Author Spotlight – Katrina Aberizk
We had the chance to catch up with doctoral candidate Katrina Aberizk, a graduate student in Dr. Elaine Walker's laboratory at Emory University. In collaboration with senior author Dr. Benson Ku, and co-authors, Katrina led a recent paper in Biological Psychiatry that focused on associations between cortisol and hippocampal volume in youth at clinical high risk for psychosis.

How did you first start thinking about this research question? What was the spark?
I was excited to apply structural equation modeling (SEM) to contribute to the literature on relations of stress with brain structural features. As a graduate student at Emory, I work with data from the North American Prodrome Longitudinal Study (NAPLS) with my mentor, Dr. Elaine Walker, and my collaborator, Dr. Benson Ku. The NAPLS dataset is unique not only because it includes youth at clinical high-risk for psychosis (CHR-P), but also because saliva samples were collected at study visits and assayed for basal cortisol. We saw an opportunity to leverage this measure of neuroendocrine stress and explore its relation to hippocampal volume using a multivariate statistical technique, especially because reduced hippocampal volume is the most well-replicated brain morphological feature of psychotic disorders, as well as some other serious mental illnesses.

Tell us about your work in this paper - what was your study design?
We applied multigroup SEM to the combined baseline samples of the second and third NAPLS cohorts, which included youth at CHR-P and healthy comparison participants. SEM allowed us to align our statistical hypotheses very closely with our research hypotheses. Imagine drawing a multiple regression with arrows pointing from your predictors to your outcome, and then allowing for covariances among predictors or plucking out relations that may not be relevant to existing theory. Flexibility is one of the great features of SEM, and multigroup SEM promotes even further flexibility. We directly compared candidate models that varied by constraints on our parameter estimates, e.g., some models promoted relations with unique coefficients per group and others constrained relations to single coefficients shared between groups. Youth at CHR-P tend to endorse greater perceived stress and demonstrate elevated basal cortisol compared to typical youth, so it was plausible that a freely estimated model would be the best fit for our data. At the same time, numerous studies have demonstrated inverse relations of stress with brain structural features, including in healthy comparisons, which suggests that constraints may be appropriate. The model selection process in SEM proceeds with competing and plausible hypotheses in mind.

What was the central finding? Why was this important?
Our central finding was that the best-fitting model constrained the relations of perceived stress and basal cortisol with hippocampal volume to single coefficients. The statistics used to evaluate the fit of structural models favor both parsimony and variance explained, so similarities in the direction and magnitude of relations between variables observed in groups surface as improvements in model fit when estimates between those variables are constrained to be identified by a single coefficient. We observed significant inverse relations between cortisol and hippocampal volume, which we viewed as consistent with an accumulation of reports that elevated cortisol is a nonspecific risk factor for reduced hippocampal volume.

Is there a little nugget buried in the results section that most readers might not notice?
It's important to emphasize that our best-fitting model also freely estimated the effects of age and biological sex. This produced different coefficients in group models for the individual relations of those variables. Although these findings were not significant, we observed an inverse trend between age and basal cortisol in youth at CHR-P and a positive trend between those variables in healthy comparisons. We questioned whether that pattern of findings was related to our restricted age range, i.e., < 20 years, so we applied our model post hoc to our sample unrestricted by age. Consistent with previous reports on healthy youth, we observed a positive and significant relation of age with basal cortisol in healthy comparisons in that unrestricted sample. The relation was positive and not significant in individuals at CHR-P. We demonstrated that the relation of age with basal cortisol differed significantly between groups. While speculative, it is possible that this finding reflects neuroendocrine dysregulation earlier in the lifespan in youth at CHR-P.

What's next for your research?
It is generally assumed that elucidating the complex interplay between neuromaturation, brain functional and neuroendocrine changes, and diagnostic outcomes is important. I'm especially interested in exploring how indices of stress are associated with brain function, including large-scale functional network topology. I think multivariate statistical procedures like SEM and its sibling techniques, and machine learning applications that allow researchers to evaluate network robustness to perturbation, promote flexibility in the model-building process that will continue to bring research and statistical hypotheses closer together. I'm also interested in the coherence between brain functional and structural features, which is being investigated in several ways and referred to by many terms in the current literature. I hope to continue contributing to that area of research as well.

Read the full details here:
https://www.biologicalpsychiatryjournal.com/article/S0006-3223(23)01759-6/fulltext