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Abstract

Little research has examined the phenomenological experiences of reading. We investigated whether perspective-taking influenced readers' experiences of visual and verbal thoughts and how they related to comprehension and transportation. Participants (n=147) received perspective-taking or control instructions, then read a narrative while being periodically asked to rate their thought characteristics. There were no main effects of condition. Visual imagery was positively associated with comprehension and transportation; conversely, verbal-thinking was negatively associated with comprehension but not transportation.

Keywords: visual imagery, verbal-thinking, reading comprehension, transportation, perspective-taking

Examining the Effects of Visual and Verbal Thoughts on Reading Outcomes

Do you remember your experience the last time you read a story? Did you focus on the words in the text, or did you visualize the scenes and the characters? Compared to the cognitive processes underlying reading, less work has been dedicated to understanding readers' *phenomenological* experiences. In particular, we know little about the individual differences that lead us to experience more visual or verbal thoughts while reading, nor do we know how these differences may impact our comprehension and memory for texts. One exception is a study that examined the relation between individuals' phenomenological experiences of reading (i.e., visual imagery and verbal-thinking) and their memory for the text (Moore & Schwitzgebel, 2018). Participants reported experiencing visual imagery more often than verbal-thinking both during and after reading; additionally, there were no strong relations between memory and visual imagery.

Recently, Öncel et al. (2020) attempted to build on this work by examining how these phenomenological experiences vary across time and task (i.e., reading or focused attention/ meditation) and how they relate to individual differences. Individuals reported more visual and less verbal thoughts when reading narratives compared to the meditation task, and these reports were stable across two sessions. Additional analysis indicated that visual imagery was greater in participants who reported a higher tendency to experience *transportation* into narrative worlds (i.e., *transportability*; Green, 1996) and to adopt the perspective of others (i.e., *mind reading motivation*; Carpenter et al., 2016).

One area that remains unexplored is how readers' phenomenological experiences relate to their comprehension and transportation into the text. *Transportation* refers to an integrative melding of attention, imagery, and feelings, focused on story events (Gerrig, 1993; Green, 2004;

Green & Brock, 2000, 2002). Although, transportation is suggested to involve vivid mental images (Green & Brock, 2002), no prior studies to our knowledge have systematically examined the link between visual imagery during reading and transportation reports.

The current study addressed this gap in the literature by investigating how readers' phenomenological experiences during reading relate to their comprehension and transportation into the text. We additionally examined whether perspective-taking instruction would moderate these potential relations between participants' phenomenological experiences and comprehension and transportation into the text. Prior work has demonstrated that although readers can take the protagonist's perspective, they usually approach the text from an omniscient perspective (Albrecht et al., 1995; Creer et al., 2019; 2020; O'Brien & Albrecht, 1992; Smith & O'Brien, 2012). While readers do not automatically adopt a character's viewpoint, there are certain conditions (e.g., reading instructions) under which readers adopt a character's perspective so that they are more sensitive to what the character "sees." Thus, perspective-taking instructions may encourage readers to experience more visual imagery during reading, and potentially lead to greater comprehension and transportation.

In the current study, we aim to answer four main research questions:

1. What is the relationship between participants visual and verbal thought reports during reading?
2. Do participants' visual and verbal thought reports relate to their comprehension of the text?
3. Do participants' visual and verbal thought reports relate to their reported experiences of transportation during reading?

4. Do perspective-taking instructions influence visual and verbal thought reports during reading or their comprehension and transportation into the text?

Methods

Undergraduate students (n=147) recruited from a university in the northeastern United States participated for partial course credit. Participants were randomly assigned to either the *perspective-taking* or *control* condition and received the relevant instructions, adapted from O'Brien and Albrecht (1992). In the perspective-taking condition, participants were instructed to take the perspective of the main character, whereas in the control condition they received instructions to read carefully. The text was adapted from J.D. Salinger's Nine Stories (1953): *Just Before the War with Eskimos;* it was written in third-person point-of-view (e.g., "she," "her") and included both dialogue and narrative sections. The text contained 4187 words and had a Flesch Reading Ease Score of 75.3, indicating that it was relatively easy to read.

During reading, participants were probed 10 times at randomly selected intervals to report visual and verbal characteristics of their thoughts. Both of these probes were on a scale of 1 to 7: *Visual Imagery*: [My thoughts were in the form of images]; *Verbal-Thinking*: [My thoughts were in the form of words]. Additionally, participants received three comprehension questions during reading to ensure they remained on task and immediate feedback on their answer (e.g., 'Correct' vs. 'Incorrect'). After reading, participants were asked to summarize the text and complete a true-false comprehension test. Finally, participants completed the *Transportation Scale* (Green & Brock, 2000), and a demographic questionnaire.

Results

Participants who answered two or more attention check questions incorrectly and who answered less then 30% of the comprehension test were removed from the analysis. Analyses

were conducted with the remaining 143 participants, 72 in the perspective-taking condition and 71 in the control condition.

We first investigated the relation between visual and verbal thought reports (see Table 1 for descriptive statistics). Correlations were calculated at both the between-subject and within-subjects levels, as the thought reports vary both between (inter-) and within (intra-) individuals. Visual imagery and verbal-thinking were significantly negatively correlated at both the between-subjects (r = - .65, $p < .001$) and within-subjects levels (r = - .34, $p < .001$), which replicates Öncel et al. (2020)'s findings. These results suggest that visual imagery and verbal thought tend to behave in opposite ways, such that an individual who experiences high visual imagery is less likely to be engaging in verbal thought.

Table 1.

Descriptive Statistics

Variables	Between - Subject M(SD)	Within - Subject M(SD)
Visual	4.97 (1.80)	4.97 (1.02)
Verbal	3.33 (1.81)	3.33 (1.03)

Next, we examined whether visual and verbal thought reports were related to text comprehension. Given the high correlation between the variables, we conducted separate models to avoid issues due to multicollinearity. There was a significant main effect of visual imagery reports on comprehension scores, $ß_{visual}$ = .23, b = .02, t = 2.78, p = .006. Similarly, there was a significant main effect of verbal reports, $ß_{verbal}$ = -.21, b = -.02, t = - 2.49, p = .014. These findings indicate that readers' experiences of visual imagery were positively related to their comprehension of the text information, whereas higher ratings of verbal thought were associated with lower comprehension.

We conducted similar analyses to examine relations between visual and verbal thought reports on readers' transportation into the narrative. Visual thought reports significantly predicted transportation scores, $ß_{visual} = .37$, $b = 2.83$, $t = 4.80$, $p < .001$. However, verbal thought reports were not significantly predictive of transportation, $ß_{verbal} = -.15$, $b = -1.15$, $t = -1.85$, $p = .066$. Thus, higher rates of visual were more important for *transportation* into a narrative than verbal reports.

Finally, we investigated how perspective-taking instructions would affect visual and verbal thought reports, comprehension, and transportation. Linear mixed-effects models were used with participant as a random effect in all models. Between the perspective-taking and control conditions, there was no significant difference in participants' reports of visual imagery, verbal-thinking, comprehension, or transportation scores. These results indicate that perspective-taking instructions did not affect the nature of individuals' thought patterns or their reading outcomes.

Summary

In the current study, we aimed to address gaps in the literature by examining how individuals' visual and verbal thoughts during narrative reading are related to text comprehension and transportation into the text. Additionally, we examined whether these outcome measures differed when participants were instructed to adopt perspective-taking during reading.

Overall, results indicated that participants' visual and verbal thought reports were related to outcomes known to be important for discourse processing. Specifically, visual imagery was positively associated with both comprehension and transportation into the text, whereas verbal thought was negatively related to only comprehension. These findings are important because

they indicate that readers' phenomenological experiences during reading are related to how they engage with and comprehend the texts they read.

One of the limitations of this study was that the thought probes were randomly placed throughout the narrative, rather than targeting specific elements of the text. Future studies will examine readers' phenomenological experiences for specific parts of narrative texts (e.g., dialogue, description) by arranging the probes accordingly. Furthermore, there were no effects of perspective-taking instructions on participants' thought reports or outcome measures. One possibility is that the perspective-taking instructions were difficult to maintain as participants were also repeatedly prompted to respond to thought probes and attention check questions. Thus, in the future, we will attempt to extend these findings by examining whether manipulating perspective *within the text* (i.e., manipulating first- vs. third-person point of view) has any effect on the reading experience.

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