Investigation of Antidepressant Maintenance Medication on Speech-Related Autonomic Function

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Introduction

Parkinson’s disease (PD) affects millions of people worldwide and a significant percentage of this population suffers from disorders of communication, including impaired speech production20. Current work in our laboratory is examining how PD affects the autonomic nervous system (ANS) functions for speech production. The ANS influences and is influenced by speech production, and it can be affected by multiple factors such as current health status and medications. Depression is known to affect the ANS, and depression rates in the PD population are high resulting in a large percentage of patients on antidepressants. Thus, it is important to include people on antidepressant medication in our comparative sample. However, due to the fact that many healthy people are prescribed long-term antidepressants as maintenance medications, we currently are forced to exclude them from our studies. The effects of antidepressants as maintenance medications in the absence of depressive symptoms on the ANS is unknown.

There are two possible outcomes to our experiment:

1) the long-term use of antidepressants as a maintenance medications will have no significant effect on the autonomic variables of interest in our research, indicating that it may be appropriate to include asymptomatic individuals taking maintenance medications as participants, or
2) the long-term use of antidepressant maintenance medications will have a significant impact on the autonomic variables of interest related to speech production, indicating the need to continue to exclude those individuals from our control group.

For this study, we will include collecting and analyzing specific autonomic measures such as skin conductance response, in both healthy individuals who are currently on long-term antidepressants and healthy individuals who have not taken antidepressants within the previous six months. Through this research, we hope to determine whether or not we can include asymptomatic individuals on long-term antidepressants maintenance medications in future studies of speech-related ANS function.

Materials

The chart below describes background information regarding the types of tests used to screen for depression. Prospective participants will need to be screened for depression as we are only including individuals who are asymptomatic in our participant sample.

<table>
<thead>
<tr>
<th>Screening Measure</th>
<th>Target Age Group</th>
<th>Potential for Use in Other Age Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric Depression Scale</td>
<td>Older Adults (Ages: young elderly 65-75 years and old-elderly &gt; 75 years)</td>
<td>Geriatric Depression Scale - Short Form (GDS-SF) is a valid screening of young adults. With equivalent reliability as GDS: GDS shows high internal consistency with PD patients</td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>Young Adults (Ages: 13-60 years)</td>
<td>Beck Depression Inventory is a valid and reliable screening tool in an elderly sample. Beck Depression Inventory has good test-retest reliability and internal consistency in PD patients</td>
</tr>
</tbody>
</table>

Methods

In lab we investigate the effects of healthy aging and PD on speech-related autonomic function. We do so by obtaining the following autonomic measures during speech production and analysis:

1. Autonomic Measures:
   - Electrodermal Signals:
     - Skin Conductance Level (SCL) - refers to the tonic changes in electrodermal activity
     - Skin Conductance Response (SCR) - refers to the phasic changes in electrodermal activity
   - Sympathetic:
     - Both measured in microvolts
     - Recorded from taken from the medial phalanges of the index and middle fingers
   - Parasympathetic:
     - Blood Pulse Volume (BPV) - refers to the amplitude of blood flow in the peripheral capillaries of the medial phalanx of the ring finger

2. Cardiovascular Signals:
   - Pulse Rate (PP) - varies between 60-100 beats per minute
     - Measured in seconds
     - Sympathetic and parasympathetic

   - Activity on histaminic muscarinic and alpha 1 adrenergic receptors

4. Norepinephrine and Dopamine Function
   - Can cause serotonin syndrome (SS) if combined with MAOIs, TCAs, NDRIs, or SNRIs
   - Associated with a small decrease in heart rate (HR)

5. Autonomic Function and Speech Production
   - Leads to the possible inclusion of additional participants in our study.

6. Predicted Outcomes and Future Directions
   - There are two alternate hypotheses:
     a. Antidepressant maintenance medication will not have a significant effect on the autonomic variables of interest in our research.
     b. Results in the future utilization of asymptomatic participants on antidepressant maintenance medications in similar studies investigating autonomic function and speech production.

7. Future Directions:
   - Complete data collection and analysis. Participants groups will include:
     1) healthy adults who are asymptomatic and not taking antidepressants
     2) Asymptomatic adults who are currently taking antidepressants as a maintenance medications will be tested for the same autonomic functions.

8. Autonomic Function (SCL, SCR, BPV, PP) will be measured while participants complete a range of speech, non-speech, and rest tasks.

9. Data will be processed and analyzed according to established procedures.

References

Please refer to the attached document for a list of works cited.

Image 1: Different types of antidepressants and their effects on the body. Both antidepressants for the body.