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Considering the role of ecology on individual differentiation

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Abstract

Our commentary articulates some of the commonalities between Baumeister et al.'s theory of socially differentiated roles and Strategic Differentiation-Integration Effort. We expand upon the target article's position by arguing that differentiating social roles is contextual and driven by varying ecological pressures, producing character displacement not only among individuals within complex societies, but also across social systems and multiple levels of organization.

Baumeister et al. present a provocative paper arguing that psychological theories of group and self can be more comprehensive if they include the concept of individual differentiation, which suggests that productivity and accountability will increase in groups where individuals are assigned distinct roles. Integrative, multilevel papers like this are rare in our field; thus, this endeavor is laudatory. The authors omitted one fundamental component, however: an outline of a mechanism for determining the degree to which groups differentiate among individuals. What causes some groups to highly specialize while others remain relatively socially stagnant and undifferentiated?

Although we agree with the core of the authors' position, we also present an evolutionary ecological perspective that complements and expands upon the authors' theory by specifying how and why certain ecological factors promote individual differentiation. Specifically, Baumeister et al.'s work on individual differentiation mirrors recent work investigating the *Strategic Differentiation-Integration Effort* (SD-IE) hypothesis, which posits that specialization and role differentiation within and among individuals and groups is an evolutionary adaptation to ecological pressures.

In essence, SD-IE articulates the ecological conditions under which individual differentiation should occur and ultimately why it does. According to SD-IE theory, slow life history strategies favor the evolution and development of individuals who are strategically

differentiated in cognition and behavior, fueling the proliferation of individuals into varied micro-niches (Figueredo et al. 2013). Whereas high population densities typically promote higher levels of social competition among conspecifics, SD-IE permits *niche-splitting* through social specialization and role differentiation, and thus a certain degree of release from this competitive pressure. Once competitive release has been achieved, social cooperation among conspecifics, requiring more egalitarian distribution of resources, and niche specialization would increase labor productivity and extraction of resources. For example, the theory of *embodied capital* posits that division of labor between the sexes emerged as a strategy to maximize productivity and resource acquisition within the household, broadly defined (Kaplan et al. 2001).

Life history theory has informed evolutionary biology and ecology to explain human between-group differences and within-group differences (Ellis et al. 2009). These life history effects are typically found in biological traits such as birth spacing, age of maturity, life span, and so forth (Stearns et al. 2008) but have recently been shown to also involve psychological traits and certain aspects of social organization (Ellis et al. 2009; Figueredo et al. 2006; Kaplan & Gangestad 2005). Figure 1 displays a conceptual schematic of the pathways that are believed to be involved in how life history strategy affects individual differentiation within complex social groups.

Predictable and controllable ecological conditions produce environments characterized by low levels of stressors that facilitate the proliferation and habitation of individuals in the locale. Proliferation of individuals then saturates the environment with conspecifics and increases population density and stability. As a result, competition emerges between individuals as access to resources decreases relative to population increase. This source of resource scarcity is an ecological factor that influences life history strategies toward the slower end of the continuum. This is because the ecology can produce differences in life history strategies on the slow–fast continuum via development (Woodley 2011). Broadly, environments that are characterized as unpredictable and where sources of illness and death are extrinsic (i.e., uncontrollable by intrinsic forces) produce environments that foster fast life history strategies. Conversely, life history theory predicts that stable, predictable, and controllable ecological conditions favor the evolution and development of slow life history strategies (Ellis et al. 2009).

The ecology also has direct effects on the social dynamics of a collective (Figueredo et al. 2015). Resource scarcity (discussed in Ellis et al. 2009) can result from depletion of resources such as drought as well as from population saturation of an area.

Thus, high population density environments containing low resources should favor cooperative social orientations and niche specialization. In contrast, harsh and unpredictable environments would produce strategically integrated individuals who generalize across niches, maximizing their plasticity to maneuver between social niches.

Thus, slow life history strategies favor strategic differentiation into social micro-niches. Evidence for cognitive and strategic differentiation-integration has been found between

individuals (Figueredo et al. 2013; Woodley et al. 2013) and at population levels (Armstrong et al. 2014; Fernandes & Woodley 2013; Woodley et al. 2014).

One place where life history strategies can impact social dynamics is through *social effort* or the allocation of time and bioenergetic resources toward cooperative and/or competitive strategies (Figueredo et al. 2015). Slow LH strategies promote prosocial, affiliative behaviors.

Socially, fast life history individuals would be oriented toward opportunistic or antagonistic social behavior such as insecure attachment, low-quality bonds, and conflict (Belsky et al. 1991; Figueredo & Jacobs 2010). Conversely, predictable environments should produce slow life history individuals who are oriented toward cooperative and affiliative social behavior.

Groups that socially cooperate will tend to differentiate because those groups with higher degrees of individual specialization are more efficient at extracting and utilizing resources from the environment (Cabeza de Baca & Figueredo 2014). This phenomenon has been termed group-level character displacement, this being the group-level analogue to individual-level character displacement (Woodley & Fernandes 2014). Nevertheless, there are costs as well as benefits: Brain growth and social skill acquisition require large investment from parents and alloparents (Alexander 1974; Lancaster & Kaplan 2009), selecting higher levels of maternal and paternal effort (Cabeza de Baca et al. 2012).

In conclusion, we suggest that the authors consider the role of ecology when examining individual-societal social dynamics and specialization as we have previously discussed (Cabeza de Baca & Figueredo 2014). We applaud Baumeister and colleagues' integration of the individual and the collective as a necessary step toward assimilating social-personality psychology with group and population studies. We do suggest, however, that the authors should clearly establish the ecological parameters that contribute toward group cohesion and system gain. We look forward to the authors' response and hope our comments enhance their theory.

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Figure 1.

(Cabeza de Baca et al.). Life history model of differentiation. Individual differentiation results from a sequence of constraints at varying levels of organization. Increases in ecological stability and thus in environmental predictability result in increased population densities and slower life history strategies. This, in turn, promotes increased cooperation and thus strategic differentiation.