Introduction

- Prenatal exposure to drugs (defined here as in-utero exposure to cocaine and/or heroin; PDE) can cause changes to neurodevelopment\(^1\).
- Effects of PDE can also be modified by postnatal environmental factors, such as, relationships between primary caregivers and children\(^3\).
- This study aims to explore the interaction between PDE and postnatal family functioning on brain development.

Hypothesis

- **H1:** Participants in the PDE group will have more caregiver changes than those in the nonPDE group.
- **H2:** Participants with PDE will report less family cohesion and lower health scores than those without PDE.
- **H3:** Hippocampal volume will differ among participants in the PDE group and nonPDE group.
- **H4:** The number of caregiver changes within the PDE group will be related to variations in hippocampal volumes and positively correlated with family cohesion and family health and competence.

Methods

- **PDE Group:** Parent-infant dyads were enrolled at delivery from an urban University Hospital and followed until 18 years\(^4\).
- **Non PDE Group:** A Community Comparison sample, matched for age and demographics, was enrolled at age 6 years and followed until 18 years.
- Formal and informal caregiver changes were documented every six months throughout the first 7 years of the study.
- During early adolescence, participants completed the Self-Report Family Instrument (SFI)\(^5\).
  - Higher scores on the SFI scales are indicative of lower family cohesion and lower health and competence\(^3\).
  - Participants also completed T1-weighted structural MRI scans. Scans were processed in FreeSurfer v5.2. Volumes were adjusted for age, sex, and intracranial volume (ICV)\(^6\).

<table>
<thead>
<tr>
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<th>PDE (n=27)</th>
<th>NON PDE (n=23)</th>
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<tbody>
<tr>
<td>Race</td>
<td>100% African American</td>
<td>100% African American</td>
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<tr>
<td>Mean Age (years)</td>
<td>14.24±1.23</td>
<td>14.24±1.23</td>
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<tr>
<td>Biological Sex</td>
<td>14 female : 13 male</td>
<td>14 female : 9 male</td>
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Results

- **H1:** Participants with PDE had more caregiver changes \((M=85±1.03)\) than participants without PDE \((M=0\), \(t(26)=4.31, p<0.001\), Cohen’s D=1.07.
- **H2:** Participants with PDE reported less family cohesion \((M=2.9±0.66)\) compared to nonPDE participants \((M=2.25±0.55\), \(t(40)=2.0, p<0.01\), Cohen’s D=8. Participants with PDE \((M=2.38±0.38)\) also reported less health competence than nonPDE participants \((M=1.91±0.53\), \(t(44)=2.49, p=0.02\), Cohen’s D=71.
- **H3:** Adjusted bilateral hippocampal volume was significantly larger for those with PDE \((M=8222.65±742.35\) compared to those without PDE \((M=7593.10±634.55\), \(t(48)=3.23, p=0.002\), Cohen’s D=91.
- **H4:** Within the PDE group number of caregiver changes was not associated with family cohesion, \(r(24)=.04, p=.83\), or health competence, \(r(24)=.02, p=.92\). However, it was positively correlated with right hippocampal volume, \(r(25)=0.40, p=0.04\).

Discussion

- The PDE and nonPDE groups differed significantly on postnatal environmental variables (health & competence, family cohesion, and number of caregiver changes), and neuroanatomical variables (hippocampal volume).
- Bilateral hippocampal volume was larger for the PDE group; however, within the PDE group, only right hippocampal volume was related to caregiver changes.
- Only the PDE group experienced caregiver changes, a potential index of family continuity.
- Associations reinforce the theme that development is influenced by both prenatal and postnatal factors.

Limitations

- Indices of family functioning are not entirely reflective of the child environment.
- Analyses utilizing caregiver changes only consisted of the PDE group because the nonPDE group did not experience any caregiver changes.
- Results are limited in external validity by homogeneity in the sample.

Acknowledgements

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