

Examining the "Undoing Hypothesis" in a Community Sample via Multilevel Moderation Analyses



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Introduction

- The *undoing hypothesis* of the Broaden and Build Theory (Fredrickson, 2004) suggests that positive emotions "undo" the aftereffects of negative emotions.
- Folkman & Moskowitz (2000) have proposed that one purpose of this undoing effect is to facilitate adaptive coping.
- Positive reappraisal (i.e., focusing on the good aspects of current or past situations) has been identified as a possible coping mechanism through which positive emotions exert their undoing effect.
- Using a subset of data from the Notre Dame Study of Health & Wellbeing (NDHWB), the current investigation examined whether positive affect (PA) buffers the stress-negative affect (NA) relationship.

Method

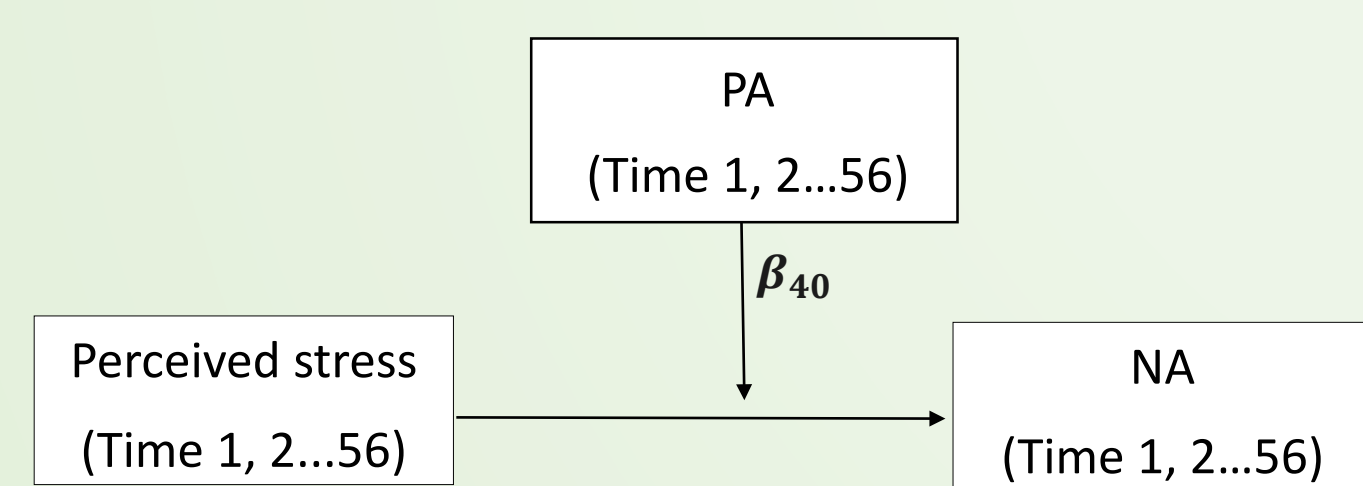
- A subset of participants (N = 694) were selected from the NDHWB, a longitudinal study exploring the processes and correlates of stress and well-being.
- Wave 7 (collected April 2013 – 2014) daily diary data from the NDHWB was used to assess the direct and interaction effects of perceived stress and PA on daily NA.
- For 56 consecutive days, participants completed the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), and the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988).

Data analytic strategy

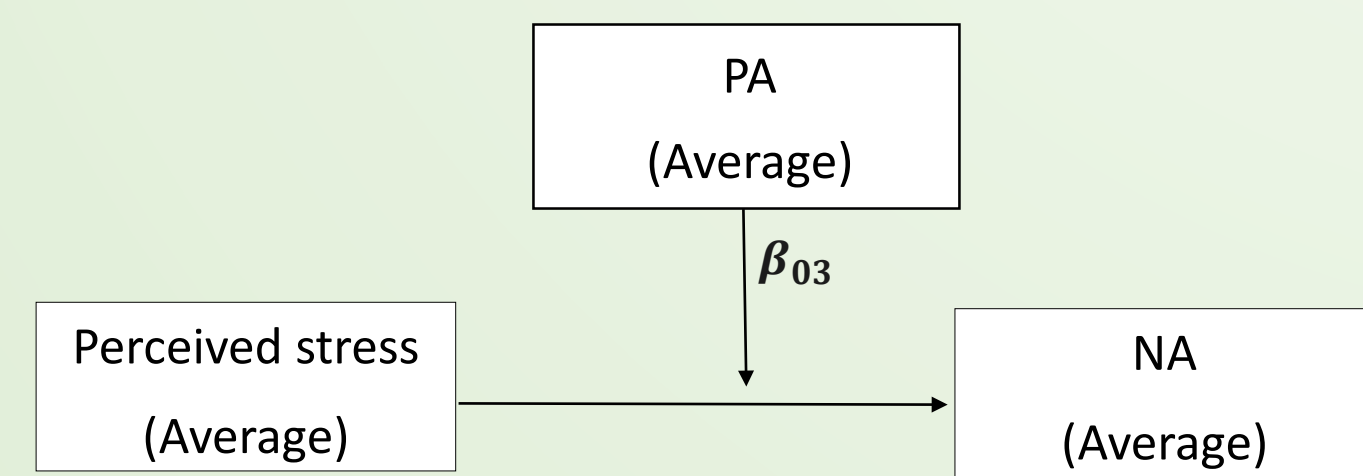
- A multilevel moderation analysis was used to examine the within-, between-, and cross-level moderation effects (Figure 1) of PA on the stress-NA relationship in daily ($t = 56$) diary burst data.

Figure 1. Path diagrams of the within-, between-, and cross-level moderation effects.

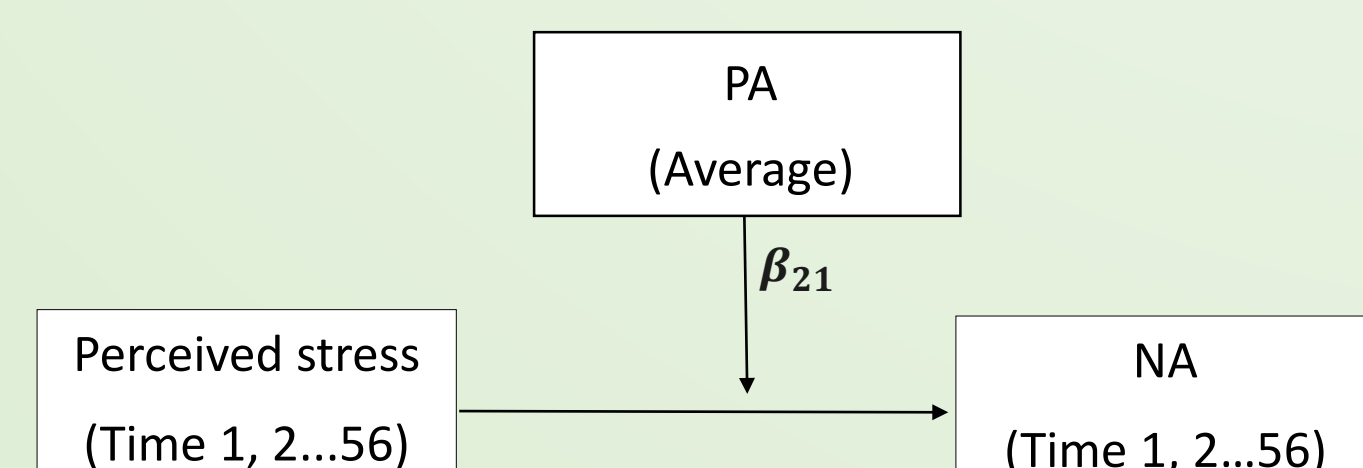
A. Within-person moderation effect



B. Between-person moderation effect



C. Cross-level moderation effect



- The within-person moderation effect evaluated whether the daily within-person stress-NA relationship is attenuated more in individuals' who experience greater daily PA. The between-person moderation effect examined whether the buffering effects of PA on the stress-NA relationship is greater for individuals with a higher average of PA experiences. The cross-level moderation investigated whether PA buffers the daily stress-NA relation more for individuals who experience greater PA on average.
- Based on the recommendations of Wang & Maxwell (2015), within- and between- person effects were disaggregated by including time as a level-1 covariate, and person-mean centering the PA and stress variables.
- SAS PROC MIXED was used to fit the following multilevel moderation model:

Level-1 equation.

$$NA_{ij} = a_{0i} + a_{1i}time_{ij} + a_{2i}(Stress_{ij} - Stress_i) + a_{3i}(PA_{ij} - PA_i) + a_{4i}(Stress_{ij} - Stress_i)(PA_{ij} - PA_i) + e_{ij}$$

Level-2 equation.

$$a_{0i} = \beta_{00} + \beta_{01}Stress_i + \beta_{02}PA_i + \beta_{03}Stress_i.PA_i + \varepsilon_{0i}$$

$$a_{1i} = \beta_{10} + \varepsilon_{1i}$$

$$a_{2i} = \beta_{20} + \beta_{21}PA_i + \varepsilon_{2i}$$

$$a_{3i} = \beta_{30} + \beta_{31}Stress_i + \varepsilon_{3i}$$

$$a_{4i} = \beta_{40} + \varepsilon_{4i}$$

Results

- Results (summarized in Table 1) revealed a significant within-level moderation effect (estimate = -.0092, $p < .0001$; see Table 1), indicating that the daily within-person effects of perceived stress on NA is significantly attenuated when an individual experiences a higher level of daily PA.
- The between-level moderation effect was also significant (estimate = 0.0089, $p < .0002$; see Table 1), suggesting that the between-person stress-NA relationship is attenuated more in individuals with a greater average of PA compared to those who experience less PA on average.
- The cross-level moderation was NS.

Table 1. Results from Multilevel Moderation Analyses

Effect	Estimate	SE	DF	t-value
Intercept (β_{00})	-2.6729	1.4730	690	-1.81
Time (β_{10})	-0.0122	0.0018	33E3	-6.72
Daily Stress (β_{20})	0.7601	0.0402	33E3	18.89
Daily PA (β_{30})	0.0024	0.0302	33E3	0.08
Average stress (β_{01})	0.7720	0.0695	690	11.11
Average PA (β_{02})	0.1958	0.0466	690	4.20
Within-person (β_{40})	-0.0092	0.0007	33E3	-14.01
Between-person (β_{03})	-0.0089	0.0023	690	-3.80
Cross-level (β_{21})	0.0015	0.0015	33E3	0.99

Note: PA = positive affect; SE = standard error; DF = degrees of freedom; p-values less than .05 are bolded.

Discussion

- The present study explored the *undoing hypothesis* by examining whether PA buffers the stress-NA relationship. Using daily-diary data collected across 56 consecutive days, multilevel moderation analyses examined the within-, between-, and cross-level moderation effects of PA.
- Results demonstrated a significant effect for the within-level moderation effect. Significant effects were also found for the between-level moderation effect. However, the cross-level moderation effect was not significant.
- The present findings indicate that that the daily within-person stress-NA relationship is attenuated when a person experiences a higher level of PA. Similarly, the stress-NA relationship is attenuated in individuals who experience greater levels of PA compared to those who experience less. (i.e., between-person effect).
- Findings from this study indicate that the experience of PA can be used to successfully mitigate the negative emotional impact of stressful life experiences, and thus supports the *undoing hypothesis* of the Broaden and Build Theory.
- However, due to the longitudinal nature of the present study, it is unknown *how* PA buffers the relationship between stress and NA. That is, the present study was unable to test whether positive reappraisal served as the coping mechanism through which PA exerts its undoing effects.

Future directions

- Experimental research is needed to determine whether PA attenuates the stress-PA relationship via positive reappraisal.
- Importantly, given that PA has been shown to attenuate cardiovascular reactivity associated with negative emotional arousal, future research should also examine whether PA undoes the aftereffects of other physiological systems.
- Particular emphasis should be placed on examining whether PA can attenuate the hypothalamic-pituitary-adrenal (HPA) axis stress response given that altered HPA functioning is associated with impoverished physical and psychological well-being.

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