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In Praise of Miscues and the Comprehension of Complex Texts

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Abstract — The reading of complex texts is a critical dimension of the *Common Core State Standards*. We have little knowledge, however, of the impact of reader miscues on the comprehension of such texts. This issue is explored through a look at fourth graders transactions with literary and scientific texts. The impact of two types of reading behaviors on comprehension are examined: (1) portions of text read with no miscues and (2) portions of text read with meaning maintaining miscues. It was found that readers were significantly more likely to comprehend and recall information that was read with meaning maintaining miscues than when read with no miscues whatsoever. Such behaviors were more likely to occur with the less familiar scientific text.

The ongoing implementation of the *Common Core State Standards* (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010a) has impacted reading instruction in a number of ways. First, is the increased use of expository texts, especially in the early grades. Narratives no longer hold center stage, but are now accompanied by the use of texts that are informational in nature. A second impact is the increase in the complexity of the texts read, whether narrative or expository. There is a move away from the use of short, simple narrative stories to those that might contain such features as flashbacks, multiple episodes and changes in narrators. Similarly, expository texts frequently address conceptual issues that are unfamiliar to the elementary reader. Finally, students are expected to closely read these complex texts with little initial teacher support.

Given this new instructional situation, I wondered how these complex texts might impact student reading and comprehension. More specifically, I wanted to understand the relationship between reader "mistakes"—often thought of as problematic from a fluency perspective—and the meanings

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that students actually constructed in their retellings. This issue is addressed through an examination of two types of reader behaviors and their impact on the comprehension of complex texts: (1) portions of text that are read with no miscues and (2) portions of text that are read with meaning maintaining miscues. I use the word miscue rather than mistake because I want to avoid the assumption that not reading exactly what is printed on the page is necessarily a bad thing. In fact, there may be a more complex relationship between reading behaviors and the text being read

ACCURACY: ARE ALL MISTAKES EQUAL?

The impact of fluency on comprehension has been extensively researched over the past decades (e.g., Breznitz, 2006; Hudson, Pullen, Lane, & Torgesen, 2009; Kuhn & Stahl, 2013; LaBerge & Samuels, 1974; Rasinski, Reutzel, Chard, & Linan-Thompson, 2011; Samuels, 1979). Typically defined as involving accuracy, speed, and prosody, the development of these factors related to fluency are thought to be prerequisites to comprehension. This is because their development frees cognitive resources so that they can be focused on the construction of meaning.

The accuracy and speed components of fluency have also received attention within instructional settings, e.g., *Reading First* (United States Department of Education, 2002) as well as within assessment, e.g., *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Good & Kaminski, 2005). However, even before fluency came to the forefront, teachers traditionally focused on accuracy, viewing errors as problematic in that they reflected poor word analysis skills.

Word identification during reading, however, involves more than the ability of the reader to graphically recognize individual words. It may also be impacted by the syntactic, semantic, and discourse context in which any word is embedded (Kucer, 2014; Tanenhaus & Seidenberg, 1981). Syntactic and semantic context refers to sentence level structure and meaning. In contrast, discourse context involves the entire text, both its organization as well as its general content.

Finally, miscues—deviations from what is written—can have various relationships with what is actually written or

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intended by the author(s). Miscues can maintain, change, or disrupt the meaning of the text. On a macro level, Goodman (1996) found a moderate correlation between the percentage of miscues that are meaningful, regardless of whether they changed text meaning, and holistic comprehension scores. What has been left unexplored by this line of research is a closer examination of the relationship between those miscues that maintain text meanings and the retelling of those meanings.

The Readers

Fifty two proficient fourth grade readers from the same school district and living in the Pacific Northwest were involved in this research. Proficient fourth grade readers were the informants in this exploration because at this age they have developed a degree of proficiency and the stamina necessary to independently read longer, more complex texts without assistance. The readers were monolingual in English and mostly European American. Approximately one third of the students came from middle class, college educated homes; two thirds came from working class communities with parents who had high school degrees. Most students lived in single family dwellings and as far as the classroom teachers were aware, no students were living in poverty, were homeless, or receiving free or reduced lunches.

Based on the assessments used by the schools to evaluate student reading ability—*Star Reading Test* and the *Quality Reading Inventory*— all of the 52 students were reading on or above grade level. Specifically, the percentage of readers on each of the following grade levels were: fourth: 51%, fifth: 31%, sixth: 10%, seventh, 6%, eighth: 2%. The teachers of the students also confirmed that they were proficient readers and had no processing difficulties.

The Texts

In collaboration with the fourth grade classroom teachers, two types of complex texts were used, one literary and the other scientific. Text complexity, as defined by the National Governors Association Center for Best Practices, Council of Chief State School Officers, (2010b), involves four qualitative factors: levels of meaning, structure, language, and knowledge demands. The factors exist on a continua of difficulty, from less to more demanding, and few texts are low or high on all factors. These complexity factors are addressed when relevant throughout the following discussion and analysis of the texts used in this study.

The first chapter of the book, *Who Stole the Wizard of Oz*? (Avi, 2005) was the literary text used for this investigation. The book was part of the fourth grade reading program used by the school district, but had not been read by the students. The teachers involved in the research indicated that it was an appropriate text for students to read based on its content and fourth grade readability.

As indicated in Table l, Becky, the sister of the story's narrator, Toby, is telephoned by the town librarian. The

book, *The Wizard of Oz*, is missing and a policeman wants to talk with her. The implication is that the librarian believes she stole the text. Becky and Toby walk to the library and she explains to her brother why the librarian might think that she has taken the book. Becky had been given a summer book report assignment and had gone to the library looking for books, including *The Wizard of Oz*. The book was already checked out; however, the librarian said that another copy of the book would be for sale the next day. Becky said that she would not return to purchase the book.

Although not all the children in this study were aware that *The Wizard of Oz* was a book, they had seen the movie. The school in which they were enrolled had a librarian and a library which the students used on a regular basis. Finally, they knew about book reports and had written their own as class assignments. It is difficult to imagine that there were any central ideas or concepts in the chapter that would be difficult for students to comprehend.

Table 1 Content Analysis of *Who Stole the Wizard of Oz* and *Amazing Animal Adaptations*	
Who Stole the Wizard of Oz	**Animal Adaptations**
Setting Present Time **Story Narrator (Toby)**	Deep in the Rain Forest
Becky and Toby sitting on the porch thinking about summer vacation. (present, Toby narrates)	These animals are able to survive through adaptations—ways animals look or behave that allow them to survive.
Initiating Event Present Time **Story Narrator (Toby)**	The Jaguar
Call from the librarian asking Becky to come to the library. *The Wizard of Oz* has been stolen.	The jaguar's tan and black-spotted coat blends in with its surroundings.
Becky goes to the library with Toby.	Its camouflage allows the jaguar to sneak up on its prey. Jaguars are not picky eaters—they eat animals, both large and small.
Explanation Flash Back **Episode Narrator (Becky)**	Jaguars have large heads and powerful jaws that allow them to be fearsome hunters. They are skilled swimmers, able to snatch fish, turtles, and small alligators.
Becky is in class waiting for school to get out for the summer. Is given summer book report assignment.	
Commentary **Present Time** **Story Narrator (Toby)**	The Giant Anteater
Toby keeps his cool and thinks before talking; Becky is more emotional and speaks her mind.	The anteater's appearance is an example of how animals adapt to their environments.
Explanation Continued Flash Back **Episode Narrator (Becky)**	With its huge claws, the anteater can rip into ants' nests.
Wants to get the book reports finished. Goes to library to get books.	Its long, pointy snout lets it poke its head into holes. Using its long tongue, the anteater slurps up ants effortlessly.
Decides to get *The Wizard of Oz* for Toby. Someone had already taken *The Wizard of Oz*.	The Red-Eyed Tree Frog
The Wizard of Oz will be for sale the next day. Will not come back to buy it because it is vacation.	The red-eyed tree frog uses its sticky toe pads to cling to the underside of wet leaves. The toe pads are like suction cups.
Conclusion Present Time **Story Narrator (Toby)**	Its bright green skin blends in with the leaves so that enemies cannot find it as it sleeps during the day.
Becky says she did not steal *The Wizard of Oz*. (present, Toby narrates)	When a predator disturbs a dozing frog, the frog's eyes fly open. The predator is surprised and dashes off.
	Summary
	All living things are adapted to their environments. Adaptations allow animals to thrive and survive

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Table 2		
Linguistic Analysis of *Who Stole the Wizard of Oz* and *Amazing Animal Adaptations*		
Text Feature	**Who Stole the Wizard of Oz**	**Animal Adaptations**
Pages	6	4
Sentences	88	31
Words per Sentence	6.34	15
Clauses	128	59
Words per Clause	6.34	7.88
Clauses per Sentence	1.45	1.9
Word	746	465
Text Type	Fictional Narrative	Scientific Exposition
Text Structure	Episode One: Setting, initiating event and response Episode Two: flashback to a previous initiating event, response, attempt, consequence Episode Three: character development Episode Four: attempt from Episode Two Episode Five: response to Episode One	Introduction, three subtopic examples, summary
Unfamiliar Language and/or Concepts	stiff as wood looks like a queen	camouflage environment predators adaptation
Pictures/Illustrations	None	3
Subheadings	None	5
Readability Level	Fourth grade	Fourth grade

Linguistically, the chapter is a first person recounting that contained both narration and dialogue. At six pages and 746 words, it contained 128 clauses and 88 sentences. On average, sentences were 9.22 and clauses 6.34 words in length. No pictures or illustrations accompanied the chapter, nor were subheadings used. However, according to their teachers, there were two instances of language and concepts that may have been new to the students. The description of a female teacher as being *stiff as wood* and *looking like queen* were most likely unfamiliar metaphors and contributed to the complexity of the text.

Using story grammar theory (e.g., Mandler & Johnson, 1977; Stein and Glenn, 1979; Stein & Trabasso, 1982; Thorndyke, 1977) and discourse analysis theory (e.g., Bloome, 2003; Gee, 1999), five episodes and their corresponding events, clauses, and story grammar elements were identified in chapter one. An episode was defined by time, location, and narrator. In each new episode the scene or setting shifts in terms of location and time, and the narration shifts from one character to the other. Each episode contained a number of major events or happenings which moved the story forward and around which the episode unfolded. In terms of text complexity, the structure of the chapter was the primary factor that challenged the readers.

More specifically, in these episodes the narration switches back and forth between the brother, Toby, who is the overall story narrator, and the sister, Becky, who is at times an episode narrator. When the brother narrates, the episode is in present time; when the sister narrates, the episode represents a flashback. Further complicating the text is the fact that the brother is actually narrating something that happened to his sister. In the flashback episodes two and four, the sister interrupts her brother's story narration to explain why the

librarian believes she might have taken the book. Therefore, not only did a new narrator take over, but the story actually moves backwards in time. Additionally, in the middle of episode two, the narrator of the story— Toby—interrupts Becky's flashback episode narration with a character analysis of his sister and himself (episode three). These characteristics—flashbacks, changing locations, shift of narrators—add to the complexity of the text and move it beyond a simple, straightforward short story. Table 2 summarizes the linguistic features of the chapter.

Amazing Animal Adaptations (Longo, 2008) was the scientific text read by the students. *Adaptations* came from Fountas and Pinnell's (2008) *Benchmark Assessment System 2*, an assessment not used by the schools involved in this research.

Adaptations (Longo, 2008) address how various physical and behavioral characteristics of animals represent an adaptation to their environment. The three main animals—jaguars, anteaters, and red-eyed tree frogs—are introduced as part of the rainforest. The concept of adaptation is then defined and concludes the first section. As indicated in Table 1, each animal's characteristics and adaptations are addressed in separate sections. In the final section, the text concludes with the definition of adaptation repeated.

The knowledge demands was one of three factors that contributed to the complexity of this text. The students had some general understanding of jaguars or jaguar-like animals (e.g., cougars, panthers) and frogs, but anteaters seemed to be a novel animal to many of them. More importantly, in discussions with the classroom teachers, it was thought that the idea of animals adjusting to their environment through changes in behavior or physical features was probably a new concept for the students.

Amazing Animal Adaptations (Longo, 2008) reflected an

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expository structure that introduced the issue, explored three examples of the issue, and then ended with a summary. Each example was accompanied by a subheading as well as a photograph. The photograph illustrated the physical adaptations addressed and was accompanied by a sentence noting the adaptations. Two of the three photographs were at the top of its own page. A third photograph was in the middle of the third page between two paragraphs. The author of this particular text also used a framing device, the use of an idea at the beginning and ending of the text. Adaptation was defined in the opening paragraph, restated in the final paragraph, and was also used as part of the text's title. This structure, common to many expository texts, was a second factor that contributed to the text's complexity and was less familiar to the students.

In contrast to the literary text, *Amazing Animal Adaptations* (Longo, 2008), was 31sentences in length, with 59 clauses and 465 words. (See Table 2.) As is common in many expository texts with academic language (e.g., Baumann & Graves, 2010; Gee, 2004ab; Author, 2009, 2011; Shanahan, 2009), the sentences were linguistically and conceptually denser than those in the narrative. On average, sentences contained 15 words and 1.9 clauses. Clauses were 7.88 words in length.

In addition to *adaptation*, three additional disciplinary words thought to be unfamiliar to the readers are identified and defined in the glossary of the text: *camouflage*, *environment*, and *predators*. This language used in an academic manner was the third factor contributing to the text's complexity. *Adaptations* (Longo, 2008) was assigned a fourth grade level by Fountas and Pinnell (2008).

The Reading and Retelling of Complex Texts

The reading and retelling of the two texts occurred over a four week period, with a single text being read each session. Before reading, students were informed that they would be reading a text aloud without assistance, were to read for meaning or understanding, and would be asked to retell all that they could remember after finishing the reading without looking back to the text. In total, students read 5,411 clauses.

The oral reading was followed by a retelling and probes by the researcher. Probes were based on what the students had retold. Requests for elaborations and clarifications, as well as gaps in the retellings reflecting the main ideas represented in Table 1, were explored. Care was taken, however, not to introduce information the readers had not recalled. All readings, retellings, and probes were audiotaped. On average, each reading and retelling session lasted no longer than fifteen minutes.

Making Sense of Reading and Retelling Behaviors

A modified form of miscue analysis was the procedure used to capture the processing behaviors of the students (Davenport, 2002; Goodman, Watson, & Burke, 2005; Wilde, 2000). Miscue analysis evaluates the degree to which readers utilize the various systems of language— graphophonemics, syntax, semantics— when interacting with written discourse. Through miscue

analysis, all miscues—i.e., deviations from what was written—are marked. Markings include substitutions, omissions, insertions, pauses, corrections, attempts to correct, abandonment of correct responses, and repetitions. The goal of the marking is to capture the reader's processing of the text as fully as possible. Students generated 2,654 miscues across the reading of the 5,411 clauses.

Typically, each sentence as finally read is then evaluated for its syntactic and semantic acceptability, as well as the degree to which the meaning has been maintained or disrupted. In this study, however, the clause was used as the unit of analysis because there is some research to suggest that it is the basic linguistic unit for processing (Gee, 2005, 2008; Hayes & Nash, 1996). Following Gee (1999), a clause is defined as "any verb and the elements that 'cluster' with it…." (p. 99). For example, the first sentence in *Who Stole the Wizard of Oz?* (Aviv, 2005) contains three clauses, indicated by /: *My sister Becky and I were stretched out on the front porch one morning / thinking out loud / about how we should spend our summer vacation*. In *Amazing Animal Adaptations* (Longo, 2008), the first sentence contains two clauses: *Deep in the rain forest, after the sun has set / a sleek jaguar creeps along the forest floor*. Because many of the sentences in the texts contained multiple verbs and clauses, the use of the clause also allowed for a more discrete analysis of both processing and retelling behaviors.

After all miscues were marked, each clause as finally read was judged for whether it maintained meaning. For example, the text clause, *You'd best bring one of your parents*, was read as, *You'll be bring one of your parents*, and coded as not maintaining meaning. Similarly, the clause, *But what if a predator does find*, was read as, *But if the predator doesn't find*, and was also coded as disrupting meaning. In contrast, *We're not at all alike*, was read as *We're not alike*, and coded as maintaining meaning. In total, 3,970 clauses were read with no miscues and 524 clauses were read with uncorrected miscues that maintained meaning.

Reader comprehension was evaluated by matching the meanings in each clause in the retelling, when possible, with the meanings in text clauses. In matches, the meaning of the retold clause had to maintain the basic meaning of a clause within the text, although synonymous language might have been substituted for the original language. For example, the retold clause, *And she said that she wanted Becky to come down*, was matched with the text clause, *"Can you come over now?"* Or, the text clause, *They are also skilled swimmers*, was matched with the retold clause, *Jaguars are good swimmers*. Given the nature of comprehension, it was not uncommon for the meanings of a single recalled clause to be located in two or more text clauses, Conversely, the meanings of a single text clause were frequently located in two or more recalled clauses. Such clauses were coded as a match since the basic meaning in the retelling had captured the meaning represented in the text.

Miscue markings, the evaluation of their impact on text meaning, and the content of the retellings were initially examined by one researcher. A second researcher then checked these results. Differences between researchers were resolved during regular data analysis meetings. The last step

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involved a statistical analysis using *t* tests to examine the retelling and clauses read with meaning maintaining miscues and their retelling.

WHAT WAS DISCOVERED

For both the literary as well as the scientific text, the existence of clauses containing meaning maintaining miscues actually supported reader recall. In fact, as indicated in Table 3, clauses with miscues that maintained meaning were significantly (statistically) more likely to be recalled than clauses read with no miscues.

Table 3 Reading Behaviors and Comprehension		
	Average Clauses Recalled	
Text Processing	Who Stole the Wizard of Oz	Amazing Animal Adaptations
All Clauses	13.5%	13%
No Miscues	13.1%	18%
Meaning Maintaining Miscues*	18.1%	26.56%

* Statistically significant difference

On average, readers of *Who Stole the Wizard of Oz?* (Aviv, 2005) recalled 13.5% of all text clause meanings, regardless of how they were read, and 13.1% of clauses containing no miscues. However, the meanings of clauses containing meaning maintaining miscues were recalled significantly more often, 18.1% of the time. Similarly, for *Amazing Animal Adaptations* (Longo, 2008), 13% of all clause meanings were recalled and 18.15% of clause meanings with no miscues. Again, the meanings of clauses with meaning maintaining miscues were recalled significantly more often, at 26.56%. For both texts, accuracy in terms of maintaining meaning was more significant than correct word identification.

Table 4 represents some of the various ways in which the readers made miscues, but maintained the basic ideas of the author in both their readings as well as in their retellings. In these meaning maintaining miscues, readers had essentially produced an alternate way of expressing the same basic idea. That is, they changed the surface structure but maintained the deeper meaning. Such miscues represented reader understanding as demonstrated in the recalled ideas. In fact, to be able to produce such miscues, readers had to rely on context and demonstrate their understanding of the clause being processed. It may also be the case that the cognitive resources expended in these "translations" caused the clauses to be more memorable or salient during the retelling task. These findings suggest that the concept of word accuracy may not be as significant as miscue meaningfulness. This translation phenomenon is similar to what occurs when readers make dialect or bilingual code switching miscues. Such miscues are only possible because readers understand the ideas being conveyed by the author.

relationship between clauses read with no miscues and their What is also interesting is that there were significantly more recalled clauses containing meaning maintaining miscues for the science text than the literary. It might have been expected, given the text's new disciplinary language and content, that readers would have had more difficulty understanding and recalling such information. This unexpected finding should give us pause when assumptions are made about the "inherent" difficulty of informational texts.

It must be acknowledged that recall of meanings at the clause level may not be the focus of many readers. Rather, readers frequently look for the "big ideas" being represented in a text. And, over time, we know that it is these big ideas that tend to be remembered (Bartlett, 1932). However, it has also been found that the recall of meanings at the clause level is highly correlated with the recall of big ideas—such as those ideas listed in Table 1 (Kucer, 2009, 2010, 2011, 2013). That is, understandings at the clause level support the development of main ideas. Therefore, clause and big idea recall are highly related to one another. Finally, clauses themselves can represent major ideas. "Animals are able to survive through adaptations," for example, is a clause that represents a major idea in *Amazing Animal Adaptations* (Longo, 2008).

Table 4 Clause Meaning Maintaining Miscues and Their Retelling Samples		
Who Stole the Wizard of Oz		
Literary Text	Reader	Retelling
…two well-written book reports, please.	…two well-written good book reports, please.	And she was supposed to do two book reports, well written.
"And I think you'd best bring one of your parents."	"And I think you'd better bring one of your parents."	…come in with her parents.
The children's books will only be five cents apiece.	The children's books were only five cents apiece.	…and they're five cents apiece.
…and pointed to a stack of books on the table.	…and pointed to this stack of books on the table.	The librarian pointed at some books.
Amazing Animal Adaptations		
Scientific Text	Reader	Retelling
The anteater curls into a ball in the hallow of a tree.	The anteater curls up into a ball in the hallow of a tree.	They roll up into a ball like a hallow of a tree.
…using its long tongue, the anteater slurps up ants effortlessly.	…using its long tongue, an anteater slurps up ants effortlessly.	The anteater has a long tongue so when it sees, like when they find an ant hole they stick their tongue in the hole and get it.
So that enemies cannot find it.	So the enemies cannot find them.	So you can't see it when a predator comes.
When a predator disturbs a dozing frog, the frog's eyes fly open.	When the predator disturbs a dozing frog, the frog's eyes flip open.	And a predator comes up to it, it shocks it by opening is eyes.

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WHAT IS A TEACHER TO DO?

As demonstrated, the relationship between how a text is read and how it is comprehended is a complex one. Miscue meaningfulness rather than word accuracy is probably a better criterion by which to judge reader miscues. Teachers can convey this fact to the students in a number of different ways. First, rather than correcting student miscues that maintain the meaning, the teacher can discuss with the students how these miscues actually reflect a high degree of reader understanding. The reader has simply changed the language into another form that reflects similar meanings. Readers are oftentimes unaware that they have made such miscues because there is nothing to cue the reader that anything has gone wrong.

The teacher can contrast meaning maintaining miscues with those that disrupt meaning. Meaning disrupting miscues usually "tell" the reader that something is amiss—what has been read does not make sense—and students can be taught various repair strategies when such miscues are made (Kucer, 2014). Readers can, for example: stop, reread what came before the miscue, and then repredict; read on and return when more content is known; substitute more sensible language for the unrecognized word; read on to determine the importance of the unrecognized word, etc.

The instructional strategy Synonym Substitution (Goodman & Burke, 1980; Kucer & Silva, 2013) actually encourages readers to produce meaning maintaining miscues. A text that students can easily read is selected and various words are underlined throughout a text. The selection of words should be done carefully so that students can make use of the previous context to read what is underlined. The students read the text aloud and substitute meaning maintaining words for the words that are underlined. After the reading, the teacher and students return to the substitutions and discuss how they maintained the meaning of the text.

One dimension of close reading is to have students return to the text after it has been read (Fisher & Frey, 2012). Reader Selected Miscues (Kucer & Silva, 2013; Watson, 1980) and Retrospective Miscue Analysis (Goodman & Marek, 1996) are both instructional strategies that engage students in revisiting the text. In Reader Selected Miscues, the readers identify places in the text where they experienced difficulty. They may be asked to mark the problems with post it notes or to simply write them down. These problems are then shared and students taught various strategies to support them in working their way through the problems. Similarly, students also revisit the text in Retrospective Miscue Analysis, except in this case they are listening to an audio recording of their reading. As they listen, the teacher and students identify interesting miscues that have been made, discuss the reasons behind them, and evaluate their meaningfulness.

In all of these instructional activities, students come to understand the differing impact on meaning of various types of miscues, why such miscues are made, and strategies for overcoming miscues that disrupt meaning. Close readings of complex texts become a process of revisiting text meanings, rather than a process of reading all words accurately. And this is as it should be, for text complexity is really about ideas, how the ideas are addressed by the author, and the ability of the reader to construct meaning from what the author has expressed.

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