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Response to Howell's (2010) Commentary

Julie D. Anderson

Indiana University, Bloomington

Abstract

Purpose: Findings from Anderson (2007) were broadly interpreted according to several psycholinguistic-oriented theories of stuttering, including EXPLAN (Howell, 2004). Although the study was not explicitly designed to test EXPLAN, it was generally concluded that the evidence does not provide appreciable support for EXPLAN. Howell (2010) objected to this conclusion on several grounds, claiming that the findings do, in fact, support EXPLAN. Anderson responds to Howell's objections in this letter.

Method: Background and perspective on the original study were presented. Howell's comments on EXPLAN's predictions concerning stuttering on "easy" and "difficult" words and the relationship between speech errors and stuttering are disputed in this reply to Howell's commentary.

Results: Howell's claims that the findings of Anderson support EXPLAN are largely refuted on the basis that (a) the data had not been analyzed by grammatical class and (b) there are no clear predictions regarding the association between variables affecting speech errors and stuttering in EXPLAN.

Conclusions: Howell's commentary seemingly represents an attempt to provide confirmatory evidence for EXPLAN using data that are simply not suitable for this purpose.

Keywords

stuttering; phonological neighborhood; frequency; children; EXPLAN

Most scientists would agree that a good theory should, among other things, be descriptive and predictive. That is, it should not only account for observed facts but also be able to predict future findings. These predictions must, by virtue, be testable and therefore open to falsification (Popper, 1965). According to Popper, although one can easily obtain confirmation for most theories if one looks hard enough, a genuine test of a theory is an attempt to refute it. Thus, the goal of research in stuttering or any other field of study should not be to make the data fit a theory or model but rather to attempt to falsify its testable predictions. The noted science philosopher further suggested that corroborating evidence should be accepted only when it stems from a legitimate attempt to directly test the theory. In applying these philosophical concepts to Howell's (2010) commentary, it is suggested that: (a) findings from Anderson (2007) can neither be used to confirm nor fully refute the

assumptions of EXPLAN (Howell, 2004) because the original study was not explicitly designed for this purpose and (b) using the findings of Anderson as confirmation for EXPLAN represents an attempt to validate its tenants using data that are simply not suitable for this purpose. It is with these concepts in mind that I address the comments raised by Dr. Howell concerning the interpretation of the findings from my 2007 study relative to EXPLAN. However, before addressing these comments, I would first like to provide some background and perspective on the original study.

Revisiting the Intention of Anderson (2007)

In my 2007 study, I examined the effect of word frequency, neighborhood density, and neighborhood frequency on the overall susceptibility of words to stuttering and the type of stuttered disfluency produced in preschool children who stutter. This study was motivated by the fact that (a) neighborhood density and frequency variables have been shown to influence the production of speech errors in both children and adults (e.g., German & Newman, 2004) and (b) it has been suggested, by way of the *covert repair hypothesis* (CRH; Kolk & Postma, 1997), that stuttering ought to be constrained by the same factors as speech errors. Although the CRH did provide some theoretical justification, the study was not intended to be a direct test of the CRH or, for that matter, any other theory/model of stuttering, including EXPLAN. Rather, the intent was to determine whether any of the aforementioned variables had an effect on stuttering and, if so, what that might tell us about the speech production processes of children who stutter.

The original article did not include an interpretation of the results within the context of the CRH because the study was not, as previously mentioned, designed to directly test this theory. However, during the review process, several reviewers requested that it be included in the Discussion. Thus, in the spirit of “going along to get along,” I opted to include a discussion of the implications of the findings for the CRH. Reviewers also strongly recommended that EXPLAN be included in the article. I was hesitant to accept this recommendation because I knew the study’s methods did not yield results that were conducive to interpretation within EXPLAN (see subsequent section). Nevertheless, I capitulated and added a qualified discussion of the implications of the findings for EXPLAN, which now serves as a source of contention for Howell (2010). I sincerely appreciate Dr. Howell’s interest in my study, and, now that the requisite background and perspective has been established, I am pleased to have the opportunity to respond to his comments.

Revisiting Howell’s (2010) Comments on EXPLAN’s Predictions Concerning Stuttering on Easy and Difficult Words

In his commentary, Howell (2010) suggests that my findings relative to the neighborhood and frequency characteristics of different types of disfluencies provide support for EXPLAN. In particular, he claims that the results were supportive because word frequency and neighborhood frequency had an effect on words containing part-word repetitions and/or sound prolongations (i.e., “difficult” words, according to EXPLAN) but not those containing single-syllable word repetitions (i.e., “easy” words). Howell’s proposition, however, is

misleading because the EXPLAN predictions concerning the level of word difficulty were made in the context of grammatical class. That is, single-syllable word repetitions and pauses (i.e., “stallings”) were predicted to occur on “easy” function words that occur just prior to a difficult content word, whereas part-word repetitions, sound prolongations, and broken words (i.e., “advancing”) were expected to occur on “difficult” content words (Howell, 2004). Thus, given that the data in Anderson (2007) had not been analyzed by grammatical class, Howell’s claim that the results support the predictions of EXPLAN is simply not valid.

A genuine test of EXPLAN, using the methods of Anderson (2007), would necessitate the following comparisons: (a) function words containing single-syllable word repetitions versus subsequent nonstuttered content words and (b) content words containing part-word repetitions, sound prolongations, and/or broken words versus nonstuttered content words (those not preceded by a stuttered function word) or preceding function words.¹ Although it would be impractical for me to conduct any comparison involving function words using the data from my study, as this would entail that all of the children’s transcripts be completely reanalyzed, the existing data on content words can be analyzed without undue effort. Thus, I thought it might be of interest to compare the frequency, neighborhood density, and neighborhood frequency values of content words containing part-word repetitions and sound prolongations to a corpus of (matched) nonstuttered content words using the procedures outlined in Anderson (2007). A series of Wilcoxon signedranks tests revealed no significant difference between these two groups of words in frequency, neighborhood density, and neighborhood frequency (p values = .16–.49). According to Howell (2010), content words containing part-word repetitions and sound prolongations should have been more “difficult” and, thus, lower in neighborhood density and frequency than the nonstuttered content words. The fact that there were no significant differences between the two groups of words, however, clearly does not support Howell’s contention—at least, insofar as the phonological processing level is concerned.

Revisiting Howell’s Comments on the Relationship Between Speech Errors and Stuttering

In his commentary, Howell (2010) questions why I failed to comment on “single-syllable word repetition when considering this point about errors” (p. 1258) relative to EXPLAN. My response to his comment is threefold. First, the speculation concerning the expected congruence between linguistic factors affecting speech errors and stuttering was for overall stuttering (i.e., part-word repetitions, single-syllable word repetitions, and sound prolongations combined), not types of stuttering. Speculation concerning types of stuttering, on the other hand, depended on their hypothesized origin in the speech-language production system, as all three lexical variables presumably affect the ease with which word-form representations are accessed in speech production. Second, that single-syllable word repetitions were not susceptible to neighborhood density and frequency variables does not

¹There is no clear account in Howell (2004) as to how single-syllable content word repetitions or function words with part-word repetitions, sound prolongations, or broken words would occur in EXPLAN.

mean that they are “easy”; rather, it means that they are not influenced by variables that are presumed to have their effect at the level of the word form. In other words, the findings do not rule out the possibility that words containing single-syllable word repetitions are vulnerable to variables that have their effect on nonphonological levels of processing, such as those involving the lexical aspects of word retrieval (which, according to Howell, would make them “difficult”). Third, my previous comment related to the fact that the EXPLAN predictions were made in the context of grammatical class also holds true in this case. That is, EXPLAN maintains that it is the single-syllable word repetitions of function words that are not difficult. Because the data in Anderson had not been analyzed by grammatical class, it is simply not appropriate to cite this study as support for “EXPLAN’s predictions about stallings and advancements” (Howell, 2010, p. 1258). To do so is highly misleading.

Howell (2010) makes three additional claims in his commentary concerning the relationship between speech errors and stuttering in EXPLAN. First, he suggests that although EXPLAN does not require errors to be associated with stuttering, it does allow for “variables that lead to errors to increase the chance of advancements” (p. 1258). Nevertheless, in the description of EXPLAN (Howell, 2004), the only reference to errors is the suggestion that activation profiles can signal lexical errors without a perceptual monitor, a process which apparently occurs when activation builds up beyond the early selection point (point “S-” in Kolk & Postma’s [1997] model). Although it is not clear how activation buildup would automatically make speakers aware of the presence of an error, the important point here is that, despite his claims to the contrary, there is no mention of how speech errors are actually handled in EXPLAN. Second, Howell (2010) suggests that EXPLAN is based on Dell’s (1990) spreading activation model of word generation. In Howell (2004), however, Dell’s model is discussed in reference to the CRH but not directly for EXPLAN, except to say that it is generally framed in the context of a spreading activation framework. Thus, despite his claims, there is no explicit link between Dell’s spreading activation model and EXPLAN. Finally, Howell suggests that “[a]llowance was made in the discussion of Howell (2004) for any factors subsequently found to be determinants of stuttering to affect activation rate” (p. 1258), but this also is not clearly specified in his description of EXPLAN. Even if it was, however, it would seem to merely leave the door open to permit, rather than to predict, which does not make for good scientific theory.

Conclusion

Karl Popper believed that the scientific mind does not ascribe to theoretical dogma but rather to the critical appraisal of hypotheses with the intent to disprove them. Howell’s (2010) commentary, on the other hand, would seem to be antithetical to Popper’s concept of science: an intent to prove the accuracy of EXPLAN using data that are ill suited for this purpose. In essence, the findings of Anderson (2007) can neither be used to confirm nor refute the assumptions of EXPLAN. To be fair, this statement also applies to the discussion in Anderson regarding the implications of the findings for EXPLAN (and, for that matter, the CRH), which is why I stated that the findings could only be “loosely interpreted” in this regard and offered a suggestion for a genuine test of EXPLAN (Anderson, 2007, p. 243).

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