Anxiety, Alcohol, Aphasia, and *Ums*

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Although several studies have documented a link between anxiety and filled pauses (*ums*, *er*, and *um*), numerous failures make it impossible to believe that the two are linked in any simple way. This article suggests anxiety may increase *ums* not when it makes the speech task harder but when it causes the speaker to pay attention to the speech. Two experiments examined this idea. One manipulated evaluation apprehension, and the other manipulated self-consciousness. Both showed dramatic increases in *ums*. Two more studies examined the real-world implications of this approach. Alcohol, which makes speaking harder but also makes speakers care less about what they say, was found to reduce *ums*. The second study found that Broca’s aphasics, who produce simple speech but must deliberate over every word, produce many *ums*. Wernicke’s aphasics may not talk well, but do not mind, and manage with few *ums*.

Anxious speakers, almost everybody assumes, will litter their speech with *ums* and *er*s. It has been shown that undergraduates believe nervous people produce more of these filled pauses (Christenfeld, 1995), and rhetoricians warn their pupils against using *ums* to avoid betraying anxiety (McBurney & Wragge, 1953; Samovar & Mills, 1983). Unfortunately, the empirical evidence does not support this simple intuition. Nor does it reject it. Of 16 reports examining the effect of anxiety on filled pauses, 5 found an increase (Boomer, 1963; Jurich & Polson, 1985; Koome & Dijkstra, 1975; Laljlee & Cook, 1973; Panek & Martin, 1959), 10 found no difference (Cook, 1969; Feldstein, 1962; Kasl & Mahl, 1965; Mahl, 1956, 1987; Meisels, 1967; Paivio, 1965; Pope, Blass, Siegman, & Raher, 1970; Siegman & Pope, 1965a, 1965b), and 1 found a decrease in *ums* with greater anxiety (Blass & Siegman, 1975).

There are too many findings on each side of the issue to dismiss the inconsistency as a statistical artifact. It is also unlikely that the null findings were a product of ineffective anxiety manipulations, because most of these studies found increases in other disfluencies, such as sentence restarts and silent pauses. A more likely explanation is that the variability in the effect of anxiety reflected some variability in the kind of anxiety created in the studies. Rochester (1973), reviewing some of these studies, suggested that the state–trait distinction might explain the mixed results. Of the six studies examining trait anxiety, one found a correlation between anxiety and *um* rates and five found no relationship. Thus, there is no compelling evidence showing that trait anxiety is linked with filled pause production. The story, however, is not so clear for state anxiety experiments. Of these, four found the predicted effect, seven found nothing, and one found the opposite relationship, with more anxious people saying *um* less often.1

Some further division of the experiments is necessary to understand the mixed effects of manipulated anxiety on filled pause production. It is, however, very difficult to develop a better way of categorizing these experiments because almost all of them manipulated anxiety by altering the topic of the speech. The anxious speech was produced when the participant talked about something like sex, and the calm speech was produced when he or she talked about something like school. Because topic has repeatedly been shown to have a profound effect on filled pauses (Goldman-Eisler, 1968; Schachter, Christenfeld, Ravina, & Bilous, 1991), disentangling anxiety effects from the effect of familiarity or expertise is probably impossible for such studies.

Explanations for the elusive filled pause–anxiety connection tend to be based on the long-dominant notion that *ums* are a symptom of the breakdown of the speech production apparatus (cf. Goldman-Eisler, 1968). When the next word, phrase, or idea is especially hard to select and more time is needed, a pause, either filled or silent, will occur. Thus, manipulations that change the demands of the speaking task should change the rate of pauses. Mahl (1956), whose work on disfluencies in psychiatric interviews started the flurry of activity on *ums* and anxiety, suggested that anxiety interferes with all complicated ongoing behavior. That is, talking is simply harder when one is anxious than when one is calm, and harder talking involves more *ums*. As Mahl (e.g., 1987) suggested, anxiety does increase just about every imaginable disfluency, but *ums* stubbornly refuse to go along with the others. It may be that *ums* are not a sign of a breakdown in the system or that anxiety does something other than distract the speaker. This article explores these two possibilities and presents a set of studies supporting a new approach to the filled pause–anxiety connection.

One alternative etiology of filled pauses has been proposed by Levelt (1989), who argued that filled pauses are produced when the speaker detects an error, or an impending error, and stops to correct it. This removes speech production from its normally

1 Two articles examined both state and trait anxiety, accounting for the 16 articles adding up to 18 studies.
automatic, unconscious mode and brings the process into the realm of conscious attention. Levelt suggested that *um* is a symptom of this repair process. However, it may be that *um* is a more general phenomenon than this and indicate that the speaker is interfering in some way with the fluid production of language. That is, detecting an error is one thing that can make a speaker think about what she or he is saying, but there are other things that can have the same effect. Thus, anything that increases deliberate control over speech production should increase the frequency of *um*. Although Levelt has suggested that the detection of an impending error will cause an *um*, what is being proposed here is that anything that makes a speaker stop the automatic production of speech can lead to an *um*, whether or not there is an error involved.

This account is similar to the account of “choking” under pressure proposed by Baumeister (1984). He argued that conscious attention to skilled performance can disrupt that performance by removing it from a fluid automatic mode and making the actor think consciously about his or her actions. He showed that asking people to think about what their hands are doing makes them perform worse on a manual game, as does letting them know that they are being evaluated. We suggest that, in the domain of language, deliberate attention to what is being said will manifest itself in the filled pause rate.

Not all types of anxiety will increase a speaker’s self-consciousness about speech, and so not all types of anxiety should increase *um*. For example, one might imagine that a speaker in the waiting room before major surgery might care very little about what he or she is saying to fellow patients. On the other hand, if she or he is asked about a résumé exaggeration during a job interview, then her or his attention to the verbal output may be very high. This latter form is what Schlenker and Leary (1982) referred to as social anxiety. That is, thinking that others are evaluating what you say will focus your attention also on what you say. If the extension of Levelt’s interference with speech idea is correct, then this latter form of anxiety should increase *um*, whereas the former would not.

It is hard to determine the relationship between the various anxiety manipulations used in previous work and the kind of self-consciousness proposed here as the cause of *um*. There is no particular reason to think that trait anxiety should be associated with attention to the content of verbal output and, thus, no reason to think that scores on trait anxiety scales should systematically be linked to filled pause rates. State anxiety manipulations may have made the task more challenging for participants without making them worry more about exactly what they were saying. The increase in other disfluencies suggests that discussing sensitive material was indeed harder for them, but this is not the same as making them more self-conscious about their verbal output.

This line of reasoning is compatible with much of the evidence that Mahl has accumulated in his extensive studies of speech disfluencies. Kasl and Mahl (1965) found, for example, that filled pauses are more frequent when one is talking over an intercom than when one is talking face to face with someone. In his 1987 book, Mahl suggested that this is because the individual deprived of nonverbal feedback, may need to “deliberate more carefully” (p. 213). Mahl suggested that it is the difficulty of the task that creates filled pauses, whereas we are arguing that it is the deliberation itself that creates the *um* by interfering with the more automatic production of speech. In his 1958 work (cited in Mahl, 1987), Mahl examined the Minnesota Multiphasic Personality Inventory profiles of his participants producing the highest number of filled pauses and found that they tended to endorse such statements as “I am unusually self-conscious.” These findings are clearly not sufficient evidence for the proposed account, but they do provide an intriguing hint that people who think about what they say may say *um*.

More effective than speculating about the implications of previous manipulations for the role of self-consciousness is testing these ideas directly. Accordingly, the first experiment manipulated anxiety in such a way that anxious participants should be especially concerned about the content of what they are saying. In other words, they should be self-conscious about their speech. The manipulation did not alter the topic of the communication, but half of the participants believed that their speech would be analyzed by judges and used as a measure of their intelligence, whereas the other half believed that their speech was of no particular importance. The *um* rates of these two groups could then be compared to assess the effects of this particular form of anxiety.

Experiment 1

Method

Thirty East Coast undergraduates participated in the experiment as part of a requirement for an introductory psychology class. Sixteen of the students were women and 14 were men; the median age was 20 years. A simple one-variable design was used, with students randomly assigned to either the high anxiety condition or the low anxiety condition. The students arrived and were seated in a small room facing a desk on which was a small tape recorder. They were told that their task was to make up a story based on a small cast of characters that the experimenter would provide. They were informed that the story should be a couple of minutes long but that the length did not really matter, and they were told that their story would be recorded. They were informed that they should begin their story almost immediately after being given the cast so that the speech would be fully spontaneous.

The students in the low anxiety condition were informed that the experimenter was trying to get some samples of speech to use in training people on grammatical coding. It was stressed that it did not really matter what their story was like and that this task was an almost irrelevant part of the project, with the real tasks to follow. The experimenter explained that because he was training the people in the coding of spontaneous speech, he thought it would be a good idea if the trainees were allowed to practice on samples of such speech. The experimenter expressed the hope that the student would be good enough to provide just such a sample. Although the students probably experienced some anxiety simply from coming into the laboratory and having the speech recorded, this condition was designed to reduce social anxiety as much as possible to make the encounter something like chatting with a friend.

Students in the high anxiety condition, however, were told that the task was a quite reliable measure of general creativity. It had been used, the experimenter elaborated, to predict which aspiring writers would have their manuscripts accepted for publication by The New Yorker. Furthermore, they were informed, the procedure had been used on a group of artists, mostly sculptors, whose work was appearing in SoHo galleries. Their score on the story creativity task was strongly related to the critical success of their show. For good measure, the students were also told that the test was being extended to the identification of promising
composers and that it was even expected that a good scientist, who also needs to be creative, should do well on the test.

The students were informed that their stories would be shown to three judges who would score them on a variety of scales relevant to creativity (e.g., integration of creative elements) and that stories would be assigned an overall creativity score. This aspect was left deliberately vague so that it would not influence the nature of the stories that the students created. A few students had questions about the procedure, but none appeared to doubt the basic explanation.

All of the students agreed to create a story and signed a consent form. Because we wanted the stories in the two conditions to be basically similar, the students were given the characters about which their story should revolve (an old lady, a young boy, and a pair of sneakers). Once the full explanation had been given and the characters provided, the students were told they should begin. If they asked about thinking it through beforehand or showed any tendency to do so, they were told that it was important that they begin right away so that the story would be fully spontaneous.

While the students told their story, the experimenter, sitting to one side and pretending to be absorbed in the contemplation of a pencil, unobtrusively counted the occurrences of filled pauses. There was no time limit on the story, and the students could end it whenever they chose.

Results

After the experiment, the stories were timed, and the ums were counted again from the tape by a second coder unaware of experimental condition. The reliability of these two counts was more than satisfactory ($r = .99$). The average story lasted almost 2.5 min. There were no significant gender differences in the stories, and all analyses were collapsed across this variable. The basic hypothesis could be examined simply by comparing the mean um rates for the high and low anxiety groups. These rates were significantly different, $t(28) = 2.28$, $p < .05$, with an average of 7.03 ums per minute in the high anxiety condition and an average of 4.07 in the low anxiety condition. This and all of the following comparisons for experiment 1 are presented in Table 1. As predicted, the students high in social anxiety produced more ums.

Although it is clear that the manipulation had the expected effect on filled pauses, it is still possible that the increase in ums was not a product of self-consciousness about the speech, rather, it could have been due to the manipulation changing the nature of the task. That is, rather than simply making the students more likely to fill their pauses, it might have caused them to choose harder words, or talk faster, in an effort to impress the imagined judges. Although not all alternate explanations can be ruled out, a few of them can be examined.

If the increase in ums was due to the students making their task harder when they thought they were being evaluated, then one might expect that those in the high anxiety condition would have told a longer story or used longer words. The stories of the high anxiety students averaged 2.8 min, and those of low anxiety students lasted a mean of 2.1 min. This difference was not significant, $t(28) = 1.47$, $n.s.$ The average number of syllables per word in the two conditions was calculated from transcripts of the stories. In the high anxiety condition, the average word used had 1.29 syllables; the average length in the low anxiety condition was 1.27. The difference did not even approach significance, $t(28) = 0.68$, $n.s.$ Apparently the students did not try to impress the judges by creating longer stories or using longer words.

Another possibility is that the students in the high anxiety condition used a greater variety of words. If their stories were more varied and less repetitious, or if they tried to demonstrate their masterful vocabularies, then they should have used a larger number of different words. Picking their words from a larger vocabulary would presumably have increased their cognitive load and led to more ums. This can be assessed through what is known as the type–token ratio. This procedure measures how many different words a speaker uses out of some standard number of words uttered. People with a small vocabulary will tend to repeat the same words more often and, thus, use fewer different words per group of words spoken.

It is essential that the compared samples be of the same length for type–token analyses, because the ratio decreases as speech length increases. The length of the shortest story, 150 words, was used as the standard. Students in the high anxiety condition used an average of 76.9 different words out of the first 150 words uttered, whereas the low anxiety students used 76.4. Again, these two means did not differ significantly, $t(28) = 0.20$, $n.s.$ A greater working vocabulary cannot explain the different use of filled pauses in the two conditions.

A third possibility is that the students in the high anxiety condition spoke more rapidly than those in the low condition. If this were the case, either because they wanted to squeeze more creativity per minute into their stories or because the anxiety simply made them talk more rapidly, then the increase in um rate may have simply reflected the greater effort required in choosing rapidly among options. To evaluate this, we calculated the average rate of words per minute over the duration of the

### Table 1

<table>
<thead>
<tr>
<th>Anxiety</th>
<th>Ums per minute</th>
<th>No. of minutes</th>
<th>Syllables per word</th>
<th>Type-token ratio*</th>
<th>Words per minute</th>
<th>% silence</th>
<th>No. of silences</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>7.03 4.26</td>
<td>2.81 1.21</td>
<td>1.29 0.07</td>
<td>76.93 7.24</td>
<td>156.28 33.55</td>
<td>17.74</td>
<td>19.67 4.95</td>
</tr>
<tr>
<td>Low</td>
<td>4.07 2.66</td>
<td>2.10 1.42</td>
<td>1.27 0.07</td>
<td>76.36 8.17</td>
<td>156.79 32.57</td>
<td>19.35</td>
<td>22.00 2.98</td>
</tr>
</tbody>
</table>

Note. Only ums per minute differed significantly between the two groups.

* See text for details.
story. Again, the two rates were remarkably similar, with means of 156.3 words per minute in the high anxiety group and 156.8 in the low anxiety group. The rates did not differ significantly, $t(28) = 0.94, n.s.$ The um difference cannot be accounted for by faster talking.

If the effect of the manipulation was to make the speech task harder rather than making the speakers more self-conscious, then one would expect disfluencies reflecting difficulty to increase. We examined three such disfluencies: silent pauses, sentence restarts, and repetitions. All three represent the kinds of disfluencies that have been shown to reliably increase in anxiety studies failing to find any effect on filled pauses.

Silent pauses were defined as any period of silence lasting at least 300 ms. The percentage of time spent in silence was not different for the two conditions, $t(28) = 0.53, n.s.$ nor was the number of silent pauses, $t(28) = 1.58, n.s.$ Sentence restarts were defined as any time the speaker started a new sentence without having finished the previous thought. From the transcripts, we calculated the frequency of these disfluencies. There was no difference in the frequency with which disfluencies occurred, $t(28) = 0.72, n.s.$ Repetitions included any time the speaker repeated exactly the same word or phrase. Again, the high and low anxiety groups did not differ, $t(28) = 0.68, n.s.$

**Discussion**

Of course, countless explanations other than greater concern with evaluation could account for the effect of the manipulation on filled pause rates. Students in the high anxiety condition might have spent more time wondering how well other students told their stories, devoted more effort to recalling their previous successes and failures, or distracted themselves searching the room for hidden judges. However, if the ums resulted from this sort of distraction making the speech task tougher, then one would expect that other disfluencies would also become more frequent, and they did not. Previous work on anxiety has shown that when the topic is more challenging, ums are unaffected, whereas other disfluencies increase. This dissociation between the two types of disfluencies is a strong argument for a different causal mechanism. Many forms of anxiety, as previously examined, may make the speech task harder (possibly by distracting the speaker or making the topic less familiar) and so increase disfluencies such as sentence restarts. However, the particular form of anxiety manipulated in this experiment must work in a different way. We have suggested that it increases the speaker's attention to what he or she is saying and, thus, interferes with the normally automatic aspects of speaking.

We are suggesting that it was not social anxiety per se that produced the filled pauses. Rather, self-consciousness about the speech, which was a result of the anxiety, produced the increase in ums. If this was the case, then a manipulation of self-consciousness without anxiety should produce the effect, whereas anxiety without self-consciousness should not. The second experiment tested this prediction. In addition, it included a manipulation of task difficulty to rule out the possibility that social anxiety increased filled pauses because it made the speech task more difficult.

Both the speech-irrelevant anxiety manipulation and the task-difficulty manipulation can provide some discriminant validity evidence for the role of self-consciousness in filled pause production. If the evaluation apprehension manipulation of Experiment 1 had its effect because it made the task harder, then the task difficulty manipulation of Experiment 2 should have the same effect. If the effect was due to general anxiety rather than specific concern about what was being said, then the task-irrelevant anxiety manipulation of Experiment 2 should increase filled pauses as well. Questionnaires were also included in Experiment 2 to determine whether the three manipulations had their intended effects on self-consciousness, task-irrelevant anxiety, and task difficulty. Experiment 2 allowed an examination of how specific the um increase is to self-consciousness, as well as a replication of how specific the effect of self-consciousness is to increasing ums.

**Experiment 2**

**Method**

Eighty Southern California undergraduates participated in this experiment to satisfy a requirement for an introductory psychology class. Forty-four of the students were women and 36 were men; the median age was 20 years.

Students were randomly assigned to one of four conditions: a control condition, a self-conscious condition, an irrelevant anxiety condition, or a difficult topic condition. They were introduced to the experimental task, gave their speech, and filled out a questionnaire.

The control students were seated at a desk in front of a small microphone. They were told that the point of the experiment was to examine how context affected vowel sounds and that they would be asked to say a few word pairs and then talk for a few minutes. They were then given a list of word pairs to read (e.g., mad dog). After they had finished reading the list, they were told that the experimenter also needed them just to talk normally for a bit and that they should spend a few minutes describing what they would do on their ideal day. They were told to describe what they would do from the time they woke to when they went to sleep, assuming that money was no object. This topic was chosen instead of the make-up-a-story format of the previous experiment because it seemed less intrinsically anxiety producing, and the situation was designed to make the students as un-self-conscious as possible. In an experiment, knowing they were being recorded, they probably could not be as relaxed as chatting on the phone with their best friend, but they should have focused little attention on exactly what they were saying.

When students in the self-conscious condition arrived, they were told that the point of the experiment was to examine the sounds and structure of various parts of speech. They were seated at a desk with a large microphone and a pair of headphones. They were asked then to put the headphones on and discuss for a few minutes what they would do if they could do anything they wanted for a day. As they talked, they heard their own amplified voice over the headphones. There was no delay in this side tone, and the volume was set slightly louder than the amplified side tone of a telephone receiver. The situation was designed to make the speakers self-conscious and to keep their attention keenly focused on speech production without making them generally anxious.

Students in the irrelevant anxiety condition were told that the experiment was designed to explore coordinated movements and that they would be asked to talk about a given topic and to dance for a few minutes while being videotaped. They were told that they could dance any way they wanted and that the experimenter and one or two other coders would watch the tape and code interlimb coordination. They were told that more details would be provided after the speech task. The speech task was exactly the same as that used for the control condition. The students were told that the speech task was being used for an analysis of the effect
of the context on vowel sounds, and they also read a few word pairs like mad dog. There was an inconspicuous microphone, there were no headphones, and the students were asked to talk about what they would do during their ideal day. Many students had further questions about the dancing part of the experiment, but they were told that everything would be explained later. This condition was designed to make the students anxious but not to increase attention to or concern about their speech.

The task-difficulty manipulation involved asking the students to describe what they ought to do on their ideal day. That is, if they had a day when they could do anything, what did they think would be the best thing they could do for society? In all other respects, this condition was identical to the control condition. This task was chosen because it should have required more thought than the other tasks but should not have had a major effect on anxiety or self-consciousness.

After giving the speech, each student filled out a brief questionnaire to assess the effectiveness of the manipulations. One question asked how self-conscious students had been while they talked. The next asked how anxious they were about the experiment, and the last asked how difficult they had found the speech task. The students rated themselves on 5-point Likert-type scales ranging from not at all (1) to very (5). These three questions were designed to assess the effectiveness and specificity of the three manipulations.

**Results**

Because the experiment was designed to allow a comparison of each of three manipulations with a control group, the analyses were carried out in the same way. For each dependent variable, a one-way, four-group analysis of variance was calculated, and then three a priori contrasts were applied. The self-conscious group, the anxious group, and the difficult task group were compared with the control group. This study sought, in addition to the predicted effect of self-consciousness on filled pauses, evidence of discriminant validity, with null effects of anxiety and difficulty on filled pauses and null effects of self-consciousness on other dependent variables. Therefore, adjusting the alpha level to a more conservative level (as with the Bonferroni or Dunnnett corrections) was inappropriate. This would have made Type I errors less likely but Type II errors more likely. This reduction in power would have biased many of the tests in favor of the prediction.²

The effectiveness of the self-consciousness manipulation could be assessed by comparing the answers students gave to the first question. The means for this question, as well as the other two, are provided in Table 2. Comparisons revealed that the self-conscious group was higher in self-consciousness than the control group, F(1, 76) = 6.87, p < .05, but that the other two groups were not, F(1, 76) = 0.19, ns, for the anxious group, and F(1, 76) = 2.34, ns, for the difficult group.

The anxiety manipulation was also effective. The anxiety group was significantly higher in anxiety than the control group, F(1, 76) = 13.93, p < .0005, whereas the other two groups were not, F(1, 76) = 2.29, ns, for the self-conscious group, and F(1, 76) = 0.01, ns, for the difficult group.

The self-consciousness and anxiety manipulations appear to have created the desired state only in the desired groups, but the results from the question about how difficult students found the speech task are not quite as clear cut. The difficult group was marginally higher than the control group on this measure, F(1, 76) = 3.82, p = .06. The self-conscious group did not differ,

$$F(1, 76) = 0.05, \text{ns},$$ but the anxious group was slightly, although nonsignificantly, lower than the control group, $$F(1, 76) = 2.31, p = .13.$$ Those in the anxious group may have reported that the speech was not very difficult because they were comparing it with the upcoming dancing task. Overall, the experiment should have been able to test fairly precisely the specific effects of self-consciousness, anxiety, and task difficulty on filled pause production and other speech disfluencies.

The students took about 2 min to describe the fantasy day and generally mentioned activities such as European travel with friends or romantic candle-lit dinners. The self-conscious students' descriptions also included significantly more filled pauses than their control counterparts produced. The self-conscious speakers had a rate of 5.61 words per minute, whereas the control students used only 3.46 per minute, $$F(1, 76) = 6.60, p < .05.$$ The means for filled pause rate, along with other measures of the nature of the speech for the four conditions, are presented in Table 3. Also shown in Table 3 are the significance levels of the contrasts comparing the three experimental groups with the control group for each measure.

As in the first study, the speech produced could be compared along a number of dimensions in addition to filled pause rate. The self-conscious students' descriptions did not differ from those of the control group on any other measure calculated from transcripts of the speeches. There were no differences in length of description, number of syllables per word, vocabulary diversity,³ speech rate, rate of sentence restarts, or word repetitions. The effect of the self-consciousness manipulation was confined to the rate of filled pauses; there was no evidence that the self-conscious students made their speech any more complex or that these self-conscious speakers were any more likely to utter other disfluencies. This finding replicates the results of the previous experiment on the specificity of the effect of self-consciousness. The other two experimental conditions tested the specificity with which these results were due to self-consciousness rather than anxiety or task difficulty.

² Even with Dunnett or Bonferroni corrections to reduce the probability of Type I errors (but increase the chances of Type II errors), each of the analyses described subsequently that was significant remained significant.

³ For this experiment, the shortest speech was 73 words long, thus, the numbers were calculated out of the first 73 words of each person's speech.
The anxious students actually used marginally fewer filled pauses than the control students, $F(1, 76) = 2.74, p = .10$. They did not differ in terms of length of speech, syllables per word, vocabulary diversity, or speech rate, but anxious students had marginally more sentence restarts and repetitions than control students. Both of these disfluencies are ones that Mahl (1987) and others found to increase reliably with anxiety, and this also replicates Mahl’s findings of a dissociation between filled pauses and other disfluencies.

The students in the difficult task condition did not differ significantly from control students in filled pause use, $F(1, 76) = 0.22, n.s.$, or in length of speech, speech rate, restarts, or repetitions. They did, however, use longer words and a marginally larger vocabulary. Students in this condition, who described the task, these students were able to talk about as quickly and as well as students with the easier task.

Discussion

This experiment provides two sorts of evidence that filled pauses are produced when a speaker is self-conscious about speech. One line of evidence is the replication of the first experiment, indicating that filled pauses are more frequent when participants are more self-conscious but that other disfluencies are not affected. The other line of evidence is that this pattern is quite different from those found when the students were anxious about other matters or were producing more difficult speech. In neither of these cases were filled pauses increased, although other disfluencies were affected. Explanations that ums are a function of the challenge of the speech task or that they are a product of a generally disruptive effect of anxiety on higher mental functions cannot predict these results.

The anxious students’ filled pause rate suggests, albeit tentatively, that anxiety by itself not only will not increase ums but may actually reduce them. The manipulation (expecting to dance alone while being videotaped) may have distracted the students from what they were saying by focusing their attention on the upcoming ordeal. In the introduction, we suggested that a patient waiting for major surgery should say um no more than normal, but this finding suggests that when the topic is unrelated to the source of the anxiety, the patient may say um less often than normal. Of course, such a prediction is tempered by the finding that the anxious students did not report especially low self-consciousness, and the effect on their filled pauses was only marginally significant.

The manipulations used in Experiments 1 and 2 were somewhat artificial laboratory constructions designed to maximize the chances of obtaining an effect. Speakers rarely hear their own amplified voices or have their speech rated by judges for creativity. If the proposed account of filled pauses is correct, however, it ought to be possible to find naturally occurring examples of self-consciousness producing filled pauses. We conclude this article with two nonexperimental observations of filled pause production in bars and in aphasics.

Drinking alcohol interferes with just about every task that intoxicated people attempt. Fairly low levels decrease both speed and accuracy in reaction time tasks (Maylor, Rabbitt, James, & Kerr, 1992). Alcohol, again in small doses, impairs learning and memory for nouns (Jones & Jones, 1977). About half of car fatalities involve an intoxicated driver (Centers for Disease Control, 1982).

Alcohol, however, has more subtle effects than simply impaired performance. There is a considerable body of evidence suggesting that alcohol reliably decreases people’s self-awareness (cf. Hull, Levenson, Young, & Sher, 1983; Zeichner & Pihl, 1979). Steele and Josephs’s (1990) approach to intoxication suggests a mechanism for this decrease in self-consciousness. They demonstrated that alcohol decreases people’s ability to attend to more than one thing at a time. Thus, it should be hard for drinkers to produce speech and also attend to what they are saying.

The other disfluencies that Mahl (1987) included in his speech disturbance index, such as tongue slips and incoherent sounds, were so infrequent that they did not allow for meaningful analyses.

\[ \text{Table 3} \]

**Linguistic Characteristics of Ideal Day Descriptions for Each Group: Experiment 2**

<table>
<thead>
<tr>
<th>Group</th>
<th>Ums per minute M</th>
<th>SD</th>
<th>No. of minutes M</th>
<th>SD</th>
<th>Syllables per word M</th>
<th>SD</th>
<th>Type-token ratio* M</th>
<th>SD</th>
<th>Words per minute M</th>
<th>SD</th>
<th>Restarts per 100 words M</th>
<th>SD</th>
<th>Repetitions per 100 words M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.46</td>
<td>2.94</td>
<td>1.91</td>
<td>1.44</td>
<td>1.26</td>
<td>0.07</td>
<td>56.00</td>
<td>7.36</td>
<td>132.43</td>
<td>17.86</td>
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<td>0.85</td>
</tr>
<tr>
<td>Self-conscious</td>
<td>5.61**</td>
<td>3.59</td>
<td>1.69</td>
<td>1.20</td>
<td>1.29</td>
<td>0.08</td>
<td>55.50</td>
<td>6.00</td>
<td>130.91</td>
<td>26.14</td>
<td>0.47</td>
<td>0.74</td>
<td>0.26</td>
<td>0.45</td>
</tr>
<tr>
<td>Anxious</td>
<td>2.07*</td>
<td>1.60</td>
<td>2.05</td>
<td>1.03</td>
<td>1.28</td>
<td>0.06</td>
<td>56.65</td>
<td>7.48</td>
<td>131.50</td>
<td>18.54</td>
<td>0.88*</td>
<td>0.86</td>
<td>1.24*</td>
<td>1.69</td>
</tr>
<tr>
<td>Difficult</td>
<td>3.85</td>
<td>1.99</td>
<td>2.19</td>
<td>1.13</td>
<td>1.32**</td>
<td>0.07</td>
<td>60.15*</td>
<td>6.00</td>
<td>128.33</td>
<td>13.92</td>
<td>0.69</td>
<td>0.87</td>
<td>0.62</td>
<td>1.03</td>
</tr>
</tbody>
</table>

* See text for details.

*p < .10. ** p < .05.
Drunk talkers thus should be more likely to run into trouble but also should be less concerned about it. They should have a harder time formulating their speech, remembering the words they need, keeping the grammar on track, and so on. However, they should be less likely to detect impending or existing errors and should care less whether these errors occur. Sober individuals, on the other hand, will be much better at the technical aspects of speech production but will be far more likely to monitor what they are saying and consciously redirect it when it goes astray.

One advantage of examining alcohol’s effects is that the challenges of the speech task and the level of self-consciousness are oppositely affected. If the actual challenge of speech production produces *um*’s, then intoxicated individuals should use these fillers more often. However, if *um*’s are produced not by tough options but by self-consciousness about what is being said or by the removal of speech production from its automatic mode, then these individuals should manage with few *um*’s.

**Experiment 3**

**Method**

One hundred eight people were interviewed in bars in the San Diego area. The experimenter went to eight local bars on 13 different nights. The bars were distributed within easy reach of a college campus, and they were popular with students and recent graduates. The experimenter randomly picked patrons, told them she was doing a project for a class, and asked whether they would be willing to answer a few questions. When they agreed, and all approached did agree, she asked them the same question participants in Experiment 2 had answered (i.e., What would they do if they could do anything they wanted for a day?). The experimenter noted on a clipboard how many *um*’s they used and how long they spoke. For 40 of the interviews, a second experimenter stood off to one side and also counted the number of filled pauses produced. Both coders were unaware of the patrons’ state of intoxication during the counting of *um*’s.

When they had explained their ideal day, the experimenter asked them how many drinks they had consumed so far that evening and also asked them their weight. A few patrons resisted divulging their weight; the weight was recorded so that a rough conversion of number of drinks to blood alcohol concentrations (BAC) could be made. The weight was recorded so that a rough conversion of number of drinks to blood alcohol concentrations could be made.

For 42 of the interviews, the experimenter also made a note, on a rough 4-point scale, of the social appropriateness of the patron’s daylong fantasy that should not be described in public, although, of course, all of these stories were confided to a perfect stranger in a bar. This coding was designed to examine the link between alcohol and monitoring of what one says.

**Results**

The average bar patron had consumed three drinks by the time he or she was approached by the experimenter; 11 had not consumed any alcohol at all. The time sequence of the drinks, recency of food intake, and a number of other factors should influence actual BAC, but these factors should simply add noise to the measure rather than systematic error. People who had consumed a greater number of drinks had probably done so over a longer period than those who had finished only a few, and thus they would have metabolized more of the alcohol. However, if one assumes a fairly steady intake and metabolizing rate, then the number of drinks measure should overestimate the actual blood alcohol by a constant percentage but still be a fairly good indication of relative intoxication.

The reliability of the *um* scoring was assessed by comparing the counts of the two experimenters for the 40 interviews in which both were present. This produced a reliability (*r*) of .97. *Um*’s are apparently as easy to count in bars as they are in laboratories.

Number of drinks and *um* rates were significantly associated. The more intoxicated the speaker, the rarer the *um*’s. The effect was not huge but was significant (*r* = −.20, *p* < .05). The effect was not changed by eliminating the one very intoxicated outlier (*r* = −.20) or by using a measure of BAC that took body weight into account (*r* = −.22). The roughness of the measure of intoxication and the heterogeneity of the sample no doubt attenuated this relationship. The effect size was smaller than those of Experiment 1 (η = .40) and Experiment 2 (η = .32 for the comparison between the self-conscious group and the control group).

Before suggesting intoxication as a strategy to concerned public speakers, it should be noted that, to eliminate the average speaker’s *um*’s, about 19 drinks in the course of an evening are required (assuming a linear alcohol–*um* relationship).

The social acceptability of the fantasies was related to the number of drinks that their inventors had consumed (*r* = −.39, *p* < .05). This supports the notion that the alcohol made the speakers less concerned with what they were saying and less prone to monitor it, at least for social acceptability. There was no significant association between social acceptability score and *um* rate (*r* = −.08, ns). Given the roughness of this measure of speech monitoring, the small number of individuals available for this comparison, and the already weak association of *um*’s with BAC, this insignificance is not surprising, although the proposed account does suggest that it should exist.

**Discussion**

Experiment 3 showed a link between drinking alcohol and avoiding *um*’s. The more intoxicated patrons, in spite of presumably greater trouble with all aspects of producing speech, used fewer *um*’s. This suggests that, in line with the first two experiments, task concern, rather than task difficulty, created these fillers.

This study cannot distinguish between decreased filled pauses being a result of the actual alcohol consumed or alcohol expectancy effects. These two were confounded, as they are generally in bars and most places people drink outside psychology labs. Steele and Josephs (1990) suggested that the inability to attend to more than one thing at a time is due to actual alcohol consumption; for the present purposes, however, it did not matter. The people who reported drinking more were the people who produced less socially acceptable speeches. Whether they did not monitor what they said because they were drunk or because they thought they were drunk does not matter. Either way,
the theory predicts that filled pauses should be reduced, and they were.

Because the data were collected in a field study rather than a laboratory experiment (it being better both ethically and financially to let participants buy their own drinks), the causality cannot be proved. It is at least conceivable that the kind of people who drink excessively are the same ones who do not say um often. There are several factors that make such an explanation unlikely, however. First, our measure of intoxication was a poor measure of the personality disposition to drink. All of the patrons had chosen to go to bars and had been there at roughly the same time in the evening, so the range of drinkers was greatly compressed. Furthermore, because we measured how much they had consumed at a random point in the evening rather than how much they would consume in the entire outing, our measure was biased by such important factors as how recently they had arrived and how rapidly they drink. It is very unlikely that such a poor measure of a personality trait to drink would be correlated, even weakly, with a single measure of the personality trait to say um infrequently (see Mischel, 1968, for an extensive discussion of the difficulty of predicting a single behavior reflecting one trait from another single behavioral measure of that trait, let alone a single measure of a different trait). Rather than quibble about causality, however, we note simply that the approach made a nonobvious prediction about a naturalistic behavior, and that prediction was confirmed.

One final prediction of this idea that ums reflect deliberate control over speech production, rather than the challenges that the system is facing, is examined here. People suffering damage to the left hemisphere can display a variety of language deficits. Although there is tremendous overlap and variability in these disorders, they do form rough groups (Kolb & Whishaw, 1990). One disorder, Broca's aphasia, is characterized by greatly simplified speech composed of only the infinitive form of verbs and singular nouns, with few adjectives, adverbs, and other frills. This speech, in spite of being reduced to such a simple form, is slow and deliberate. These speakers are aware of their trouble articulating their meaning, and they make a conscious effort to form the speech. The speech of Wernicke's aphasics is quite different. Their speech can involve a great variety of words and forms but will make little sense, often being meaningless "word salad." It is neither slow nor deliberate. They do not realize that they are not communicating effectively and do not, or cannot, exert conscious control over this flow of speech.

Wernicke's aphasics, then, should fall into the same group as those who are intoxicated. They may not be producing speech very well, but they are not concerned about it, and so they should use few ums. Broca's aphasics are more like sober individuals. Their speech is better at conveying information; how well, but they are not concerned about it, and so they should use few ums. Broca's aphasics are more like sober individuals. Their speech is better at conveying information; how well, or not, the once automatic process of speech production. But what is clear is that the complexity of verbal output is not always a good indicator of the frequency of filled pauses, because the more complex and varied speech of Wernicke's aphasics involves few ums and the enormously simplified speech of Broca's aphasics involves many.

General Discussion

In general, the cause of ums proposed here moves away from the cognitive complexity notions that have long been in favor. Anxiety, it is suggested, does not itself play a causal role in filled pause production. However, anxiety is sometimes accompanied by increased attention to the content of one's own speech, and this self-consciousness about the speech, whether or not it is a product of anxiety, will lead to more filled pauses. Alcohol will do just the opposite, keeping speakers talking without much monitoring of what they are saying. The aphasias differ in the attention that their victims must devote to controlling what they say, and the um rates reflect this.

The proposed account of ums described here requires that speaking be accomplished quite successfully without deliberate interference or control. As Levelt (1989) pointed out, it is for-
tunate that people are capable of just this sort of automatic production of speech. If we had to think about what word to say as much as we think about what tie to wear, speech would be halting indeed. People do occasionally interfere with their own speech, and *ums* may signal when such executive control is exerted over the normally automatic process. Generally, automatic processing is diagnosed by such symptoms as its imperviousness to the addition of other tasks (e.g., memory load; Schneider & Shiffrin, 1977). Filled pauses may, in a similar way, provide information about moments when speech is not being produced automatically. That is, rather than indicating when a tough decision is being made by the normal speech production apparatus, *ums* may indicate when the speaker changes modes and gives deliberate attention to some aspect of the speech. This signal could prove useful in tracking the development of automatic speech in children and nonnative speakers.

It is probably the case that the difficulty of the speech task and the *ums* rate are not entirely independent, because attention to what one says is likely to be high when the task is hard. However, it does seem to be the case that one can predict far better what the rate of filled pauses will be from an examination of the social context of the utterance than from an inspection of the complexity of the output. The mechanism by which these social factors influence *ums* differs from that traditionally assumed. These factors do not operate by simply adding to the existing cognitive load; rather, they change the way in which the speech is generated.

This approach to filled pauses suggests that they should be affected by a number of social variables that do not necessarily have any effect on the actual verbal output. For example, the nature of the audience should have a profound effect on the *ums* rate of the speaker. It is readily observable that messages left on answering machines are overflowing with *ums* that do not occur when someone actually answers the call. Knowing that one’s words are being recorded makes this unnatural form of communication especially likely to focus attention on what is being said. Telling a story to one’s best friend may lead to fewer filled pauses than telling the same story to a parole officer. This approach also suggests that people who make an effort to speak well may use *ums* more often than people who do not care how well they are talking. In fact, the best way to eliminate *ums* from one’s speech—better than tranquilizers or alcohol—may be to ramble, saying whatever pops into one’s head without any concern for whether it is appropriate, informative, or interesting.

**References**


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