Title: Filled Pauses, ASD severity, and the Broader Autism Phenotype in Adults with ASD and their Parents

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Introduction: The production of “um” is thought to serve a pragmatic, listener-oriented function, where the speaker can indicate that they are “holding the floor” during a conversation. Recent reports suggest that individuals with autism spectrum disorder (ASD) produce fewer filled pauses (i.e., “um” or “uh”) than age-matched participants with typical development, and that “um” production is related to ASD severity but not measures of language or cognition (Gorman et al., 2016; Irvine et al., 2016; Lake et al., 2011; Parish-Morris et al., 2017). Some first degree relatives of individuals with ASD have the broader autism phenotype (BAP), which often presents with pragmatic deficits (Losh et al., 2009). The present study sought to examine filled pause production within families of adult children with ASD, including the relationship between filled pauses and ASD severity or BAP characteristics, to determine if filled pause use may serve as a linguistic marker for the BAP. We had three research questions: 1) Are filled pauses produced by mothers related to their Broad Autism Phenotype-Questionnaire (BAP-Q) scores?; 2) Are filled pauses produced by fathers related to their BAP-Q scores?; 3) Are filled pauses produced by children related to their Childhood Autism Rating Scale (CARS) scores?

Method: Data for this study were drawn from a larger intervention study focused on improving work outcomes for adults with ASD, and data transcription and coding is ongoing. Results presented are from 27 mothers, 15 fathers, and 35 adult children with ASD, who had available language data and ASD symptom severity data. Adults with ASD included 27 males, 8 females between 18 and 28 years of age ($M = 22.13$, $SD = 2.42$), and had IQ scores ranging from 56 to 139 ($M = 106.92$, $SD = 19.32$). Mothers, fathers, and the adult children were all asked to provide five minute speech samples (FMSS). Mothers and fathers were prompted to talk about their son or daughter, while the adult children were asked to give two FMSS, one about their mother and one about their father. The majority of adult children did not reach their five minute time allotment for either sample; therefore, both samples from the adult children were combined for a total of five minutes. The FMSS were transcribed in the Systematic Analysis of Language Transcription software (SALT). Filled pauses “um” and “uh” were counted within each transcript. Variables of interest included: “um” frequency (total number of “ums” out of the total number of words produced), “uh” frequency (total number of “uhs” out of the total number of words produced), and “um” ratio (total number of “ums” out of the total number of filled pauses; Parish-Morris et al., 2017). Mothers and fathers completed the BAP-Q, which provides a total score, as well as three sub-scores: Aloofness, Pragmatic Language, and Rigidity. Mothers and fathers were similar on all BAP-Q scores. An examiner completed the CARS for each adult child with ASD.

Results: Table 1 includes averages and standard deviations of filled pause variables for each group. There were no significant relationships between the mothers’ filled pause use and their BAP-Q total scores or sub-scores. For the fathers, “um” frequency was significantly related to their BAP-Q total score ($r = -.597$, $p = .019$) as well as their BAP-Q Aloofness sub-score ($r = -.696$, $p = .004$). Fathers’ “uh” frequency was not related to any BAP-Q score. For the adult children with ASD, their um ratio (number of “ums” out of the total number of filled pauses) was related to their CARS scores ($r = -.414$, $p = .018$). Neither their “um” frequency or “uh” frequency were related to their CARS scores.

Discussion: These findings build on prior work that suggest that the use of “um” in spoken language serves a pragmatic or listener-oriented function, by extending this association to parents of children with ASD. Specifically, fathers of children with ASD had moderately strong associations between their BAP-Q total score and Aloofness sub-score, such that increased BAP characteristics were related to decreased production of “um”. These results are preliminary evidence that filled pause use may serve as a linguistic phenotypic marker for BAP characteristics of fathers of children with ASD. As coding is currently ongoing, we predict that these relationships will strengthen with increased power.
References:


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Table 1. Filled pause means and standard deviations

<table>
<thead>
<tr>
<th></th>
<th>Mothers M, (SD)</th>
<th>Fathers M, (SD)</th>
<th>Adult children M, (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Um” frequency</td>
<td>0.046 (0.027)</td>
<td>0.047 (0.025)</td>
<td>0.022 (0.024)</td>
</tr>
<tr>
<td>“Uh” frequency</td>
<td>0.009 (0.010)</td>
<td>0.017 (0.017)</td>
<td>0.012 (0.017)</td>
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<tr>
<td>“Um” ratio</td>
<td>0.839 (0.159)</td>
<td>0.761 (0.228)</td>
<td>0.618 (0.367)</td>
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</tbody>
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