Letter to the Editor

Language Growth Predicts Stuttering Persistence Over and Above Family History and Treatment Experience: Response to Marcotte

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Purpose: This response addresses comments made by Marcotte (2019) regarding our recent publication, "Preliminary Evidence That Growth in Productive Language Differentiates Childhood Stuttering Persistence and Recovery" (Leech, Bernstein Ratner, Brown, & Weber, 2017). Marcotte calls into question our finding that language growth is a valid predictor of recovery from stuttering because we did not account for treatment and family history.

Conclusions: In response to her comments, we provide additional empirical analyses couched in a larger discussion of the difficulty of calibrating treatment and family history of stuttering. In short, we show that once treatment history and family history of stuttering are accounted for, the effect of language growth remains a significant predictor of stuttering persistence.

We agree with Marcotte (2019) that family history and aspects of treatment are certainly important in understanding the etiology of stuttering. Family history was not addressed in Leech, Bernstein Ratner, Brown, and Weber (2017) because it has been addressed elsewhere, including a recent paper from our group on this concept (Walsh et al., 2018). Further, it was not possible for us to include all variables that may relate to stuttering outcomes given concerns of statistical power. More specifically, we were concerned that adding additional predictors to a regression model on a small sample size would increase the likelihood of not detecting an effect. Nonetheless, we welcome the opportunity to examine these concerns empirically by adding family history and treatment to our statistical analysis. Once we have done so, language growth remains a significant predictor of fluency outcomes.

More specifically, we were able to identify family history data (coded as 0 = *no history of persistence*; 1 = *history of persistence*) for all 50 children who were included in Leech et al. (2017). In our sample, 34 of the children (65% of the sample) had no family history of persistent stuttering; the other 16 children did have a reported family history. The association between family history and child recovery status was significant, such that children who recovered were significantly more likely to have no family history of persistence, $\chi^2(1) = 5.85$, $p = .016$. Importantly, after including this variable in our final model (see Table 3 in original article), *the effect of language growth on recovery status remained significant,* ß = 3.23 (*SE* = 1.54), Wald = 3.44, *p* = .036.

We also reanalyzed our data to include treatment history (coded 0 = *no treatment for stuttering*; 1 = *treatment for stuttering*) for all 50 participants. Though Marcotte (2019) recommends including "the provision, type, and timing of treatment" (p. 2), we again appeal to a statistical argument: There is simply not enough power to incorporate all three variables in addition to phonological, familial, and linguistic ones. At the time of their initial visit, 14 of the children who persisted (28% of the sample) received therapy compared to 12 children who went on to recover. Treatment history coded in this way was not associated with recovery status, $\chi^2(1) = 2.13$, $p = .14$. Adding the treatment variable to the final model (see Table 3

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in original article) again indicated that the effect of language growth *remained a significant predictor of recovery*, ß = 2.74 (*SE* = 1.36), Wald = 4.05, *p* = .044.

Note that even *when both family history and treatment variables are added* to the regression model together, *the effect of language growth was still significant*, ß = 3.41 (*SE* = 1.58), Wald = 4.65, *p* = .031. Again, we must reiterate that we had very little power to detect these effects given a sample size of 50 children. The fact that we did suggests that future work examining language growth with a larger sample may yield stronger effects, though we hold off on speculating further until such data are available, perhaps in future years by combining research data from multiple sites, which is the goal of Fluency Bank (Bernstein Ratner & MacWhinney, 2018).

We find it odd that Marcotte (2019) uses her response to our study as an opportunity to weigh the merits of specific treatments for childhood stuttering. She proposes that even research analyses that control for treatment history must verify *which* treatment or treatments the child has experienced. Taking issue with Marcotte's belief that a program such as Lidcombe provides a gold standard for intervention quality is beyond the scope of this type of exchange. We do note, however, that there is spirited debate regarding the superiority of any single treatment for childhood stuttering (see Bernstein Ratner, 2018; Nippold, 2018).

We hope this conversation can serve as a catalyst for continued work on the predictors of stuttering persistence. As we have discussed in prior work (e.g., Smith & Weber, 2017; Spencer & Weber-Fox, 2014), a multifactorial approach to understanding which children will go on to persist versus those who are likely to recover is necessary to more fully understand this disorder. This certainly includes the study of predictors such as treatment and family history mentioned by Marcotte (2019) as well as other characteristics examined in Leech et al. (2017), such as phonology and language. A multifactorial approach, however, requires adequate sample sizes that afford enough statistical power to include these multiple predictors. As researchers and clinicians, the more we know about early predictors of persistence, the better we can target our efforts to children who will be at the greatest risk for persistence.

Acknowledgments

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