

Short Report

Positive Emotion Displayed in a Writing Task Predicts Salivary Biochemical Changes

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ABSTRACT: *This investigation sought to begin detailing the biochemical changes that occur in response to a mood induction writing task. The level of positive emotion found in the participant writing samples was found to be predictive of increased levels of secretory immunoglobulin A, dehydroepiandrosterone and cortisol. These findings are in congruence with the results of other mood induction tasks.*

One frequently utilized emotion-altering experimental technique is the mood induction writing task, where participants write about emotionally-arousing topics (e.g., Baker & Guttfreund, 1993). Research on the biochemical changes induced by this task has been limited. One of the few relevant investigations found that writing about negative emotive topics lowered stress hormone levels (Warnick & Liddell, 2008, this issue). This finding may be due to the writing task's similarities to expressive written therapy (see Pennebaker, 1997). Pennebaker and colleagues have demonstrated that written therapy produces positive health outcomes (Pennebaker, 1997). Further, other researchers have found that the level of emotion displayed predicts degree of health outcome (Gillis, Lumley, Mosley-Williams, Leisen, & Roehrs, 2006). In the current study, we investigated whether the level of emotion produced by a mood induction writing task predicted changes in levels of the immune system marker secretory immunoglobulin A (SIgA), the sex steroid dehydroepiandrosterone (DHEA) and the stress hormone cortisol.

METHOD

This investigation utilized the data from a previous study in this laboratory (see Warnick & Liddell, 2008). In that experiment, participants wrote for 30 min in one of two groups: a positive group that wrote about someone they loved or a negative group that wrote about someone they hated. Participants provided a saliva sample both before and after the writing task that was analyzed via ELISA for SIgA, DHEA, and cortisol concentration (SIgA, DHEA and ER HS Cortisol Research; Salimetrics, LLC, State College, PA, USA) according to the manufacturer's instructions. The intra-assay coefficients for each assay ranged from 2.11% to 4.45%.

The essays composed in the writing task were digitally transcribed and the level of emotion was determined by the *Linguistic Inquiry and Word Count* software program (version 2007). Each essay was analyzed for the percentage of words displaying positive emotion, negative emotion, anxiety, sadness and anger.

Ethical Considerations

This experiment was approved by the Arkansas Tech University Human Subjects Research Committee and conducted under the ethical guidelines of the American Psychological Association.

RESULTS

In the positive group, stepwise linear regression analyses revealed that increased level of positive emotion was the sole significant predictor of increased

concentrations of SIgA ($\beta=.876$, $p<.0001$), DHEA ($\beta=.767$, $p<.0001$) and cortisol ($\beta=.84$, $p<.0001$). Similarly, in the negative writing task, stepwise linear regression analyses revealed that increased levels of positive emotion was the sole significant predictor of increased concentrations of SIgA ($\beta=.718$, $p<.005$), DHEA ($\beta=.679$, $p<.005$) and cortisol ($\beta=.872$, $p<.0001$).

DISCUSSION

This experiment investigated whether the level of emotion displayed in a mood induction task predicted biochemical changes. The level of positive emotion was found to be predictive of increases in SIgA, DHEA and cortisol. These findings are consistent with studies that show positive affect correlates with androgen release (Booth, Shelley, Mazur, & Tharp, 1989) and increased immune system function (Stone, Cox, Valdimarsdottir, Jandorf, & Neale, 1987). The finding that positive emotive writing is associated with the release of cortisol is consistent with the previous finding that negative emotive tasks decrease cortisol levels (Warnick & Liddell, 2008). These findings begin biochemically profiling the writing task and suggest potential changes associated with expressive therapy.

REFERENCES

- Baker, R.C., & Gutfreund, D.G. (1993). The effects of written autobiographical recollection induction procedures on mood. *Journal of Clinical Psychology*, *49*, 563-568.
- Booth, A., Shelley, G., Mazur, A., Tharp, G., & Kittok, R. (1989). Testosterone, and winning and losing in human competition. *Hormones and Behavior*, *23*, 556-571.
- Gillis, M.E., Lumley, M.A., Mosley-Williams, A., Leisen, J.C.C., Roehrs, T. (2006). The health effects of at-home written emotional disclosure in fibromyalgia: A randomized trial. *Annals of Behavioral Medicine*, *32*, 135-146.
- Pennebaker, J.W. (1997). *Opening up: The healing power of expressing emotions* (revised edition). New York: Guilford Press.
- Sloan, D.M., & Marx, B.P. (2004). A closer examination of the structured written disclosure procedure. *Journal of Consulting & Clinical Psychology*, *72*, 165-175.
- Stone, A.A., Cox, D.S., Valdimarsdottir, H., Jandorf, L., & Neale, J.M. (1987). Evidence that secretory IgA antibody is associated with daily mood. *Journal of Personality and Social Psychology*, *52*, 988-993.
- Warnick, J. E., & Liddell, C. D. (2008). The neurochemical profile of positive and negative emotions. *Electronic Journal of Integrative Bioscience*, *5(1)*,35-38.