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Stressing the Hormone: Biological and Psychosocial Factors associated with Chronic Stress

Kymberlee M. O'Brien
University of Massachusetts Boston, Kymberlee.obrien@umb.edu

Jerrold S. Meyer
University of Massachusetts - Amherst

Edward Z. Tronick
University of Massachusetts Boston

See next page for additional authors

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Presenter Information
Kymberlee M. O'Brien, Jerrold S. Meyer, Edward Z. Tronick, and Celia L. Moore

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Stressing the Hormone:
Biological and Psychosocial Factors associated with Chronic Stress

O'Brien, K.M.[1,2], Meyer, J.S.[3], Tronick, E. Z.[1,2], & Moore, C.L.[1]
UMass Boston, Developmental Sciences Research Center[1,] Child Development Unit[2]; UMass Amherst[3];

Introduction

Over two studies from the diverse UMB campus and neighboring communities, we examined linkages between biological, psychosocial, and cognitive factors related to acute and chronic stress.

Biological indicators of chronic stress were collected, including hair cortisol (measuring approximately 3 months retrospective cortisol secretion), waist-to-hip ratio, and resting systolic, diastolic blood pressure, and cardiovascular parameters.

These measures were tested for associations with subjective measures of stress including chaos in the home, city stress (i.e., frequency of violence, assessments of neighborhood safety), perceived daily and lifetime discrimination, and perceived personal stress.

In study 2, we also included indices of social identity as potential moderators of the relationship between stress and health, affective, and cognitive outcomes.

Method

Participants
Study 1: 134 adults (ages 18-67; *M* = 29.49, *SD* = 12.48)
Study 2: 180 adults (ages18-30, *M* = 22.56, *SD* = 3.54)

T1 Measures:
Biological measures of stress.
- Hair Cortisol
- Resting Blood Pressure
- Waist-to-hip ratio

Self-Reported Stress.
- Perceived Stress Scale (Cohen & Williamson,1988)
- City Stress Index (Ewart & Suchday, 2002)
- Chaos in the home (Matheny, et al., 1995)
- Well being
- ***Total Stress.*** Stress scales were z-transformed and a **Total subjective stress** score was calculated with mean scale items.

T2 Additional Measures:
- Daily Discrimination (Williams, 1999)
- Lifetime Discrimination (Williams, 1999)
- Social Identity (Schaafsma, 2001)
- Vigilance task: A modified Stroop (1935) task assessed affective vigilance by producing social devaluation cues. Dependent variables including latencies (ms) and physiological reactivity during the negative cues (e.g., loser, projects) as compared to the neutral cues block (e.g., house, book).

Results

Study 1

Figure 1.
Hair Cortisol and Subjective Stress: Hair cortisol was significantly and positively associated with Total subjective stress (TSS), (r = 1.9), p <.05).

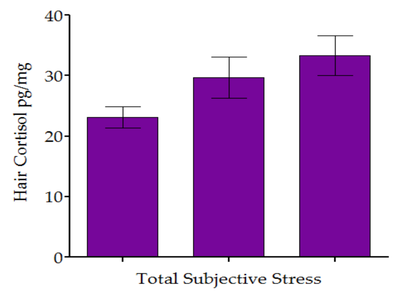


Figure 2.
Total Subjective Stress: The significant Race x SES interaction showed that high SES minorities reported the greatest TSS, as compared to the non-minorities, who reported decreases in stress, $F(2, 125) = 4.28$, p <.05.

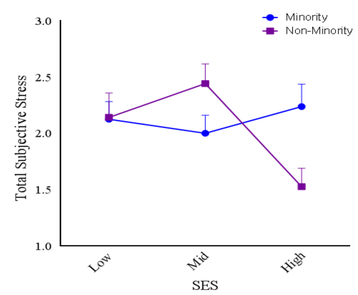
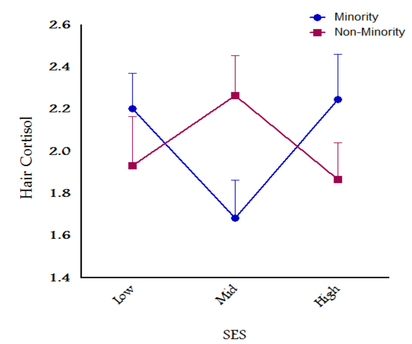


Figure 3.
Hair Cortisol and SES: The Race x SES interaction showed that minorities in low- and high- SES and non-minorities in mid-SES resulted in the greatest hair CORT levels, $F(2, 122) = 3.26$, p <.05.



Study 2

Figure 4.
Total Subjective Stress: Somewhat replicating t1, the Race x SES interaction showed that with higher SES, African-Americans reported greater TSS, and only the Latina/os reporting decreases in stress with higher SES, $F(6, 174) = 2.19$, p <.05.

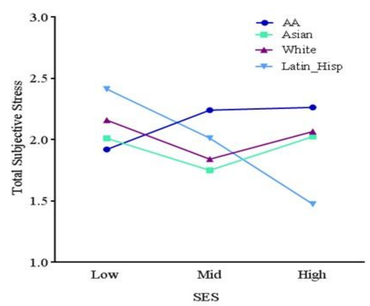


Figure 5.
Daily Discrimination: Race x SES interaction on Daily Discrimination $F(6, 177) = 2.40$, p <.05. The figure illustrates that African-Americans reported the highest frequency of perceived discrimination in high SES, and the Asian group in mid-SES; whereas White and Latina/os show little change by SES.

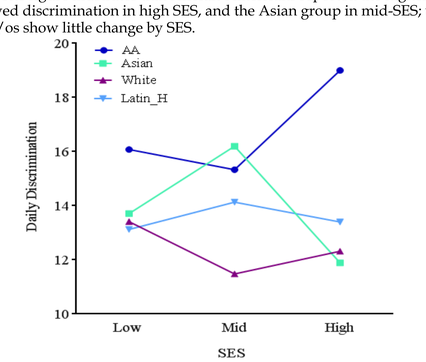


Figure 6.
Stroop Vigilance Task. Main effects of Race on latencies (left panel) and heart rate reactivity (right panel) during the Stroop Vigilance task ($F(3, 175) = 3.05$, p<.05; ($F(3, 174) = 2.20$, p<.05 respectively). African-Americans produced the longest latencies and greatest increases in heart rate.

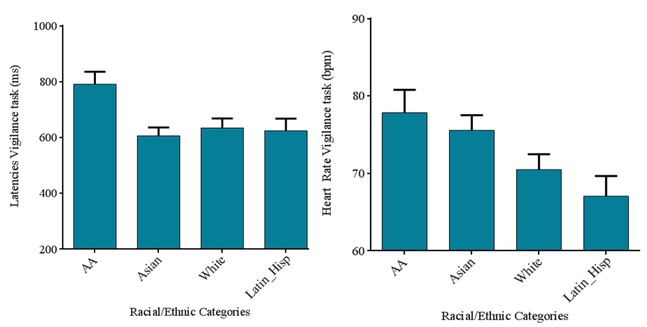
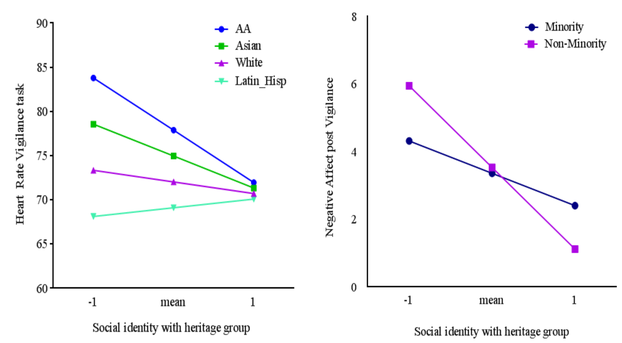


Figure 7.
Social Identity. Those with high social identity showed little heart rate reactivity during the Stroop Vigilance task, (left panel) $F(6, 172) = 2.5$, p <.05. Right panel: there also appears to be a protective result: those with high social identity reported greater decreases in negative mood post Vigilance task, compared to the low social identity groups, $F(1, 172) = 2.6$, p <.01.



Summary

STUDY 1:
•**Hair CORT** is positively and moderated associated with a composite of total subjective stress (Figure 1).

•**Race X SES**: Figure 2 shows that at any level of SES, minorities have little change in Total subjective stress, compared to non-minorities, who show the expected decrease in stress with higher SES.
•**Race X SES**: Figure 3 illustrates that both low and high SES minorities show higher CORT, similar to the mid-SES non-minorities.
What are the potential mechanisms?

•Evidence exists that minorities in higher SES may have greater daily experiences of **discrimination**, or social interactions where race becomes more salient (e.g., Schaafsma, 2011; Brody, et al., 2007).
•Evidence also suggests that the extent to which an individual identifies with their ethnic/heritage group may moderate experiences of discrimination, such that group stereotypes have less negative impact (e.g., Schaafsma, 2011; Noh, 1999).
•The unexpected findings of higher stress in higher SES for minorities led us to the further investigations in **study 2.**

STUDY2:
•**Race X SES**: Figure 4 shows that most groups in **higher SES reported higher Total subjective stress**: African-Americans report the greatest and Latina/os show the expected benefit of decreases in stress with higher SES (Figure 4).
•**Race X SES**: Figure 5 illustrates that African-Americans also report greater discrimination in high SES.
•**Main effects:** Figure 6 (left panel) demonstrated evidence for greater vigilance as indexed by longer latencies, and increased heart rate reactivity during the vigilance task (right panel).

•*However, we hypothesized that strong social identity with one's heritage group would be protective for some biological and psychological outcomes.*

•**Race X Social identity:** Figure 7: Those with strong **social identity** showed little change in heart rate reactivity during the vigilance task (left panel).
•**Race X Social identity:** In the right panel, for those reporting strong social identity, both minority and non-minority groups reported greater decreases in negative mood.

The present research illuminates psychosocial mechanisms that may be both beneficial and costly, such as a strong social identity with ones heritage group, particularly for those who experience high stress and more frequent discrimination. Future work could add related measures, including self-identity, self-esteem, and other biological measures of allostatic load to further understand these complex findings.

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The first author can be contacted at University of Massachusetts, Boston
Kymberlee.obrien@umb.edu, 617-287-3169
Horizon Center, Dept of Psychology

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