Text Box Size, Skill, and Iterative Practice in a Writing Task

Roxanne B. Raine, Lisa Mintz, Scott A. Crossley*, Jianmin Dai, and Danielle S. McNamara
Institute for Intelligent Systems
University of Memphis
Memphis, TN
{rbraine; lmintz; jdai; dsmcnamr} @memphis.edu

*Department of Applied Linguistics
Georgia State University
Atlanta, GA
scrossley@gsu.edu

Abstract

Although freewriting strategies are commonly taught in composition courses, there have been few empirical studies on freewriting. We address this gap by examining effects of prior writing skills (as measured by a pre-write essay), freewriting training, text-box size (1, 10, 20 lines), and repetitive writing on freewriting quality. Participants watched an agent-based *vicarious learning* freewriting instruction video or a *control* video including brief instructions on freewriting. After training, participants wrote six freewrites, two in each box size. Lesson delivery and text box size did not affect expert human ratings of the freewrites. Furthermore, participants did not benefit from writing successive freewrites regardless of their initial skill level. We describe how these results have been used to inform the design of Writing-Pal, an essay-writing intelligent tutoring system.

Introduction

The Writing-Pal (W-Pal) is an intelligent tutoring system that provides high school students writing strategy instruction. W-Pal includes training and practice modules to scaffold students toward writing higher quality essays. The training aspect of W-Pal features a series of lessons that parallel the typical high school English composition curricula (see McNamara et al., in press, for a more detailed description of W-Pal and its components).

W-Pal's design is theoretically driven and based on empirical evidence regarding effective pedagogical methods for improving writing skills (e.g., argument development: Larson, Britt, & Kurby, 2009; Larson, Britt, & Larson, 2004; topic sentences: McCarthy et al., 2008; cohesion: McNamara, Louwerse, McCarthy, & Graesser, in press; and paraphrasing: Rus, Lintean, Graesser, & McNamara, 2009). As much as possible, all aspects of W-Pal's design are based on existing accounts of successful approaches and methods to teaching writing strategies. However, empirical literature about certain aspects of the writing process is sometimes unavailable. Such gaps in the literature give opportunity for new studies that we can use to inform our approaches to provide instruction within the W-Pal system. This paper is about one such study.

Freewriting is an idea-generation exercise. There are no rules in freewriting except that the writer not stop writing for an allotted amount of time (usually 2-5 minutes). Freewriting is expected to be helpful for all writers, regardless of skill level (e.g., Blau, 1983; Elbow, 1973). By using freewriting, it is assumed that writers can overcome writer's block, develop content for an essay, and get started with the writing process in a relatively pressure-free manner (Elbow, 1973).

As popular as freewriting has been within English composition curriculums, the use of freewriting strategies has not been validated by solid empirical evidence. Although we have studied how textual features predict freewrite quality in previous studies (Weston, Crossley, & McNamara, 2010a, 2010b), these studies did not address the operationalization of a freewriting module. Such issues are the focus of this paper. Namely, we address how a freewrite's text box size or lesson delivery might affect freewrite quality.

In the following section, the limited available freewriting literature is discussed. None of the existing literature directly answers the question of how to design W-Pal's freewriting lesson and practice interfaces. In fact, different

accounts within the literature predict opposing designs with regard to text box size.

Freewriting Interface Design: What Matters?

Although many English teachers include freewriting strategy instruction in their curriculums, very few studies have explored pedagogical techniques to improve the quality of freewrites. Moreover, the existing freewrite literature does not directly address the question of how to incorporate freewriting exercises into a computer interface.

The size of a text box might impact the amount of text produced in a freewriting exercise. Writers may write more in larger boxes and less in smaller boxes, or vice versa. Pianko (1980) found that writers spend approximately 1 minute glancing back at what they have written for every 10 words they write. However, in freewriting, writers should not look back at what they have written (Elbow, 1973). Thus, Pianko's findings, along with Elbow's notion of successful freewriting, suggest that a small 1-line text box could be best for computer-based freewriting. Using a 1-line text box, writers would be prevented from reviewing most of what they have already written. If writers spend time writing (as Elbow [1973], suggests they should) instead of reviewing what they have written (as Pianko [1980] suggests they tend to do), then they might write more, and what they write might be better. Because freewrites that contain more content have been found to be rated higher (Weston et al., 2010a; 2010b), restricting box size may lead to better freewrites.

Time dedicated to writing and prevention from looking back at what has been written are not the only factors that could make smaller text boxes more conducive to freewriting than large text boxes. Blau (1983) had participants use faulty pens to write on blank sheets backed by carbon paper. This technique prevented his participants from seeing what they were writing, but also allowed Blau to record what had been written. Blau referred to his technique of using non-functional pens to write on blank paper "invisible writing." Blau's participants reported that they were more creative and their writings were more fluent when they used this "invisible writing" strategy. According to Blau's (1983) interpretation, invisible writing facilitated creativity and fluency because it hindered premature editing. Blau proposes that his participants were allowing their ideas to flow more freely because they were not distracted by continuously evaluating what they had already written.

Marcus (1991) replicated Blau's (1983) experiment using computers instead of non-functional pens. To emulate Blau's (1983) invisible writing technique, Marcus turned the computer monitor brightness down completely to prevent his participants from seeing what they were typing. Marcus's participants had different reactions to the technique than did Blau's (1983) participants. Whereas all of Blau's participants found the invisible writing technique helpful, some of Marcus' participants were distracted by their inability to see what they were typing.

In contrast to Pianko's (1980), Elbow's (1973) and Blau's (1983) work, which suggests that a 1 line text box would prompt writers to produce more text, Čech and Condon (1998) found that participants produced more words when they were given larger text boxes. Čech and Condon's (1998) study, in contrast to the previous studies, investigated behavior in a dialogue task. Their participants completed a planning task over a series of weeks in which they were assigned to conditions with 4, 8, or 18 line text boxes. When provided with larger text boxes, participants took longer turns and wrote more than they did in the smaller text boxes. Čech and Condon relate the result to verbal studies of turn-taking, which indicate that interlocutors tend to align with each others' strategies (Sacks, Schegloff, & Jefferson, 1974). Larger text boxes might also motivate freewriters to write more, even though they are not dialogue participants.

In summary, prior studies have shown that using a paper and pencil paradigm, invisible writing increased writing and reduced editing without reported complaints (Blau, 1983), but in the context of computer mediated writing, students often reported that the invisible writing technique was unhelpful (Marcus, 1991). Moreover, the computer-mediated version of invisible writing did not limit the amount of writing the writers were able to see, but obscured the students writing completely (because the monitor's brightness was set to zero). By contrast, the dialogue studies using computer interfaces (in which students were allowed to see the text boxes) showed opposite results: interlocutors were primed by the box sizes to write more or less (congruent with the text box size; Čech and Condon, 1998). As such, the available literature does not conclusively inform the design of a freewriting module regarding text box size. The lack of evidence available to indicate how to design a freewriting module's box size partially prompted the current study.

Freewriting Online: Determining What Matters

Freewriting is a relatively simple practice, with no rules except that the writer continue writing for a predetermined amount of time (Elbow, 1973). Thus, it is possible that a lengthy and detailed 25-minute explanation of freewriting (as found in the W-Pal system) may not have an advantage over a brief 2-minute definition. Furthermore, although vicarious learning instruction can be effective in teaching fairly complex skills (e.g., McNamara, Levinstein, & Boonthum, 2004), it is possible that simple skills such as freewriting would not benefit from vicarious learning. As a result, it is possible that simple skills such as freewriting can be easily taught by giving students a definition and that the same students would not benefit from longer instructions, even if those instructions were delivered in a vicarious learning format.

To test these notions, participants in this study were placed into two training conditions: vicarious learning or a control condition (in which students received minimal instruction of freewriting). All students then wrote 6 freewrite in a number of text box sizes. By manipulating freewriting lesson delivery and text box sizes, we were able to examine whether lesson delivery strategies and text box

size influence freewrite quality. We also added a baseline short essay pre-write to assess individual differences in initial skill levels.

Methods

Participants

Fifty-seven students participated in the study. Six students' data were not included in the analysis due to inability to complete the study within the allotted period of time (55 minutes) or accidental data overwriting (two experimenters simultaneously assigning students to the same experimental slot). Eleven students (4 males, 7 females) volunteered for extra credit from a University of Louisiana at Lafayette introductory English composition course. The remaining 40 students were either from the University of Memphis psychology subject pool and participated as part of their Introductory Psychology course requirements (5 males, 12 females) or from introductory English composition courses and participated for monetary compensation (10 males, 13 females). The use of three participant groups gave us a wide population sample.

Procedure

The entire experiment was delivered via a self-contained computer program designed and written by our first and fourth authors. Participants came into the lab, sat at computers, and progressed through the program as follows: (1) They wrote a short essay, (2) They watched one of two videos (depending on condition), (3) They wrote 6 freewrites, and (4) They completed a short questionnaire.

Participants first wrote a 10-minute essay on the following assignment adapted from prior SAT writing tests:

> It is often the case that revealing the complete truth may bring trouble—discomfort, embarrassment, sadness, or even harm—to oneself or to another person. In these circumstances, it is better not to express our real thoughts and feelings. Whether or not we should tell the truth, therefore, depends on the circumstances.
>
> Is it better to always tell the truth?

After writing the essay, participants watched one of two videos (depending on condition) incorporated into the experimental computer program. One video was a vicarious learning video constructed by our first author, which described freewriting with a teacher agent and two student agents who were situated in a classroom beside a blackboard that featured text related to their discussion. The other video was a direct instruction video that was compiled by our first and second authors with the help of a recording engineer. The direct instruction video described a number of features relevant to the writing process such as APA style formatting, the importance of avoiding plagiarizing, DOI referencing techniques, and freewriting practice. This video was a compilation of three YouTube videos followed by a text and audio explanation of freewriting. Both videos (the vicarious learning and direct instruction videos) were 23 minutes long, but the YouTube direct instruction video only covered freewriting for 2 minutes, whereas the vicarious learning video covered freewriting for the entire 23 minutes.

After the video, text appeared on the computer screen informing the students that they would write 6 freewrites in succession, and that they would have 5 minutes per freewrite. The system timed participants' freewrites and automatically advanced to the next freewrite when their five minutes for the freewrite expired.

The freewrite assignments were modified SAT prompts. Each freewrite question was, like the above-mentioned mini-essay, preceded with a prompt. For the sake of brevity, only 2 example assignment questions are listed here:

- Can people ever be truly original?
- Do people place too much emphasis on winning?

Freewrite questions appeared in random order for each participant in box sizes of 1, 10, or 20 line boxes, which were also randomly ordered. Each prompt question had the same likelihood of appearing with any of the text box sizes, and in any order with each participant. Each participant received every prompt and wrote in each box size twice. The experiment was a 2 (video) x 3 (box size) mixed design with random assignment.

Measures

The dependent variables for this study were pre-write essay score and freewrite essay scores (by trained human raters).

Pre-write Essays. Two members of the W-Pal lab graded pre-write essays using a standard SAT essay-grading scale of 0-6. The graders were blind to experimental condition while evaluating the essays. To resolve occasional discrepancies between the two raters' ratings, essays were discussed. After discussion, the scores were always within ½ point of one another. These pre-write essay scores were used as baseline measures of the participants' skill levels.

Freewrites. There were 51 participants, each of whom wrote 6 freewrites. Trained experts from Mississippi State University rated these 306 freewrites on a scale developed for a previous freewriting experiment (Weston et al., 2010b). This specially designed freewrite scoring rubric consisted of 11 features: variety of ideas, explanation of ideas, continuity of ideas (semantics), continuity of ideas (connectives), order of ideas, relation to writing prompt, concluding ideas, length, organization, punctuation, and an overall holistic score. The two raters produced 11 ratings for each of 306 freewrites. Of these 3366 ratings, there were only 46 that had a discrepancy between raters higher than 2 (less than 1.4% of their ratings). Rater's holistic scores (used in the analysis below) were satisfactorily correlated at 69%.

Results

The dependent variable for all analyses was the freewrite

ratings for the participants' freewrites. In the mixed ANOVA of video condition (vicarious vs. direct instruction) x text-box size (1, 10, or 20), there were no effects (F<1).

Based on the previous research examining invisible writing techniques in hand-written exercises and text-box sizes in computer-mediate communication, our null results for box-size were somewhat surprising. Although there were no significant effects in the omnibus analysis, there were a number of factors potentially attributable to the null effects. First, participants may have been desensitized to the box-size manipulation because they wrote six freewrites in succession within a number of different box sizes. A second alternative is that the participants may have improved in performance once exposed to a particular text box size more than once.

A third alternative relates to the variation in freewrite topics. The randomly ordered freewrites were on different topics, and were randomly matched with box sizes. Thus, it is also possible that the freewrite topics resulted in substantial freewrite-to-freewrite variability.

Finally, it is possible that the participants' initial skill level (as measured by there pre-essay writing score) may have affected their performance on the experimental task. The following analyses explore these four possibilities.

Further Text Box Size Analyses

First Freewrites. Text box sizes appeared in a random order, and each participant wrote two freewrites in each box size. However, it is possible that as they wrote successive freewrites, participants became desensitized to the box-size manipulation. If invisible writing and smaller text boxes promote creativity and fluency, it is possible that those who were exposed to smaller text boxes (i.e., those who had written freewrites initially in 1-line text boxes) may have carried this strategy over once they begin writing in 20-line boxes. In contrast, if larger text boxes prime writers to produce more text, writers provided larger text boxes initially may continue to produce more text even when their box sizes were subsequently reduced to 1-line text boxes. Thus, an ANOVA including initial box-size condition as the between-subjects variable was conducted on freewrite quality including the 17 participants who began with 1-line boxes, the 16 participants who had 10-line boxes, and the 18 participants who had 20-line boxes in their first freewrites. There were no significant effects for the size of the initial text box (F<1). In addition, human judgments of the quality of the participants' initial freewrites were not related to text box size.

Improving with Experience of a Particular Text Box Size. The next possible explanation for the unexpected null result was that the participants could have improved as they experienced a particular box size the second time. The previous research addressing invisible writing and text box size suggests that we should have found a significant result for text box size—according to Elbow (1973), smaller text boxes should have been correlated with higher quality freewrites; according to Čech and Condon (1998), larger text boxes should have correlated with higher quality freewrites). Writers in a number of different situations tend to be influenced by text box size. It is possible that our participants were also sensitive to text box size when freewriting, but this result was not detected by our omnibus analysis because the participants had improved with exposure to the text box sizes. If this were the case, we would need to take into account whether it was their first or second time freewriting in a particular box size.

To test this hypothesis, we compared each person's first and second freewrite with each text box size. This analysis allowed us to detect whether improvement with exposure to a particular box size had confounded our previous analysis. That is, if each person did poorly in their first freewrite with a box size, but improved in their second freewrite with that box size, the randomization of the box sizes could have played a part in masking the significant role that text box size had played in their behavior.

However, in an ANOVA comparing box size order (first or second), condition (vicarious learning or YouTube video), and box size (1, 10, or 20 line box), there were no significant effects (F<1).

Prompt Variability. Another consideration was whether the prompts created too much text-to-text topic variation to allow for detection of significant effects. In a 6 (prompt topic) x 3 (box size) ANOVA x 2 (video condition) ANOVA, there were no significant effects for freewrite quality as assessed by human raters. Apparently, there was not a great deal of variability from prompt to prompt (F<1).

Prior Writing Skill. Our final question regarded the potential effects of participants' prior writing skill. To examine effects of skill, a median split was conducted based on the 10-minute pre-write essay participants completed at the beginning of the experiment. The scoring rubric used for these essays was a standardized SAT scoring rubric that is designed for 25-minute essays. Presumably due to the limited time to write the essay, the highest score for the pre-write essay was a 3.0 (out of 6). Participants who received scores equal to or lower than 1.5 were categorized as low skill, and participants who received scores higher than 1.5 were categorized as relatively high skill.

In a mixed ANOVA comparing the high skill and low skill participants' freewrite quality based on their text box size (1, 10, or 20 lines) and freewrite order (1st, 2nd, 3rd, 4th, 5th, or 6th), there were main effects for freewrite order and skill level, but no interactions. The main effect for skill level revealed that those who had higher scores on their pre-write essays also wrote higher quality freewrites, F (1, 49) = 15.00, p < .001. Whereas those with higher essay scores had an average freewrite score of 3.58 (sd = 0.64) those with lower essay scores had an average freewrite score of 3.04 (sd = 0.77). There was also a significant decrease in freewrite quality across freewrites from first to last, F (5, 245) = 2.66, p = .023. A post-hoc adjusted Bonferonni pair-wise comparison of main effect of order revealed that the second freewrites participants wrote were scored significantly higher than the fifth freewrites they wrote (second freewrite mean score: 3.510; fifth freewrite mean score: 3.175), p = .037.

In summary, participants' freewrite quality was not impacted by text box size. The lack of an effect of box size was not due to the experimental factors, including training condition, the repeated measures box-size manipulation, the randomization of prompt order, or the randomization of box size appearances. In addition, there were no interactions with writing skill.

Discussion

Previous research indicated a potential causal relationship between text box size and freewrite quality. However, the direction of these possible effects was debatable. Invisible writing research suggested smaller text box sizes would be more beneficial (Blau, 1983), whereas computer-mediated dialogue studies indicated that larger text box sizes would be more conducive to freewriting (Čech and Condon, 1998). Possibly, as Marcus (1991) noted, the degree to which a person can be comfortable with typing blindly (e.g., without looking back at previously typed text) may depend on personal preferences. However, Marcus' study did not include text boxes. Rather, his experiment deprived participants of any viewable interface for their typing practice.

The current study did not reveal any pedagogical advantages for the video or box-size manipulations. Regardless of whether participants viewed 23 minutes of vicarious tutoring regarding freewriting strategies or 2 minutes of a freewriting definition mixed with various writing instructions, our participants performed equally well on the 6 freewriting exercises they were given. Text box size did not affect the participants' abilities to freewrite. The box size null effect was surprising, and was closely examined by numerous analyses. We did not find any effects for text box size in any of our analyses, increasing our confidence that there is indeed no difference for text box size in freewriting practice. We also found that participants likely fatigued as they wrote successive freewrites resulting in lower scored freewrites as a function of time spent in the experiment. There were no differences based on writing skill level, which indicates that freewriters of all skill levels will benefit from the same kind of practice regardless of their initial skill.

The information gathered in this experiment has been used to update the W-Pal Freewriting lesson. The current study did not show any significant differences between the beta version of the Freewriting Lesson and the YouTube control video condition. As a result, the W-Pal Freewriting Lesson has undergone a substantial overhaul, and is expected to be much more pedagogically effective than the version used in this experiment. The Freewriting Lesson now includes interactive quizzes (Checkpoints) that probe students for their knowledge of the information they receive during the lesson. The users are taught strategies, then participate in interactive practices that test their knowledge of these strategies. They are allowed to choose if they would like to review the information that has been presented or move on with the lesson. The W-Pal users also participate in activities that require identification of quality evidence. The current W-Pal Freewriting Lesson contains many interactive opportunities, whereas the original beta version of the lesson had none.

The updated Freewriting Lesson also features a 2-minute freewriting practice session in which the user is asked to write whatever they can in a text box. Later in the same lesson, they are given a freewriting strategy (i.e., Ask and Answer Questions), and given a text box in which they can practice asking and answering questions. They can write as many questions and answers in the text box as they choose to write. Once they have written their questions and answers about the topic, they can click a button to proceed with the lesson. Many other exercises and examples are also included throughout the lesson.

In the new W-Pal freewriting lesson, it was necessary to designate a text box of a predetermined size for these embedded freewrites and exercises (i.e., we could not use resizable text boxes). This requirement is due to our system design, which does not allow for adjustable text boxes within the lesson videos themselves. As such, many of the text boxes within the lesson are one line text boxes. Using a one line text box is more aesthetically pleasing, because it reduces clutter in the interface windows. As we did not find any deleterious effects for participants who wrote in one line text boxes in the current study, we have confidence in basing our decision on graphical aesthetics without sacrificing pedagogical effectiveness.

A number of other studies on freewriting also informed our lesson modifications. For example, Proske, Narciss, and McNamara (2010) found that a scaffolded academic writing instruction increased essay-planning time and comprehensibility of essays that were produced. This result reinforces the importance of using scaffolding in a pedagogical system, which was incorporated in our redesign of the W-Pal Freewriting Lesson. Future studies will investigate how the updated Freewriting Lesson's interactivity relates to the direct instruction lesson. It is possible that a simple task like freewriting simply does not benefit from more advanced methods of lesson-delivery.

The results from the current study had a great impact on our Freewriting Lesson, but are also being used in other aspects of the W-Pal system. Unlike the Freewriting Lesson video, W-Pal's essay-writing practice component's interface now allows users to control their text box size. Thus, as students practice writing essays within W-Pal, their essay's text box is resizable. Additionally, they are given access to a resizable scratch-pad they can use to freewrite and outline. If Marcus' (1991) speculation that a text box's optimal size will vary from person to person, the updated W-Pal essay-writing practice module can account for those interpersonal differences.

The current study outlines a number of features of computer-mediated writing and learning. Our finding that vicarious learning was not advantageous compared to direct instruction indicates that simpler pedagogical tasks may not benefit from vicarious learning. We plan to continue this study by comparing a more advanced form of

lesson delivery (interactive training) to direct instruction. In our Freewriting module, we now know that the freewrite's text box size will not affect the users' freewrite quality. Additional follow-up studies will be needed to determine whether this effect will also carry over to essay text boxes.

Acknowledgements

This research was supported in part by the Institute for Education Sciences (IES R305A080589). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the IES. Thanks to our ULL colleagues: Claude Čech for generously sharing his lab, and Carmen Comeaux for loaning us her students. Also, thanks to Wes Raine for creating our control video, Phil McCarthy for early stages of study design, Jennifer L. Weston for assisting in running participants and grading the preliminary essays, Amelia Mañá Lloria for running participants, and our MSU colleagues: Kristen Dechert and Joshua Thompson, who rated the freewrites.

References

Blau, S. 1983. Invisible writing: Investigating cognitive processes in composition. *College Composition and Communication, 34,* 297-312.

Britton, J., Burgess, T., Martin, N., McLeod, A., & Rosen, H. 1975. *The development of writing abilities*. London: Macmillan, 11-18.

Čech, C.G., & Condon, S.L. 1998. Message size constraints on discourse planning in synchronous computer-mediated communication. *Behavior Research Methods, Instruments, & Computers, 30,* 255-263.

Crossley, S.A., Louwerse, M.M., McCarthy, P.M., and McNamara, D.S. 2007. A linguistic analysis of simplified and authentic texts. *Modern Language Journal, 91*, 2, 15-30.

Elbow, P. 1973. *Writing without teachers*. New York: Oxford University Press.

Larson, A.A., Britt, M.A. & Kurby, C.A. 2009. *The Journal of Experimental Education, 77*, 339-365.

Larson, M., Britt, M.A. & Larson, A.A. 2004. Disfluencies in comprehending argumentative texts. *Reading Psychology, 25*, 205-224.

McCarthy, P.M., & Jarvis, S. 2007. A theoretical and empirical evaluation of vocd. *Language Testing, 24*, 459-488.

McCarthy, P.M., Renner, A.M., Duncan, M.G., Duran, N.D., Lightman, E.J., & McNamara. D.S., (2008). Identifying topic sentencehood. *Behavior Research and Methods*, 21, 364-372.

McNamara, D.S., Crossley, S.A., & McCarthy, P.M. 2010. Linguistic features of writing quality. *Written Communication, 27,* 57-86.

McNamara, D.S., Levinstein, I.B., & Boonthum, C. 2004. iSTART: Interactive strategy trainer for active reading and thinking. *Research Methods, Instruments, & Computers, 36,* 222-233.

McNamara, D.S., Raine, R., Roscoe, R., Crossley, S., Jackson, G.T., Dai, J., Cai, Z., Renner, A., Brandon, R., Weston, J., Dempsey, K., Lam, D., Sullivan, S., Kim, L., Rus, V., Floyd, R., McCarthy, P.M., & Graesser, A.C. (in press). The Writing-Pal: Natural language algorithms to support intelligent tutoring on writing strategies. In P.M. McCarthy and C. Boonthum, (Eds.), *Applied natural language processing and content analysis: Identification, investigation, and resolution*. Hershey, P.A.: IGI Global.

Marcus, S. 1991. Invisible writing with a computer: New sources and resources. In W. Wresch (Ed.), *The English classroom in the computer age: Thirty lesson plans* (pp. 9-13). Urbana, IL: National Council of Teachers in English.

Pianko, S. 1980. Understanding composing. *College Composition and Communication, 31*, 364.

Proske, A., Narciss, S., & McNamara, D.S. 2010. Computer-based scaffolding to facilitate students' development of expertise in academic writing. *Journal of Research in Reading, 33*, 1-17.

Rus, V., Lintean, M., Graesser, A.C., McNamara, D.S. 2009. Assessing student paraphrases using lexical semantics and word weighting. In V. Dimitrova, R. Mizoguchi, B. du Boulay, and A.C. Graesser, (Eds.), *Artificial intelligence in education; Building learning systems that care; From knowledge representation to affective modeling* (pp. 165-172). Amsterdam, The Netherlands: IOS Press.

Sacks, H., Schegloff, E.A., & Jefferson, G. 1974. A simplest systematics for the organization of turn-taking for conversation. *Language, 50*, 696-735.

Weston, J. L., Crossley, S.A., & McNamara, D.S. 2010a. Towards a computational assessment of freewriting quality. In H.W. Guesgen and C. Murray, (Eds.), *Proceedings of the 23rd International Florida Artificial Intelligence Research Society (FLAIRS) Conference* (pp. 283-288). Menlo Park, CA: The AAAI Press.

Weston, J. L., Crossley, S.A., & McNamara, D.S. 2010b. Computationally assessing expert judgments of freewriting quality. In P.M. McCarthy and C. Boonthum (Eds.), *Applied natural language processing and content analysis: Identification, investigation, and resolution*. Hershey, PA: IGI Global.