

[in press, *Behavioral and Brain Sciences*, August 2016]

Dimensions of Environmental Risk Are Unique Theoretical Constructs

[Commentary on Van Lange, Rinderu, & Bushman, 2016]

Nicole Barbaro & Todd K. Shackelford

Oakland University

Department of Psychology

Corresponding author: Nicole Barbaro, 218 Pryale Hall, 654 Pioneer Drive, Oakland University,
Rochester, Michigan 48309. nmbarbar@oakland.edu

Abstract

Life history theory serves as the foundation for the CLASH model of aggression. This model embodies several misunderstandings of life history constructs and principles, however. The CLASH model does not recognize that environmental harshness and environmental unpredictability are unique theoretical constructs, rendering predictions and implications from the model suspect.

Dimensions of Environmental Risk Are Unique Theoretical Constructs

Life history theory is a theoretical framework for addressing how and why organisms, including humans, allocate resources to conflicting life tasks (Del Giudice, Gangestad, & Kaplan, 2015; Roff, 2002; Sterns, 1992). Life history theory is complex and rich in its predictions, but is often oversimplified when applied to human psychology and behavior. Van Lange et al. (2016) also present an oversimplification of life history theory as the foundation for the CLASH model proposed to explain aggression and violence across the world. In particular, the model incorrectly specifies how environmental harshness and unpredictability affect life history strategies and behavioral outcomes. Here, we discuss three misunderstandings of life history theory expressed in the target article.

First, the CLASH model appears to conflate the constructs of environmental harshness and environmental unpredictability into a single predictor of individual variation in life history outcomes (e.g., aggression). The model correctly identifies that environmental harshness and environmental unpredictability both function to regulate life history strategies. The model incorrectly implies, however, that harshness and unpredictability are dependent constructs. Ellis et al.'s (2009) dimensions of environmental risk—harshness and unpredictability—are independent constructs that exert *unique* influences on individual variation in life history strategies. The CLASH model of aggression specifies that environmental harshness and environmental unpredictability determine the overall stress of the environment. In turn, this overall environmental stress is predictive of aggression. Environmental harshness and environmental unpredictability can be positively associated, such that a given environment can be harsh *and* unpredictable. The CLASH model, however, does not account for, or acknowledge, that (1) dimensions of environmental risk can be inversely associated (e.g., a predictable but harsh environment), and (2) environments characterized as harsh or unpredictable are not hypothesized to be exclusively associated with fast life histories.

Ellis et al. (2009) specify the conditions under which high environmental harshness and greater environmental unpredictability facilitate the adoption of either fast *or* slow life history strategies (pp. 218, 230). Whether environmental harshness or environmental unpredictability are associated with faster life

history strategies is determined by age-specific rates of morbidity-mortality. Depending on whether external threats resulting from ecological factors exert greater influence on juvenile or adult morbidity-mortality rates (or variation of morbidity-mortality rates), environmental harshness and unpredictability can facilitate faster or slower life histories. The CLASH model does not specify whether ecological conditions of temperature affect threats to juvenile or adult morbidity-mortality, or both. And neither does the CLASH model specify whether or how average temperature or variation in temperature differentially affect juvenile and adult morbidity-mortality.

Second, the CLASH model assumes that environmental harshness and environmental unpredictability exert similar and equal influence on specific life history outcomes over the lifespan. However, research has demonstrated that environmental harshness and unpredictability exert unique influences on life history outcomes at different developmental stages. For example, environmental unpredictability in childhood, but not environmental harshness, is uniquely associated with perpetration of intimate partner violence by both men and women (Barbaro & Shackelford, 2016), and criminal behavior in young adulthood (Simpson, Griskevicius, I-Chun Kuo, Sung, & Collins, 2012). Other research has demonstrated that environmental harshness in adolescent years exerts unique influence on deviant behavior in adolescence, such as drug and alcohol use (Brumbach, Figueredo, & Ellis, 2009). Environmental harshness and environmental unpredictability, therefore, may uniquely predict aspects of life history strategies, including aggressive behavior, over the lifespan.

The CLASH model does not readily accommodate, or discuss, the possibility that the dimensions of environmental risk may exert differential influence on the outcomes of interest. Conflating environmental harshness and environmental unpredictability into a single construct of environmental stress is not warranted, and may bias the results of research guided by the CLASH model. Ellis et al. (2009) detail the properties of environmental risk dimensions, and note how each dimension is associated with external threats to morbidity-mortality at various stages of development. Life history theorists, moreover, have suggested that environmental harshness and unpredictability may not exert equal

influence on life history strategies (Roff, 2002), such that the effects of environmental unpredictability might be smaller than the effects of environmental harshness (Del Giudice et al., 2015).

Third, the construct of environmental unpredictability is not presented accurately in the target article. The authors assert that environmental unpredictability “refers to the uncertainty of future outcomes.” This definition is incorrect. Environmental unpredictability reflects the extent to which ecological factors produce variation in external morbidity-mortality threats (Ellis et al., 2009). Hypotheses derived from the CLASH model, therefore, rest on a faulty operationalization of environmental unpredictability.

The misunderstandings of life history theory embodied by the CLASH model, and the relationship between ecology and behavioral outcomes, is further evident in a primary proposition of the model. The authors suggest that greater seasonal variation in temperature should facilitate slower life history strategies, because seasonal variation necessitates that individuals “plan and prepare for the next season.” However, life history theory specifies how ecology influences external threats to morbidity-mortality (e.g., increased pathogen load in the environment), which then influence the adoption of life history strategies. Because the CLASH model does not specify which external morbidity-mortality threats are affected by temperature, it is not clear how temperature is hypothesized to impact human life history strategies. For instance, temperature variation might cause greater variation in *specific* sources of external morbidity-mortality in northern environments. During colder winter months, resource availability is lower. In the hotter summer months, pathogen load and disease prevalence are greater. Greater temperature variation, then, produces greater variation in particular external threats to morbidity-mortality. It could alternatively be argued that temperature variation could lead to fast, rather than slow life history strategies.

Rather than providing an “extension” of life history theory, the CLASH model for aggression is founded on misunderstandings of life history theory. The CLASH model incorrectly specifies how environmental harshness and environmental unpredictability exert influence on life history strategies.

Future applications of the CLASH model should recognize that dimensions of environmental risk are, in fact, unique theoretical constructs.

References

- Barbaro, N., & Shackelford, T. K. (2016). Environmental unpredictability in childhood is associated with anxious romantic attachment and intimate partner violence perpetration. *Journal of Interpersonal Violence*. Advance online publication. <http://dx.doi.org/10.1177/0886260516640548>
- Brumbach, B. H., Figueredo, A. J., & Ellis, B. J. (2009). Effects of harsh and unpredictable environments in adolescence on development of life history strategies: A longitudinal test of an evolutionary model. *Human Nature*, *20*, 25–51.
- Del Giudice, M., Gangestad, S. W., & Kaplan, H. S. (2015). Life history theory and evolutionary psychology. In D. M. Buss (Ed.), *The handbook of evolutionary psychology (Vol 1)* (2nd ed.) (pp. 88-114). New York: Wiley.
- Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental dimensions of environmental risk: The impact of harsh versus unpredictable environments on the evolution and development of life history strategies. *Human Nature*, *20*, 204–268.
- Roff, D. A. (2002). *Life history evolution*. Sunderland, MA: Sinauer.
- Simpson, J. A., Griskevicius, V., I-Chun Kou, S., Sung, S., & Collins, A. (2012). Evolution, stress, and sensitive periods: The influence of unpredictability in early versus late childhood on sex and risky behavior. *Developmental Psychology*, *48*, 674-686.
- Sterns, S. (1992). *The evolution of life histories*. Oxford: Oxford University Press.
- Van Lange, P. A. M., Rinderu, M. I., & Bushman, B. J. (2016). Aggression and Violence Around the World: A Model of CLimate, Aggression, and Self-control in Humans (CLASH). *Behavioral and Brain Sciences*. Advanced online publication. <http://dx.doi.org/10.1017/S0140525X16000340>