
Therese Louie, San Jose State University
Jackie Snell, San Jose State University

Studies in real world settings investigated information processing overload for time-constrained and personally consequential decisions. It was hypothesized that written materials not in the readers’ first language would prompt overload, with longer processing corresponding to poorer choice performance. As anticipated, when American students whose first language was not English took an open-book multiple-choice test, longer completion times correlated with lower scores. In contrast, English-only speakers did not show significant deterioration. Convergent evidence that reliance on written materials caused overload for bilinguals comes from opposite closed-book exam results, wherein longer times correlated with positive performance. Discussion focuses on consumer applications and future research.

[to cite]:

[url]:
http://www.acrwebsite.org/volumes/14919/volumes/ap08/AP-08

[copyright notice]:
This work is copyrighted by The Association for Consumer Research. For permission to copy or use this work in whole or in part, please contact the Copyright Clearance Center at http://www.copyright.com/.
More News is Bad News? Bilingualism and Information Processing Overload in Time-Constrained and Consequential Decision-Making Settings

Therese A. Louie, San José State University
Jackie Snell, San José State University

Studies in real world settings investigated information processing overload for time-constrained and personally consequential decisions. It was hypothesized that written materials not in the readers’ first language would prompt overload, with longer processing corresponding to poorer choice performance. As anticipated, when American students whose first language was not English took an open-book multiple-choice test, longer completion times correlated with lower scores. In contrast, English-only speakers did not show significant deterioration. Convergent evidence that reliance on written materials caused overload for bilinguals comes from opposite closed-book exam results, wherein longer times correlated with positive performance. Discussion focuses on consumer applications and future research.

INTRODUCTION

Like many consumers, Don is preparing for a busy day. After working eight hours, he will escort his non-English speaking parents to the airport to catch an overseas flight home from visiting him in the States. Then, he will race to the computer store to buy new accessories needed for a professional meeting the next day. With plans to arrive about an hour before the shop closes, Don will be armed with articles from Consumer Reports, as well as with information available electronically on the Web, and even coupons delivered via cell phone. He feels grateful that technology will allow him to easily carry materials that will help him to make optimal purchases. Intuitively, having convenient information upon which to refer has no down side.

Yet, there may be reasons why Don should reconsider relying upon his decision-making aids. Early research on information processing overload demonstrated that when consumers’ capacities to process information are exceeded, decision making is suboptimal (Jacoby 1977). Later studies noted that there may be conditions when bilingualism, specifically second-language use, heightens processing difficulties (Dornic 1980). For example, Dolinsky and Feinberg (2006) conducted a study with native English speakers who were proficient in Spanish, and with Spanish-speakers from the Hispanic community who were proficient in English. Their participants made hypothetical housing choices after reviewing either low or high levels of data. In the low information condition, participants made ideal choices when the information was presented in either Spanish or English. However, with high levels of information, participants deviated from the best choice when information was presented in their non-native language. The results suggest that bilingual consumers may reach information overload more quickly when viewing materials not in their first language.

This research expands upon Dolinsky and Feinberg’s (2006) work by examining additional factors present in many true-life choice environments. First, in this investigation decision inaccuracies have negative consequences. Second, similar to past work (Hauser, Urban and Weinberg 1993), the participants must make decisions within a limited time period. Following Dolinsky and Feinberg’s (2006) reasoning, these two added pressures are hypothesized to increase processing load for bilingual participants who have access to materials in their second language. It is proposed that, for bilingual students, synthesizing information will be so inefficient that additional resources will be associated with not just ineffective, but with detrimental, decision making. That is that synthesizing available information will deleteriously influence effective choices.

Although time constraints and decision consequences are prevalent in real world information processing settings, it is difficult to find consumer environments that allow for studies of bilingualism and information processing overload. Fortunately, open-book examinations provide naturally occurring situations with all those variables. Although the lack of experimental controls can be troublesome, researchers have successfully used classroom settings to study behavior in performance settings (Louie, Curren and Harich 2000). Hence, this study revolves around a course taught on a campus where 70% of the students are bilingual.

STUDY 1 METHOD

Participants

Study 1 examines the performance of twenty-nine students (41% male) in a marketing research class who took an open-book exam. All were of junior or senior class standing at a large public university in the United States.

Bilingualism/First language

In a class exercise, students were asked to note whether they spoke languages other than English, and where they developed their skills. Although it is possible to learn a second language through coursework or travel, in this class all of the bilingual students learned a language other than English at home. Nineteen (65%) of the students originally learned a language other than English from their parents. Four students were fluent in Spanish, and four others in Vietnamese. Five spoke Chinese (three students knew Mandarin, and two knew Cantonese). One student each knew Arabic, Cambodian, Gujarati, Polish, Portuguese and Taiwanese.

Procedure

Students took a multiple-choice exam in which they were allowed access to their textbooks and lecture notes. In addition, they used a course handout that contained formulas to calculate statistics, degrees of freedom, or cell sizes for 13 of the 33 questions. The test, which was written in English, constituted 25% of the overall course grade. The students had 80 minutes to finish.

Dependent Variables

Finishing times were recorded when students submitted their exams. Combined with the test start time, this revealed the number of minutes students used to complete the test. Mean scores are reported as the percent correct on multiple-choice questions.

STUDY 1 RESULTS

It was proposed that students’ use of their non-native language would heighten information processing load such that the availability of external information would be detrimental. If so, then for the bilingual students the time used during the open-book test should be inversely related to their exam performance. As anticipated, the correlation between exam completion time and test score is negative and statistically significant for the students whose first language is not English ($r = - .474$, $p < .05$). As predicted, information processing overload was not problematic...
DISCUSSION OF STUDY 1

The results of Study 1 suggest that the more time the bilingual students in the class spent synthesizing information, the worse they performed on the test. This supports previous findings (Dolinsky and Feinberg 2006) that the processing of materials in a non-native language prompts overload and suboptimal choices.

The natural environment in this study makes it impossible to control for extraneous factors that might have influenced the results. For example, an alternative explanation is that the students whose first language was not English had more difficulty comprehending the materials, which prompted them to spend more time and not to do as well on the test. However, the time spent taking the exam was the same for the bilingual and the English-only groups (bilingual $M = 73$, monolingual $M = 72$, $t(27) = 0.28$, NS). If bilingual students comprehend less, we would expect to see lower scores for bilingual than English-only students. Instead, there is no difference in the mean exam scores across the two groups (bilingual $M = 79$ and monolingual $M = 75$, $t(27) = 0.79$, NS). For this open-book test, the average time spent and average comprehension is the same across groups.

It is also possible that insufficient studying efforts caused the relationship between longer test completion times and poorer scores. Yet, if that were the case, the correlation should be strong across both student groups. It should be noted that the small sample of English-only students makes it difficult to establish a significant effect, or to make other meaningful comparisons. (Of course, obtaining a more compelling level of significance with this small sample is possible if the effect is strong enough, as will be seen in Study 2.)

Another fact potentially clouding the data interpretation is that no measures were taken to determine how much students depended upon external materials during the test. For example, although students knew that there would be handouts with formulas for calculating statistics, it is possible that some of them memorized the materials and did not make use of notes or books. Even if all students used the external information, the extent of their reliance is not known. Some insight into this issue can be gained by studying the relationship between completion time and performance for closed-book exams, which prevent the use of external information. That is the focus of Study 2. If the written materials had no influence on the exam 1 results, then the data should be similar for a subsequent closed-book test. If the pattern of results differs, then there is additional support that taking time to read and synthesize the Study 1 materials was detrimental to the bilingual students.

STUDY 2 METHOD

Participants

The same 29 students from Study 1 took a second midterm, for which they were not allowed to use books or notes.

Procedure

As in Study 1, the students had 80 minutes to finish a multiple-choice exam that was worth 25% of their total course grade. The second exam covered different course topics, and did not require any mathematics. It appears to have been a bit more difficult than exam 1 as measured in average percentage scores ($M = 72$, $SD = 12.8$, and $M = 78$, $SD = 11.6$, respectively).

STUDY 2 RESULTS

As for exam 1, the bilingual and English-only groups did not differ significantly in their exam 2 completion times ($M = 42$ minutes, and $M = 43$ minutes, respectively, $t(27) = .26$, NS).

While the bilingual students’ exam 1 times and scores are significantly negatively correlated, their exam 2 times and scores are positively and significantly correlated ($r = .494$, $p < .04$). For students using their second language, spending more time on exam 1 was associated with lower scores, but spending more time on exam 2 was related to higher scores. For monolingual students, the correlation between completion times and exam scores is also positive, and is marginally significant ($r = .578$, $p < .09$).

GENERAL DISCUSSION

A closed-book test seems to “level the playing field” more or less between the bilingual and English-only students. When students were relying primarily on internal already-synthesized information, bilingual students and monolingual students performed equivalently. It is only in the high information setting that second-language processing becomes a burden. The findings of these two studies are consistent with the notion that synthesizing information in a non-native tongue in time-constrained settings may heighten processing overload and, when the information load is also high, decrease accuracy.

One alternative explanation to the data is that the bilingual students had a harder time understanding the course materials, both while studying for the test, and during the exams. If that were the case, then their performance should be inferior to the monolingual students. However, the data do not support this interpretation. As noted in the discussion of Study 1, if bilingual students comprehended less, we would expect to see lower scores for bilingual than English-only students. If anything, although the difference does not reach significance, the bilingual students performed better ($M = 74$ bilingual, $M = 66$ English-only, $t(27) = 1.69$, NS). As shown by their equal (or better) scores on both exams, bilingual students were apparently equally capable of comprehending information when studying for the exam, or during the test.

It is also possible that the course content covered in each exam caused the performance differences. For example, perhaps for “math phobic” students, increased time spent on exam 1 reflected struggling, while increased time on exam 2 reflected thorough and successful memory retrieval. Although it is impossible to rule out exam topic effects, there is no reason to suppose that bilingual students are more math-phobic than their English-only counterparts. In fact, the opposite is often hypothesized. If math phobia had a strong impact it should have influenced the performance of both bilingual and monolingual students. Instead, the long exam time/poor performance relationship was significant only for the bilingual students. Note that even if the Study 1 results are due to the quantitative nature of the test, the findings are applicable to the many settings in which numerical estimations are necessary. These include situations when consumers make price/quality evaluations, choose between loan options, compare interest rates, or make financial investments.

These findings suggest that bilingual consumers face information overload and decision degradation sooner in their non-native than their native language, especially when facing time constraints. Hence, “bilingual Don” described at the start of this paper should not feel pressure to thoroughly process all accessible information during his short visit to the computer store. Even when the information is credible and complete, there is the chance
that it will hinder optimal decision-making. According to Study 2, synthesizing the material into memory before shopping would take time, but in that case Don’s extra efforts should improve instead of worsen his choice accuracy.

Marketers could help Don by providing him with the option of materials written in his first language. Enhancements in consumer decision-making and post-purchase satisfaction might well be worth the translation costs. Geographical areas that contain a high proportion of recent immigrants, as well as those with visitors from around the world, have already embraced this practice in museum brochures, street signs, and advertisements. In addition to potentially helping bilingual consumers to process information, translations may foster a more welcoming environment.

One might expect that second language use would impose information overload in situations other than reading. Consider the situation in which consumers apply for their drivers’ licenses. The playing field may be leveled when a bilingual person takes the written driving test, which is closed-book. Yet, bilinguals might suffer overload when asked to follow instructions from an English-speaking tester, and while simultaneously reading road and traffic signs in their nonnative language. Similarly, second language speakers may face high information under time constraints when taking notes in lecture, and perhaps when talking with service providers and salespeople.

Previous studies of information processing overload have usually manipulated the number of brands or amount of information per brand. Bilingualism seems to deal with a different dimension, the amount of processing, rather than the amount of information. It would be interesting to try manipulating the processing required, say by degrading the print (similar perhaps to the distortions used by Web sites to see if a person or a machine is trying to enter a credit card number or send email). Another way to test for “amount of processing” effects is to present information to note-takers in a strong accent to see whether these conditions show patterns similar to the second language speakers in the studies presented here.

Future research should test the generalizability of these findings. The same school exam environment could be used to determine whether or not the open-book pattern of results in Study 1 is obtained for non-quantitative exams. Using a larger English-only sample could determine whether monolingual speakers actually have a negative correlation (like non-native speakers) or no correlation between scores and time spent in the open-book situation. Since most students finished well before the 80-minute time limit in study two, it may not qualify as time-constrained even though the students approached the task knowing that there was a deadline. It would be worthwhile to further explore the effect of time constraints on second language speakers given a closed-book decision-making setting. More generally, researchers using laboratory settings can examine overload through experimental time constraints and decision consequences (e.g., through heightened rewards for successful performance on choice tasks) that allow for more control over extraneous variables.

The bilingual/English only dichotomy is a very rough approximation of the cognitive burden placed on bilingual students. The results of this paper might be strengthened if one could show, for example, that students with very high TOEFL scores more closely approximate the results found with English-only speakers. (We thank an unidentified reviewer for this suggestion). Finally, the wide variety of languages spoken by the students in this study brings to mind the question of how overload is influenced by language similarity. Although intuitively it would seem that languages with common roots would be easier to process, resemblances may also prompt confusion, or overconfidence. In sum, there are many ways to extend upon this work.

The amount of information available to consumers in decision-making settings is growing, and population diversification is increasing. It is hoped that this research encourages more investigations of bilingual overload in time-pressured and decision-consequential settings.

REFERENCES


