IL-1β Activity Predicts Investment in Present Versus Delayed Outcomes

Emily K. Corrigan, Maggie Kleiser, Mary Eliza Baker, Jeffrey Gassen, Gary W. Boehm, Marjorie L. Prokosch, Randi P. Proffitt Leyva, Jordon D. White, Julia L. Peterman, Sarah E. Hill

Texas Christian University, Department of Psychology
email: emily.k.corrigan@tcu.edu

Results
- Serum IL-1β was related to a more present focus, inability to delay gratification, and greater global impulsivity. The relationship between serum IL-1β and a faster life history strategy as measured by the Mini-K was trending towards, but did not reach significance (p = .17).

We next sought to explore if characteristics known to negatively impact somatic condition would predict serum IL-1β levels, leading to a preference for present outcomes.

Analysis 1
- We examined the relationship between serum IL-1β levels and investment in present versus delayed outcomes.
- Participants provided answers to Delaying Gratification Inventory (DGI; Hoerger et al., 2011), Mini-K (Figueredo et al., 2014), Future Orientation scale (FO; Steinberg et al., 2009), and Barratt Impulsiveness Scale (BIS; Patton et al., 1995).
- We predicted that higher levels of serum IL-1β would be associated with temporal discounting and an overall faster life history strategy.

Correlations Between IL-1β and Focus on Present Outcomes

<table>
<thead>
<tr>
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<th>Serum IL-1β</th>
<th>Mini-K</th>
<th>Delayed Gratification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future Orientation</td>
<td>- .34**</td>
<td>.43***</td>
<td>-.58***</td>
</tr>
<tr>
<td>Delayed Gratification</td>
<td>-.37**</td>
<td>.48***</td>
<td>-.56***</td>
</tr>
<tr>
<td>BIS-11</td>
<td>.42**</td>
<td>-.49***</td>
<td></td>
</tr>
<tr>
<td>Mini K</td>
<td>-.21</td>
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</tbody>
</table>

Note. *p ≤ .05, **p ≤ .01, and ***p ≤ .001

Analysis 2
- Guided by previous literature, we selected five established somatic stressors as predictors of IL-1β activity:
  - Body Mass Index (BMI; Flegal et al., 2013)
  - Childhood Stress (Simmons & Bernstein, 1982)
  - Adult Stress (Prior et al., 2016)
  - Childhood Illnesses (Bozzoli et al., 2008)
  - Adult Illnesses (Klevens et al., 2007)
- Individually, none of these predictors were significantly correlated with serum IL-1β levels (ps > .21).
- The allostasis load literature, however, describes the cumulative effect of environmental stressors on the body (e.g., see Schulkin, 2004). With this in mind, we computed a summative somatic damage composite using Z scores of each variable listed above so that a higher score would represent greater somatic stress.

Analysis 3
- We next looked to explore if the relationship between IL-1β would remain after controlling for these sources of somatic stress.
- After controlling for all of these variables, the relationship between serum IL-1β and all measures of preference for investment in present outcomes (DGI, FO, & BIS) holds (ps < .03).

Discussion and Future Directions
- Serum IL-1β predicts investment in present over delayed outcomes. Consistent with the prediction that IL-1β is a marker of one’s somatic condition, factors known to negatively impact bodily health together predict levels of serum IL-1β.
- The relationship between serum IL-1β and investment in the present remains after controlling for antecedents to somatic damage. Previous literature has suggested that the role of internal and external factors in determining IL-1β-related outcomes might be moderated by variants of the IL1β, which warrants further investigation (Baune et al., 2010).
- It appears that the ability for elevated serum IL-1β to promote present temporal focus exhibits a path independence, such that the primary effect of IL-1β on preference for present outcomes is not sensitive to the factors which determine its rise.

Additional Preliminary Analyses
- We have preliminary data suggesting that factors harmful to somatic condition individually predict elevated release of IL-1β by peripheral blood-derived mononuclear cells (PBMCs) in vitro. Please ask the presenter for additional information.

Selected References
- Baune, B. T., Dannowski, U., Domschke, K., Janssen, D. G., Jordan, M. A., Ohrmann, P., ... & Baxter, A. G. (2010). The interleukin 1 beta (IL1B) gene is associated with failure to achieve remission and impaired emotion processing in major depression. Biological psychiatry, 67(6), 545-549.