Culture and Child Attachment Patterns: a Behavioral Systems Synthesis

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Abstract

We propose that the two dominant culture institutions (individualist and collectivist) are neither learned nor cognitively represented by the people who practice them. Instead, they exist as group-level payoff structures that reflect differential distributions of child attachment patterns within a society. Individualist societies reflect an overrepresentation of insecure-avoidant attachments and collectivist societies reflect an overrepresentation of insecure-anxious attachments. Moreover, attachment patterns are embodied rather than representational—schedule-induced rather than incrementally shaped or verbally learned. If attachment patterns are schedule-induced, the prospects are poorer for effecting cultural change through economic incentives or informational campaigns (top–down). Rather, cultural practices will be responsive to changes in family practices—to the extent they affect attachment patterns (bottom–up). For example, if breastfeeding rates decline or the workforce participation of women increases, a society will become more individualist and less collectivist. That is because those practices increase avoidant as compared to anxious attachments. Moreover, because insecurely attached children are behaviorally less flexible than are securely attached children, the former have a greater impact on cultural practices than do the latter.

Keywords Attachment · Collectivist · Culture · Exaptation · Individualist · Schedules of reinforcement

The sources of social order differ across collectivist and individualist societies (Yamagishi & Hashimoto, 2016). *Individualist* societies maintain social order by a strong, central, rule of law. In *collectivist* societies, the rule of law is weak, necessitating regulation at a more local

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level. These cultural differences correspond with different social and psychological propensities of individuals inhabiting them (Armenta, Knight, Carlo, & Jacobson, 2011; Frias, Shaver, & Díaz-Loving, 2014; Heinke & Louis, 2009; Van Hoom, 2015). For instance, collectivists are more likely to have an external locus of control, prioritize group over self, promote in-group favoritism and harmony, sharply distinguish friends from strangers, seek social support, display empathy, attend more carefully to signals of approval and disapproval, and have a narrower trust radius. These characteristics reflect the core belief of collectivism that survival requires close connections to others, and a core strategy of managing and preserving *strong-tie relationships*. Individualists, by contrast, are characterized by an internal locus of control, attention to internal psychological states of self and others, greater self-expression and self-enhancement, a broader trust radius, and a tendency to engage in less altruism but more public prosocial behavior. These personal characteristics are consistent with the core belief animating individualist societies—that human potential is best fulfilled when people foster engagement with new prospective partners (*weak-tie relationships*) for personal gain, free of strong-tie constraints (Yamagishi & Hashimoto, 2016).

These individual-level differences across societies reflect contingencies for *security-seeking* and *novelty-seeking* social behaviors. Collectivism, as a response to the dangers of exploitation outside of strong-tie relationships, shapes individuals towards social security-seeking; whereas individualism incentivizes social novelty-seeking in the form of partnering and cooperating with individuals outside of established, strong-tie networks. According to Yamagishi and Hashimoto (2016), collectivist settings cultivate bonding-type social capital, whereas individualist settings cultivate bridging-type social capital. Of course, contingencies and cultures exist as continua rather than as dichotomies, but the simplification is relevant for the study of social and individual differences across societies (Hofstede, 2001; Triandis & Gelfand, 2012).

A similar dialectic concerning security-seeking and novelty-seeking—bonding and bridging—is described by attachment theory (Ainsworth, 1979; Bowlby, 1988). Attachment theory defines *relatively stable behavioral tendencies* that arise from environmental contingencies that exist within the family unit. These contingencies concern differential responsiveness of caretakers to the security-seeking behavior of infants and children, and result in at least three distinguishable patterns or categories of attachment: secure, insecure-anxious, and insecure-avoidant.¹ A *secure attachment* arises when child security-seeking overtures are met with caretaker behavior that consistently results in child distress reduction—a pattern of caretaking that is *predictably responsive*. Attachment theorists describe this pattern of attachment as ideal, and as allowing for confident environmental exploration from a secure social base (Ainsworth, 1979; Bowlby, 1988; cf., Keller et al., 2018). The predicted developmental outcome is one of characterological flexibility for individuals raised under such circumstances, and the maximization of outcomes related to both bonding and bridging, security-seeking and novelty seeking. Securely attached individuals are distinguished by their adaptability.

As an alternative, insecure attachment comes in at least two varieties, both of which apparently reflect less balance and flexibility across the bonding and bridging divide.

¹ Attachment categories other than those just described have been identified, most notably *insecure-disorganized* attachment (Lyons-Ruth & Jacobvitz, 2008). However, unlike the other three that describe variations on normal development, *insecure-disorganized* attachment is thought to reflect serious maladjustment arising from factors that impede normal development, such as abuse and neglect. As such this attachment category is not conceptualized as corresponding with culture.

Insecure-avoidant attachment describes attachment that privileges bridging and relationships with weak-tie conspecifics. It arises from caretaking that is *predictably unresponsive* (i.e., an extinction schedule), and over time results in the rejection by the child of the caretaker as a source of security. Because caretaker-directed overtures are not effective with regard to the alleviation of distress, the child's employment of such overtures diminishes. As a result, avoidantly attached children engage the social world without attempts to obtain or coax responsivity from their attachment figures. They seek comfort and satisfaction outside of strong-tie relationships. The condition of such children was described by John Bowlby (1988, p. 167) as one of "compulsive self-sufficiency."

Insecure-anxious attachment, also called anxious-ambivalent attachment, describes behavior wherein children display a preoccupation with the caretaker and attempt to influence his or her behavior toward greater predictability, responsiveness, and bonding (Beckes, Simons, Lewis, Le, & Edwards, 2017). This attachment pattern arises from caretaking behavior that is *unpredictably responsive* (Ainsworth, 1969; Beckes et al., 2017). That is, the safety-seeking behavior of the child is sometimes met with a distress-reducing response from the caretaker, and sometimes not. This intermittency corresponds with what behavioral researchers have termed a *variable ratio schedule of negative reinforcement* (Ferster & Skinner, 1957). The qualifier, negative, refers to the fact that the child experiences an alleviation or reduction of an aversive state—in this case, the experience of distress—as a consequence of the caretaker response to his or her behavior. And to the extent that this reinforcement is experienced only intermittently—and unpredictably—reward is said to be uncertain or variable, as opposed to continuous. It is noteworthy that the complex of behaviors that Ainsworth (1969) labeled insecure-anxious attachment is consistent with those of nonhuman animals exposed to variable reinforcement schedules (Anselme, 2016; Staddon & Simmelhag, 1971). In particular, such schedules increase the *incentive salience* of rewards and *sign-tracking* behavior. That is, animals exposed to reward uncertainty respond with greater effort to procure rewards, and devote more attention to the stimuli that signal them (Anselme, 2016; Hart, Clark, & Phillips, 2015). Likewise, human insecure-anxious attachments are characterized by a preoccupation with one's caretaker and attempts to prompt predictable responsiveness from them (Beckes et al., 2017).

The term used to describe this class of behavior is *schedule-induced behavior* (or *adjunctive behavior*; Segal, 1972). It is characterized by species-specific complexity that arises spontaneously. It is distinguished from operant and rule governed behavior—which involves incremental shaping or verbal learning, respectively (cf., Killeen & Pellón, 2013). Previously viewed as insufficiently understood to have explanatory value (Segal, 1972), schedule-induced behavior is now implicated as potentially causal with respect to complex biobehavioral phenomena including foraging and fat storage (Anselme & Güntürkün, 2019), addictive behavior (Berridge & Robinson, 2016), creativity (Pryor, Haag, & O'Reilly, 1969), superstition (Skinner, 1948; cf., Staddon & Simmelhag, 1971), aggression (Kupfer, Allen, & Malagodi, 2008), and compulsive and religious behavior (Strand, 2009).

In the remainder of this article, we examine the implications for culture institutions—individualism and collectivism—of attachment patterns conceptualized as instances of schedule-induced behavior. To preview, we argue that collectivist cultural practices (characterized by the privileging of strong-tie relationships) reflect

relatively high rates of insecure-anxious attachments within a society, and individualist cultural practices (characterized by the privileging of weak-tie relationships) are a reflection of relatively high rates of insecure-avoidant attachments within a society. That is to say, culture types are an emergent phenomenon of the differential distribution within a society of insecure attachment patterns.

Attachment as Mediator of Culture

Table 1 lists key characteristics of culture institutions and attachment patterns. Face-value correspondences are evident between the collectivist culture type and the insecure-anxious attachment pattern, and between the individualist culture type and the insecure-avoidant attachment pattern. The former emphasize bonding social capital, whereas the latter emphasize bridging social capital. By contrast, the secure attachment pattern corresponds to neither of the two culture institutions. Instead it is characterized by flexibility and adaptability. In this way, only the insecure classifications fit with a specific cultural context—owing to their relative behavioral inflexibility with respect to the privileging of either strong-tie or weak-tie relationships. We will discuss the impact of these different attachment patterns on the group-level payoff contingencies that define the culture institutions below.

It is well and good to describe these culture-attachment correspondences, but do they manifest cross-culturally? Affirmative evidence is provided and summarized in a recent review of worldwide attachment distributions (Mesman, van IJzendoorn, & Sagi-Schartz, 2016). Except within societies characterized by extreme economic or social upheaval, 50–70% of children worldwide are securely attached. These rates are similar across individualist and collectivist societies. At the same time, rates of attachment *insecurity* vary. Global estimates reveal higher rates of insecure-avoidant attachment in individualist societies, and higher rates of insecure-anxious attachments in collectivist societies. Likewise, for a sample of Mexican and U.S. college students (Frias et al., 2014), associations were statistically significantly positive between insecure-anxious attachment and collectivism ($r = .24$), between insecure-avoidant attachment and individualism ($r = .13$), and either insignificant or negative between insecure-anxious attachment and individualism ($r = .00$) and insecure-avoidant attachment and collectivism ($r = -.13$). These correlations are consistent with the predicted attachment-culture correspondences. Finally, associations between attachment types and relationship satisfaction also appear to differ across cultures in a manner suggested in Table 1. Friedman et al. (2010) found that the negative effects of insecure-avoidant attachments on adult romantic relationships were more extreme in collectivist compared to individualist cultures. This is consistent with the notion that in individualist societies, avoidant attachments are more normative and functional than they are in collectivist societies.

The Roots of Attachment and Culture: Caretaker Practices

If culture is an emergent phenomenon of attachment, then caretaker practices for child security-seeking behavior should differ across cultures. In particular, individualist societies should evidence caretaker practices characterized by higher relative rates of

Table 1. Culture institutions and attachment pattern characteristics

	Culture institutions		Attachment patterns	
	Individualist	Collectivist	Avoidant	Anxious
Cultural and developmental context	Strong rule of law: Weak-tie relationship risks are low	Weak rule of law: Weak-tie relationship risks are high	Caretaker Predictably Unresponsive: Caretaker encourages independence in response to child security-seeking	Caretaker Unpredictably Responsive: Caretaker encourages child security-seeking
Interpersonal focus	Bridging across groups: Rewards plentiful outside of strong-bond network	Bonding within groups: Risks plentiful outside of strong-bond network	Novelty-seeking predominates: Security-seeking is unrewarded; novelty-seeking predominates	Security-seeking predominates: Security-seeking is variably rewarded; novelty-seeking diminishes
Instrumental goals	Self-agency: Sense of personal control over one's own actions (internal locus of control)	Social harmony: Sense of harmony between group members (external locus of control)	Self-sufficiency: Reliance on oneself to meet needs; help rejecting	Caretaker influence: Reliance on caretaker/others to meet needs
Sources of comfort and happiness	Weak-tie relationships: Diffuse social network	Strong-tie relationships: Circumscribed social network	Independence: Self-reliant	Interdependence: Inter-reliant
				Secure
				Caretaker Predictably Responsive: Caretaker responds consistently and promptly to security-seeking
				Balanced: Secure base allows for confidence across strong- and weak-tie contexts
				Balanced: Comfortable relying on self and others to meet needs
				Balanced: Interdependence and Interdependent

extinction for security-seeking behavior (inducing insecure-avoidant attachments), and collectivist societies should evidence caretaker practices characterized by higher relative rates of intermittent reinforcement for security-seeking behavior (inducing insecure-anxious attachments; Beckes et al., 2017). What evidence exists that cross-cultural parenting practices conform to these predictions?

Collectivist Caretaking Practices Evidence for anxious-attachment inducing caretaker practices in collectivist, non-Western societies was suggested in the early reports of Bateson and Mead (1942, reported in Rohner, 1986). They noted a cultural practice among the Balinese of the South Pacific called the *borrowed baby game* that introduces variability into parental responsiveness to child security-seeking. The game is described as follows: “a mother borrows a neighbor’s young infant and gives it her breast expressly for the purpose of teasing her own 18- to 48-month-old child. When her baby cries or has a tantrum the mother returns the ‘borrowed’ baby, but ignores her own child. If her child then attempts to regain reparation with her, she often retakes the infant and reenacts the same teasing sequence.” In addition, “the mother may hand the child to a neighbor and threaten to leave him or her. If the child bursts into tears, she may pick the child up without looking at him or her” (Rohner, 1986, pp. 75–76). The sequence of events described suggests that a security-seeking response is elicited from the infant that is not immediately rewarded (i.e., left unreinforced). In an otherwise responsive caretaking context, this would increase reward uncertainty and subsequently induce more intense security-seeking behavior (i.e., incentive salience and sign-tracking).

Consistent with this classic description, anthropologists and cultural psychologists have more recently documented other instances in which mothers “engage in care that stresses infants” (Keller et al., 2018, p. 1923). Among the Deng of Africa, mothers have been observed giving enemas as part of the bathing routine and giving water to drink before breastfeeding, both of which are unpleasant for the infant. These practices occur in the presence of other mothers and are described as having religious significance and perhaps as being in the service of fostering multiple attachments. Furthermore, it is important to note that such ritualistic practices may prompt (and have as their aim) an increased attentional focus of infants and children on caretakers, and perhaps on strong-tie relationships, in general. Such a focus would be consistent with the tenants of collectivism, and adaptive to the extent that in a collectivist milieu personal success aligns with attending to strong-tie relationships (Yamagishi & Hashimoto, 2016).

Individualist Caretaking Practices Parenting experts in Western cultures warn against parental overinvolvement and speak to the need for consistent discipline and responsivity in order to socialize toward independence and interpersonal dependability—goals that would be viewed as inappropriate in some other cultural contexts (Lancy, 2015). Consistent with this, caretakers in the United States often interpret positively child behavior that trained observers agree is avoidant. Instead of viewing such behavior as reflecting a tendency toward social disengagement, it is spoken of by such caretakers as reflecting the child’s ability to “play alone” and be appropriately “independent” (Weisner, 2014, p. 269). It is also noteworthy that early separation from mothers, via bottle feeding and maternal outside-the-home employment, had its origins and greatest expression in the individualist Western countries.

Compared to breastfeeding, bottle feeding is associated with higher rates of avoidant attachments, as is maternal outside-the-home employment (Carlson & Harwood, 2014; True, Pisani, & Oumar, 2001).

Differential attachments across ethnic groups within North America also appear to support linkages between parenting practices and attachment classifications. For example, African American children are more often exposed to punitive socialization strategies, and have higher rates of insecure-avoidant attachments (Montague, Magai, Consedine, & Gillespie, 2003). Mexican American children, on the other hand, are less exposed to punitive socialization and display lower rates of insecure-avoidant attachments (Wei, Russell, Mallinckrodt, & Zakalik, 2004; cf., Lopez, Melendez, Sauer, Berger, & Wyssmann, 1998). This patterning of cross-cultural findings—albeit correlational—is consistent with attachment theory predictions that punitive socialization is potentially causal with respect to avoidant attachments (Agishtein & Brumbaugh, 2013; Posada et al., 2002), and is consistent with the distribution of differential attachment patterns across cultural groups within U.S. populations, wherein Mexican American children have comparatively higher rates of anxious attachments and African Americans have comparatively higher rates of avoidant attachments (for a discussion of this, see Agishtein & Brumbaugh, 2013).

Differential outcomes arising from intermittent compared to continuous schedules of reinforcement for child security-seeking were informatively described by Rohner (1986):

As parents become increasingly rejecting, the child is likely—up to a point—to intensify bids for positive response, that is, to become increasingly dependent [insecure-anxious]. Beyond that undefined point on the parent rejection scale the child is likely to make fewer and fewer bids for positive response. He or she will then appear to be independent [insecure-avoidant], but this apparent independence is not “healthy independence.” Rather, it is what I call “defensive independence.” (p. 80)

Mikulincer and Shaver (2005) describe this same dynamic wherein anxious and avoidant attachments are a function of the responsivity of significant others to security-seeking behavior; anxious attachment is induced by an intermittent schedule and an avoidant attachment (defensive independence) is induced by an extinction schedule. Likewise, Ainsworth (1969) notes that, “dependency does not come about so much through consistent reinforcement as through schedules of intermittent reinforcement” (p. 985). Consistent with this, we propose collectivist children are not taught or instructed to reject or be suspicious of strangers, nor are individualist children taught or instructed to approach strangers or reject strong-tie conspecifics. Neither set of children knows their cultural norms in the sense of having obtained them via incremental shaping or social learning. In this way, the importance of cultural scripts and internal working models as mediators of such behavioral tendencies is downplayed in favor of nonrepresentational, schedule-induced processes (Beckes et al., 2017).

Additional Support for Culture-Attachment Associations

Culture theorists postulate that reputation management in the form of maintaining a high degree of behavioral predictability signals trust in weak-tie relationships (Yamagishi & Hashimoto, 2016). Recent studies suggest that levels of behavioral predictability differ across attachment categories, in a manner consistent with hypothesized associations between culture institutions and insecure attachment patterns. The economic choice behavior of insecure-anxious adults was less predictable than was the behavior of securely attached adults (McClure, Bartz, & Lydon, 2013). In another study, the behavior of insecure-avoidant children was more predictable (less variable) than was the behavior of other children (Moss, Cyr, Bureau, Tarabulsy, & Dubois-Comtois, 2005). These findings fit the notion that the behavior of avoidant individuals is more predictable and the behavior of anxious individuals is less predictable, which is consistent with correspondences between insecure attachment patterns and culture institutions. The relative overrepresentation of anxiously attached individuals—and their tendency toward behavioral unpredictability—may be an impetus for smaller trust radii and the preference for exchanges with strong-tie partners that define the social proclivities of collectivist societies.

Individual- and Group-Level Effects of Attachment on Culture

It is likely that attachment patterns have some influence on choice behavior in interdependent choice situations at both an individual and group level. At an individual level, anxiously attached persons are predisposed to cooperate with strong-tie associates and less so with weak-tie associates. The opposite is true of avoidantly attached individuals. Thus, at the group level groups made up of a higher proportion of individuals of either of these two attachment patterns will perpetuate the underlying (individual-level) tendency in a feed-forward loop. That is because in a group of individuals disposed to privilege strong-tie or weak-tie relationships the likelihood of experiencing success (e.g., reward maximization) is increased by conforming to that bias.

Support for this interplay of individual- and group-level factors exists in behavioral economic studies exploring how group membership determines rational choice (Axelrod & Hamilton, 1981; Camerer & Fehr, 2006; Chaudhuri, Sopher, & Strand, 2002; Nowak & Sigmund, 2005). Such studies reveal that differences in the behavioral propensities of individuals engaged in group resource allocation games can profoundly affect outcomes for selfish versus cooperative strategies. For instance, in groups made up primarily of individuals with *other-regarding preferences* (i.e., equitable outcomes), cooperation predominates. However, even slight increases in the number of *self-regarding* individuals can alter aggregate outcomes such that the prior balance is disrupted and replaced with nearly universal selfish behavior—even among those who otherwise endorse other-regarding preferences (Camerer & Fehr, 2006).

These data reveal that the social behavior of an individual is dictated by both individual-level predisposing preferences and group-level contingencies. Our model highlights how group-level contingencies are impacted by individual level predispositions. Predispositions for security-seeking versus novelty-seeking behavior explain and underlie the culture institutions. At the individual level they are codified as attachment

patterns. It is for this reason that it is appropriate to identify cultures as being a function of attachment.

The behavioral predispositions of insecure-anxious versus insecure-avoidant individuals—represented in the aggregate—defines the culture of a group by constraining the rational choice behavior of individuals who bargain within that group. Collectivist societies are characterized by narrower trust radii *because* they are made up of individuals who are less likely to cooperate with strangers. Group-level contingencies act to maintain interpersonal tendencies that are already overrepresented in the group. As a stranger, if you know the relative distribution of these tendencies across two groups, you can improve your chances of success by choosing to approach and interact with the group of individuals positively disposed to weak-tie relationships (i.e., interchanges with strangers). And by entering the group, you alter the group-level contingencies in a manner consistent with your own security-seeking versus novelty-seeking predispositions.

Figure 1 displays the bidirectional model developed here. Culture types are defined by the payoff structures established at a societal (group) level. Those structures are (at least partially) determined by the distribution of attachment patterns within that society. And below that, attachment patterns are determined by the reinforcement schedules for child security-seeking that exist within families. In this way, culture is an emergent property of attachment that falls within that class of behavior that is schedule-induced and, therefore, not incrementally shaped or cognitively represented in the traditional sense (Anseline, 2016; Segal, 1972). Upward-pointing arrows reveal the impact of bottom-up processes. Top-down effects include the impact of cultural practices on the reinforcement schedules operative for child security-seeking within families. In the next section we discuss the implications for culture of attachment patterns as schedule-induced rather than learned phenomena.

Fig. 1. Bottom up and top down influences linking culture types with family reinforcement processes via child attachment patterns

The Intergenerational Transmission of Culture and Attachment

The present formulation explains the intergenerational transmission of culture without recourse to higher-order social–cognitive structures. Culturally well-adapted children have not so much “incorporated” or “internalized” cultural values as they have experienced early-life contingencies related to security-seeking and novelty-seeking that predispose them to interdependent behavioral tendencies that are well-matched to the payoff structures that characterize the cultural milieu they will experience as adults. This is consistent with Gibsonian ecological psychology (Gibson, 1979), the experimental analysis of behavior (Donahoe & Palmer, 2004), dynamic systems theory (Thelen & Smith, 1994), and nonrepresentational, radically embodied cognitive neuroscience (Beckes, IJzerman, & Tops, 2015). These perspectives have in common a rejection of mediational representational structures in favor of explanations based on the dynamic coupling of environmental affordances, sensory experience, bodily features, and reinforcement contingencies.

A similar feedback loop could be a contributor to the intergenerational stability of attachment. This would be true, for example, if the unpredictability characterized by an insecure-anxious attachment manifests in the behavior of the caretaker. Likewise, an insecure-avoidant caretaker may be prone to predictably ignore the security-seeking overtures of a child, thereby contributing to an insecure-avoidant attachment.

Practical Implications

If attachment behaviors are schedule-induced rather than incrementally shaped or learned verbally (and, therefore, embodied rather than represented), the prospects are poorer for effecting cultural change through top–down economic or legal incentives, or educational campaigns. That is because the influence of culture on attachment (top–down) is weaker than previously thought, and the impact of attachment on culture (bottom–up) is greater. Therefore, cultural practices will be responsive to changes in caretaker practices to the extent that such changes affect attachment patterns. For example, research suggests that increasing the workforce participation rates of women, or substituting bottle feeding for breast feeding, reduces collectivist and increases individualist practices in a society (True et al., 2001). According to the present formulation, that is because such practices influence the development of avoidant or anxious attachments.

Culture and Attachment: a Rapprochement

Anthropologists and cultural psychologists have published extensively on the inadequacies of attachment theory (Keller et al., 2018; Lancy, 2014; LeVine, 2014; Otto & Keller, 2014). They reject the notion that responsive caretaking is necessarily normative or desirable, or that secure attachments are universally adaptive. Based on a review of 200 cases from the ethnographic and archeological record, Lancy (2014) noted, “it is not at all certain that evolution would have favored the formation of strong bonds of attachment between children and their caregivers” (p. 90). More likely, in circumstances of poverty, subjugation, and social disintegration, insecure attachments are functionally superior—in particular to the caretaker (Scheper-Hughes, 2014). LeVine (2014) asserts, “attachment researchers have ignored, dismissed, and distorted cross-

cultural evidence indicating greater diversity in both maternal behavior and infant emotional resilience that might refute the [attachment] model” (p. 51).

The present formulation is largely sensitive to these critiques. A preoccupation with the cultural validity of the “secure versus insecure” dichotomy gives way to questions about the impact of avoidant and anxious attachments on group-level payoff structures. Instead of viewing secure attachments as universally advantageous, they are understood as possessing strengths (behavioral flexibility) and weaknesses (less well-suited to maximizing social outcomes within certain cultural contexts; Ein-Dor & Hirschberger, 2016). Insecure attachments, on the other hand, are more rigid with respect to their characteristic interdependent behavior tendencies, but such tendencies are often well-aligned with the cultural context into which children who come to possess them are born—collectivist contexts for anxious attachments and individualist contexts for avoidant attachments (Mesman et al., 2016). As such, a society’s most vulnerable members—its insecurely attached children—may have an outsized impact on its cultural institutions. That is because their behavioral inflexibility is a source of stability for the interdependent payoff structures that define collectivist and individualist cultures. Of course, depending on the complexity of the environment, behavioral inflexibility can be disadvantageous. This might explain why, compared to insecure attachments, secure attachments are associated with higher measured intelligence (van IJzendoorn, Dijkstra, & Bus, 1995) and in general better psychological and social adjustment (Cassidy & Shaver, 2016). However, like intelligence (Stolarski, Jasielska, & Zajenkowski, 2015), the impact of attachment patterns on well-being differ depending on cultural context (Friedman et al., 2010).

Comparisons with Other Theories of Attachment and Culture

It is worth considering how the present formulation relates to (a) theories that speak to the evolutionary context of attachment patterns, and (b) how ecological factors may drive cultural differences. With regard to the former, we consider Life History Theory (LHT; Belsky, Steinberg, & Draper, 1991; Chisholm, 1996; Del Giudice, 2009). Regarding the latter, we consider agricultural-economic (Talhelm et al., 2014) and pathogen prevalence (Brown, Fincher, & Walasek, 2016; Fincher & Thornhill, 2012) explanations of the individualist–collectivist cultural divide.

Evolution and Attachment LHT equates insecure attachments (both anxious and avoidant) with a *life history strategy* that is in the service of maximizing offspring quantity in lieu of investing in offspring quality, owing to threats to reproductive and offspring certainty arising from harsh environmental conditions. A secure attachment, on the other hand, reflects favorable environmental conditions and triggers greater investment in fewer offspring. Therefore, according to LHT, attachment is part of an evolved module wherein the attachment patterns are the products of evolutionary contingencies (Belsky, Schlomer, & Ellis, 2012). In contrast, we propose that attachment patterns are reflections of reinforcement contingencies. Evolutionary contingencies, by contrast, likely established the *entire class* of schedule-induced behavioral phenomena—a class that includes not only attachment but also fat storage, foraging, creativity, compulsions, and addictions (Anselme & Güntürkün, 2019; Strand, 2009).

As such, attachment patterns are explained without recourse to a postulated evolutionary purpose or modularity.

Attachment Patterns as Exaptations *Exaptations* are biological structures or behavioral phenotypes evolved for one purpose that come to serve a different one, and can also be *spandrels*, meaning that the evolution of one process gives way to another that was not initially intended but is nonetheless useful (e.g., as the brain grew larger humans became capable of language; Gould, 1991). The attachment patterns could have evolutionary significance at both the individual and group levels, as exaptations. Attachment patterns are necessarily *preconditions* of evolved life history strategies, owing to their membership in the larger class of schedule-induced behavior—evolved, perhaps, in the service of foraging (Anselme & Güntürkün, 2019). But this adaptation for survival that enabled foraging gave rise to spandrels—additional evolutionary benefits at the individual and group level. Now, at the individual level, attachment patterns may potentiate a cascade of neuro-endocrine-behavioral events that comprise a hypothesized LHT module. At the group level, as discussed previously, attachment patterns may be exapted by the social group. This is true if attachments induced in children come to serve a *social purpose*, such as ensuring (culturally) appropriate incentive salience and sign-tracking of attachment figures.

Ecological Determinants of Culture Theorists have long speculated that culture institutions are reflections of different ecological and economic conditions faced by societies (Hofstede, 2001; Sng, Neuberg, Varnum, & Kenrick, 2018). Talhelm et al. (2014), for instance, note that differences between collectivist and individualist societies, and the individuals who inhabit them, may reflect the differential demands of rice versus wheat farming. Likewise, it has been suggested that culture institutions reflect pathogen risks such that high-contagion ecologies support strong-tie, insular (collectivist) social practices, whereas low-contagion ecologies afford a freer exchange across weak-tie relationships (Brown et al., 2016; Fincher & Thornhill, 2012). These ecological and economic features could certainly affect social practices as suggested, and they do represent a mechanism different from the one we propose. However, underspecified is how societal-level social tendencies of adults come to exist in children. To close that gap, an appeal is made to top–down social learning, wherein what children learn in the family environment aligns with contingencies operative in the larger, nonfamily environment. By contrast, our bottom–up model suggests that behavioral tendencies that define schedule-induced behavior, and are reflected as the attachment patterns, are a source of alignment between the intra- and interfamily environments. It is interesting that the two formulations are not in disagreement; both specify the impact of environmental contingencies on culture and could be concurrently operative.

Conclusion

How children come to behave in culture-consistent ways and what makes cultures stable are among the great mysteries of behavior science (Henrich & Tennie, 2017; Radick, 2016). The dilemma rises from the fact that before they could have been

exposed to the contingencies that define the adult social world, children behave in ways that are consistent with the contingencies and values of the societies into which they are born (Strand & Downs, 2018). However, it remains unclear what is that preparation, and if children receive enough of it. Traditional theories of culture rely on social learning and internal mental models to bridge this gap (Chisolm, 2017).

Schedule-induced behavior is a class of behavior that arises in response to exposure to schedules of reinforcement (Beckes et al., 2017). It differs from typical learned behavior in that it manifests a high degree of complexity “for free”—without incremental shaping or verbal learning (Anselme, 2016; Segal, 1972). We propose that much of the preparation children receive for their entrance into the culture in which they are born is schedule-induced, and aligns with the interdependent payoff contingencies that define that culture. Children are not carrying forward a script, or even a set of rules. Instead, behavioral predispositions concerned with security-seeking versus novelty-seeking, established during childhood, hedge interdependent choice behavior in culture-consistent ways and serve as a deep source of cultural stability.

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