Title: Expressive Language Development in Adolescents with Down Syndrome and Fragile X Syndrome: Change Over Time and the Role of Family-Related Factors

Authors: Laura del Hoyo Soriano\textsuperscript{1,2}, Angela John Thurman\textsuperscript{1}, Danielle Harvey\textsuperscript{1}, Leonard Abbeduto \textsuperscript{1}

\textsuperscript{1}University of California, Davis

Introduction: Expressive language is delayed in males with DS and FXS, although the profile of impairments is syndrome specific (del Hoyo Soriano, Thurman, & Abbeduto, 2018). In addition, level of intellectual disability (ID) as well as family-related factors, predict language development early in development within each disorder (Abbeduto, Brady, & Kover, 2007; Abbeduto, Warren, & Conners, 2007). It is less clear, however, whether expressive language trajectories differ between males with DS and FXS during the adolescent period. Nor are the predictors of adolescent language development in these disorders known. In this study, we examined expressive language trajectories, assessed through conversation and narration, in adolescent males with DS and FXS in relation to chronological age, nonverbal cognitive level, and family-related factors.

Method: 20 males with DS (Visit 1 mean age =12.8, SD = 1.9, range= 10.1-15.9) and 27 males with FXS (Visit 1 mean age= 12.9, SD=1.7, range= 10.2-16) along with their biological mothers participated. Nonverbal cognition (Leiter-R), as well as conversational and narrative samples were collected from each participant at four time points, one year apart. Samples were audio-recorded, transcribed, and analyzed using SALT software. Dependent variables indexed syntactic complexity, lexical diversity, intelligibility, and talkativeness. Mothers were administered an IQ assessment, along with a Family Background Questionnaire, and questionnaires related to their mental health (Symptom Checklist—90 Revised; SCL90-R) and the quality of the mother-adolescent relationship (Positive Affect Index; PAI), which were introduced as predictors along with syndrome, while controlling for children’s NV cognition and age. Repeated measures and random effects models assessed patterns of change in expressive language across time points.

Result: For the entire sample, we found a decrease in syntactic complexity ($\beta$=-0.05, SE=0.01, p<0.001) and lexical diversity ($\beta$=-2.5, SE=1.1, p=0.03), but an increase in talkativeness ($\beta$=0.4, SE=0.2, p=0.02), in conversation over time, controlling for age and NV cognition. Furthermore, those participants with higher NV cognition showed an increased rate of change over time in talkativeness and a smaller decrease over time in syntactic complexity ($\beta$=0.05, SE=0.01, SE=0.003). Age at baseline did not predict changes over time in any expressive language measure. Regarding syndrome-related differences, males with DS increased less each year in conversational talkativeness ($\beta$=-1.3, SE=0.4, p=0.001), while increasing more each year in narrative syntactic complexity ($\beta$=0.4, SE=0.2, p=0.006) compared to males with FXS. Regarding family-related predictors, higher family income ($\beta$=0.6, SE=0.3, p=0.03) and a higher PAI score (closer relationship) predicted less decrease over time in lexical diversity during conversation ($\beta$=0.8, SE=0.3, p=0.004), and participants of mothers who graduated college showed a greater increase in conversational talkativeness over time compared to those of mothers with a high school education ($\beta$=0.8, SE=0.3, p=0.02).

Discussion: Our results suggest that during adolescence there is an increase in the amount of attempts at communication, but also a decline in the quality of the expressive language (in terms of grammar and vocabulary) for males with DS and FX, at least during conversation. Also, that type of syndrome predicts the slope of changes in some of these constructs. In addition, our results reinforce the link between level of ID and expressive language skills, as well as the protective role of family-related factors in expressive language development. Finally, the different results observed across conversation and narration suggests the need to assess expressive language under a broader range of contexts from a research and a clinical perspective. Further longitudinal studies with larger samples including females with DS and FXS and reaching into adulthood are needed to confirm and extend our results.

References/Citations:

