the picture of the target object only, indicating that the simulation of the ongoing situation was only activated at the point of integration of the target object and was quickly deactivated because of the constraints of the preceding verb in the sentence. We do not wish to claim that there is no lasting simulation of the situation in perfect sentences. However, this simulation is not focused on the ongoing situation, but rather on the completed situation or its resultant states. Exactly what aspects of the completed situation are focused in perfect and perfective situation descriptions remains a question for future empirical investigations.

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## APPENDIX

## Sample stimuli used in Experiments 1 and 2

To view colour versions of these figures, please see the online issue of the Journal.



John was working/had worked on his laptop at home.



Fred was using/had used his umbrella to keep his suit dry.



Tim was using/had used the iron to press his shirt.

# PQJE369778

## Queries

Carol J. Madden and David J. Therriault

905		950
	Q1	Gainesville ok as added?
	Q2	Vendler: 1967 in refs, 1957 in text.
	Q3	Barsalou: 1999 in refs, 1998 in text.
910	Q4	Barsalou, Santos, Simmons, & Wilson (in press). Still in press?
	Q5	Zwaan & Truitt, 1997, changed to Truitt & Zwaan, OK?
	Q6	Schneider, Eschman, & Zuccolotto (2002). Reference put into format for computer software, OK?
915		960
920		965
925		970
930		975
935		980
940		985
945		990