

Slow Life History Strategy Predicts Six Moral Foundations

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ABSTRACT

Moral foundations (MF) theory proposes six evolved, universal psychological systems (“foundations”) on which cultures construct diverse moralities, while further proposing individual differences (e.g., political differences) in reliance on various moral foundations. Life History (LH) theory suggests that slow LH individuals develop under stable socio-ecological conditions where displaying moral traits and behavioral restraints on selfishness may have been particularly adaptive for delayed social benefits. Human LH theory has been used to help explain individual differences in various moral intuitions, but these findings have not been entirely consistent. Across 2 studies, samples of undergraduate students completed self-report questionnaires assessing their reliance on various moral foundations, their LH strategies, political attitudes, and early-life socioeconomic status. Psychometric measures of slow LH strategy were positively associated with each moral foundation, even after statistically controlling for respondent sex, social desirability, and early-life socioeconomic factors in study 2. The six moral foundations were positively intercorrelated. Neither self-perceived life expectancy nor self-reported age of first sexual intercourse predicted the moral foundations. These findings suggest that LH strategies (measured psychometrically) account for strength of moral foundations and the positive intercorrelations among the moral foundations.

KEYWORDS

Moral Foundations, Life History Strategy, Life History Theory, Conservatism

Political beliefs have been theoretically and empirically associated with different *intuition-based* moral foundations, involving rapid and effortless moral judgments and decisions (rather than slow, controlled reasoning processes) (Haidt, 2012). Liberals in the U.S.A. score slightly higher on two *individualizing* foundations: *Care/Harm* and *Fairness/Reciprocity*. Conservatives largely share those moral concerns, but also score higher on measures of three additional *collectivistic* or *binding* foundations: *Ingroup/Loyalty*, *Authority/Respect*, and *Purity/Sanctity*. Since

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liberals emphasize *individualizing* foundations and conservatives emphasize the *binding* foundations, they might reasonably be expected to negatively correlate. However, at least in some samples, the “liberal” (*individualizing*) foundations and the “conservative” (*binding*) foundations are positively related to one another (Graham, Haidt, & Nosek, 2009) overall. This positive interrelationship suggests that important, but previously omitted, third variable(s) might account for the interrelationships among the various moral foundations better than political attitudes alone.

One previous study suggested *psychometric* measures of slow life history strategies are both theoretically and empirically (positively) associated with increased strength of both *individualizing* and *binding* moral intuitions (Gladden, Welch, Figueredo, & Jacobs, 2009). This makes theoretical sense because the development and adaptive success of slow life history strategies is thought to depend on socio-ecological stability where restraints on individual selfishness can pay off through close and cooperative social relationships. Both *individualizing* and *binding/collectivistic* moral foundations are thought to function to suppress or regulate selfishness and enable cooperative social life (Haidt, 2008). However, research findings linking slow life history strategies with diverse moral foundations have been inconsistent when different sorts of *demographic* life history measures are used (Van Leeuwen, Koenig, Graham & Park, 2014). Below, we briefly describe moral foundations theory and, then, human life history theory. In the two studies reported, we tested whether evolved life history strategies might account for why the various moral foundations appear to be positively inter-related, at least in some samples, and (in study 2) if political attitudes might mediate between slow life history and moral foundations.

Moral Foundations Theory

Moral foundations (MF) theory proposes at least five evolved and cross-culturally universal psychological systems (“foundations”) on which culturally-variable moralities are constructed (Graham, Haidt, & Nosek, 2009; Haidt & Joseph, 2004). These evolved moral psychological systems involve primarily fast, intuition-based moral cognition in response to an appraisal of a morally-relevant situation. The intuitive moral psychological systems, though modifiable, are organized prior to experience and evolved to enable adaptive social life within and among groups. Following this intuitive (and often emotion-filled) response, slow reasoning is used primarily (post hoc) to find reasons to confirm and justify one’s own intuitive reaction to the situation and to recruit/persuade others why they ought to join us in our judgment (Haidt, 2012). The theory assumes that human morality is constructed “from the coevolution of genes and cultural innovations” (Haidt, 2008).

MF theorists have proposed both cultural and individual differences (e.g., political liberals vs. conservatives vs. libertarians) in the degree of reliance on the various moral foundations (Haidt & Graham, 2007; Graham, Haidt, & Nosek, 2009). Haidt & Joseph (2004) suggested that the different moral intuitions were like “different kinds of social receptors that form the foundation of our highly elaborated and culturally diverse moral sense”. Thus, these differences in moral appraisal “receptors” produce intuitions that guide moral reasoning toward confirmation bias

and toward binding individuals into groups with similar moral viewpoints, but generally don't enable individuals to detect flaws in their own self-righteous (and hopelessly biased) reasoning.

MF theory (see Haidt & Joseph, 2004) was developed by considering both cross-cultural anthropological work on human morality (e.g., Shweder, Much, Mahapatra, & Park, 1997), including both cross-culturally universal psychological features and culturally-variable (and constructed) moral virtues, and by considering human evolutionary adaptive problems which may have led to our moral intuitions, with some reference to the building blocks of morality in other primates (de Waal, 1996). Haidt & Joseph (2004) examined previous social science works on morality by listing/tallying the types of social situations that reliably (and cross-culturally) lead to positive or negative evaluations in humans and other primates. They aimed to explain why cultural virtues can vary so widely while still showing elements that emerge reliably across most cultures (and even across some other species). Based on their analysis, situations that consistently lead to moral judgment included those related to “reciprocity, loyalty, respect for (some) authority, limits on physical harm, and regulation of eating and sexuality.” MF theory also built on the Social-Intuitionist Model of moral judgement (Haidt, Koller, & Diaz, 1993; Haidt, 2001), which suggests much moral thinking is guided by quick intuitions and gut feelings rather than driven by slow, conscious reasoning. Following the Social-Intuitionist Model of moral judgement (see Haidt, Koller, & Diaz, 1993; Haidt, 2001), Haidt and Joseph (2004) proposed that humans evolved an “*intuitive ethics*, an innate preparedness to feel flashes of approval or disapproval toward certain patterns of events involving other human beings.” These innately prepared intuitive ethics relate to various moral foundations later proposed/described by moral foundations theorists.

Six Moral Foundations

The *Care/Harm* foundation involves concerns about cruelty or harm, and providing kindness, nurturance or care to others. Emotions associated with *Care/Harm* intuitions include compassion, sympathy, guilt and (emotional) empathy (Haidt, 2003), elements of which are found in other primates (de Waal, 1996). *Fairness/Reciprocity* involves concerns with interpersonal fairness, justice, cheating, and respect for rights. The evolution of this foundation and emotions associated with it (e.g., guilt, gratitude, anger at cheaters/nonreciprocators) are explainable by Trivers' (1971) theory of reciprocal altruism. Graham et al. (2009) labeled both *Care/Harm* and *Fairness/Reciprocity* foundations *individualizing* foundations because they are meant to inhibit selfishness by respecting others' rights and protecting individuals.

The *Loyalty/Betrayal* foundation involves loyalty and favoritism toward ingroups and tribes, patriotism, and avoidance of betrayal toward one's group. This moral foundation helps bind people into stable social groups and ties in with work on the evolution of “coalitional psychology” (Kurzban, Tooby, & Cosmides, 2001). *Authority/Respect* concerns obedience, respect or deference to (some) individuals in positions of authority (or high status), conformity to social traditions (and virtues of authorities such as leadership and protection), and duties. This foundation may help maintain social order in groups and matches well with ideas about the evolution of

hierarchy in primates (de Waal, 1996). Graham et al. (2013) referred to Boehm (1999) to explain why humans seem to have evolved psychological mechanisms concerned with authority and respect, despite a (presumably) largely egalitarian evolutionary past as hunter-gatherers:

“Authority is a particularly interesting case in that hunter-gatherer societies are generally egalitarian. Yet as Boehm (1999) explains, it’s not that they lack the innate cognitive and emotional structures for implementing hierarchical relationships, because such relationships emerge very rapidly when groups take up agriculture. Rather, hunter-gatherers generally find cultural mechanisms of suppressing the ever-present threat of alpha-male behavior, thereby maintaining egalitarian relationships among adult males in spite of the hierarchical tendencies found among most primates, including humans”

The *Purity/Sanctity/Degradation* foundation involves psychological intuitions related to concerns with disgust and contamination, and involves religious notions about how to live in a more noble (and less carnal) way. This moral foundation serves social functions such as marking off the group’s *cultural* boundaries and it may inhibit individual selfishness (e.g., lust, hunger, and material greed) by promoting a spiritual mindset (Graham, Haidt, & Nosek, 2009). *Loyalty/Ingroup, Authority/Respect, and Purity/Sanctity/Degradation* have been labeled *binding (or collectivistic)* foundations because they bind (primarily conservative and religious) individuals into groups for the good of their particular community or collective by emphasizing group-binding loyalty, duties of one’s social roles, and self-control (Graham, Haidt, & Nosek, 2009).

Iyer, Koleva, Graham, Ditto, & Haidt (2012) developed a *Liberty/Oppression* foundation because of concern that the core value of political libertarians was not being represented well with the original five moral foundations. The liberty foundation focuses on personal freedom and autonomy (both economic and lifestyle-oriented freedom) and involves negative reactions to societal constraints on individual liberty and when there is an attempt to try to exert restrictive control over others. Thus, the *Liberty* foundation should sometimes come into conflict with the *Authority/Respect* foundation. We speculate that these sorts of moral sentiments may be adaptive for some individuals to display in reaction to guard against situations where overly controlling or bullying individuals or groups are demanding things against the reproductive interests of certain individuals. Iyer et al. (2012) found that self-identified libertarians (both men and women) score higher than liberals or conservatives on the *Liberty* moral foundation, and score low on the other five moral foundations. They suggested that libertarians have a “dispositional preference for independence” and have somewhat decreased interest in (sometimes restrictive) interconnected social relationships.

Moral foundations theory has focused on moral differences among political groups as well as cross-cultural differences in the reliance on different moral foundations. Liberals tend to rely more exclusively on *individualizing* foundations (*care/harm* and *fairness/reciprocity*) than conservatives. Conservatives tend to rely on the six foundations more equally (Graham et al., 2009; Iyer et al., 2012) and have to balance any inherent conflict among the various moral foundations when different moral concerns come into conflict (Haidt & Graham, 2007). “WEIRD”

(Western, Educated, Industrialized, Rich, and Democratic) samples are thought to rely much less on the *binding/collectivistic* foundations and to particularly emphasize the *individualizing* (and perhaps *liberty*) foundations (Haidt, 2012). This emphasis on political and cultural differences suggests that, particularly in WEIRD cultures and within conservative individuals with diverse moral concerns, there can be much inherent conflict between moral concerns involving individualizing versus binding/collectivistic foundations. While this is no doubt partly true, moral foundations theory has not addressed or accounted for why, *overall*, the various moral foundations are evidently *positively* inter-correlated with one another. In WEIRD samples, where we might expect binding foundations to be greatly diminished, they have been found to be positively associated (e.g., Graham et al., 2009; Gladden et al., 2009). For example, Graham et al. (2009 supplement) reported that the structural model of best fit for representing the moral foundations contained five correlated factors. The five factors *positively* correlated and could be represented as the two higher-order factors described earlier: *Individualistic* and *Binding/Collectivistic*. Additionally, *Individualistic* and *Binding/Collectivistic* foundations were also *positively* correlated, but they decided not to create a single, higher-order *general* moral foundations factor, in part, because they saw no theoretical justification for doing so--so the residual positive relation found was left unexplained (see Graham et al., 2009 supplement).

In the two studies reported below, we tested whether life history theory might account for why the various moral foundations appear to be positively inter-related, at least in some samples. Each of the moral foundations is thought to function to inhibit selfishness and enable cooperative sociality. According to Graham et al., (2009), the *binding* foundations are meant to “suppress selfishness by strengthening groups and institutions and by *binding* individuals into these groups and institutions for the good of society.” The *individualizing* foundations are meant to “suppress selfishness by protecting individuals directly and teaching individuals to respect the rights of other individuals.” Based on a life history theory perspective (described further below), suppressing selfishness and regulating social organization enables delayed social benefits (e.g., managing a reputation, building alliances for mutually beneficial interactions, and gaining social support) that would be more strategically valuable to slow LH strategists than fast LH strategists. In short, social conditions that suppress selfishness and bind individuals into organized social groups are more strategically consistent with slow LH strategies.

Psychosocial Life History Traits

Human LH theory (e.g., Pianka, 1970; Rushton, 1985; Figueredo et al., 2006) suggests there should be adaptively structured (i.e., strategically coordinated) variation in a large number of psychosocial, behavioral, and developmental traits. In general, “fast” LH strategists are expected to tend to exhibit rapid sexual maturity, earlier age of first sexual intercourse, lower parental and nepotistic care, shorter life expectancy, and lower degrees of altruism and social organization. Slow LH strategies should tend to exhibit the opposite pattern: delayed sexual maturity, later age of first sexual intercourse, higher parental and nepotistic care, longer life expectancy, and higher degrees of altruism.

According to LH theory, fast LH strategies develop, both evolutionarily and ontogenetically, under unstable and uncontrollable environmental conditions (Ellis, Figueredo, Brumbach, & Schlomer, 2009) where long-term survival is at more risk. In other words, fast LH strategies develop contingently on cues that reliably indicate that it is strategically unwise to “invest” in traits that payoff reproductively only in the distant future. Fast LH strategies are expected where environmental risk of uncontrollable morbidity and mortality is high such as where resources are unreliably provided (e.g., without a living and investing father throughout development). If long-term survival is uncertain or unlikely, it is more adaptive to “live fast and die young” (start making lots of babies as soon as possible) (Promislow & Harvey, 1990). This may include breaking social and moral rules for selfish, short-term, and opportunistic benefits. In contrast, slow LH strategies should be more successful when there are stable and supportive socio-ecological conditions, which might enable investments in social relationships and groups to be adaptive to individuals.

Both Slow Life History Strategies and Stronger Moral Foundations Regulate Selfishness and Depend on Stable Social Support

Consistent with the idea that stable socio-ecological conditions and social support promote both moral foundations and slow LH strategies, Wilson, O'Brien, and Sesma (2009) reported that “prosocial” individuals (in Binghamton, NY) receive higher levels of multiple forms of social support from “family, school, neighborhood, religion, and extracurricular activities” and naturally clustered across neighborhoods. These supportive social environments conceptually overlap with constructs measured in scales from the Arizona Life History Battery (ALHB) such as religiosity, altruism toward the community, and altruism toward kin (Figueredo, Vasquez, Brumbach, & Schneider, 2004; 2007). These forms of social group support would seem to also conceptually overlap with aspects of the *binding foundations* of *ingroup/loyalty* and *purity/sanctity* (e.g., *religious group support*). We argue that slow LH strategists might particularly benefit from relying on a diverse set of moral foundations including both the *individualizing* and *binding* foundations to successfully navigate their social world, to receive more social support, to be favored as social partners, and to be favored by others in social conflicts.

Haidt (2008) suggested that both the *individualistic* foundations and the *binding* foundations function to suppress or regulate selfishness and enable social life. The *individualistic foundations* suppress selfishness by encouraging compassion and empathy for those less fortunate, and respect for other individuals' independence. The *binding foundations* aim to suppress selfishness by binding people into collectives (families, tribes, teams, or other groups), emphasizing group cohesiveness, cooperativeness, interdependence of individuals, and particular limitations on individual choices/desires perceived as contrary to the group's interests or social order.

LH Strategy and Conservatism

Rushton (1985) speculated that slower ('higher K') LH strategies may relate to conservative political and social attitudes (e.g., conservatism vs. liberalism and attitudes about order vs. freedom). As described above, slow LH strategies, as measured by psychometric measures such as the Arizona Life History Battery, share some features with political conservatism (e.g., religiosity, strong family ties, attitudes favoring restrained sociosexuality, childhood stress, and secure attachment style, e.g., see Thornhill & Fincher, 2007). Thus, we hypothesized (in study 2) that psychometric measures of slow LH strategies would positively relate to political conservatism and that conservatism would partly mediate between slow LH strategies and increased *binding* foundations. Additionally, since liberals have previously been shown to score slightly higher than conservatives on *individualistic* foundations (Iyer et al., 2012), we hypothesized that conservatism might also mediate between slow LH and decreased *individualistic* foundations, even while slow LH had a positive relationship with *individualistic* foundations overall.

Individual-level Psychometric Indicators of Slow Life History (LH) have been Positively Associated with both Individualizing and Binding Moral Intuitions

Using path analysis and a sample of U.S. college students, Gladden et al. (2009) found that psychometric measures of "slow" LH strategies positively predicted both religiosity ($r=.31$) and a moral intuitions factor ($r=.39$), composed of morally dumbfounding intuitions (e.g., Is it wrong to eat your dead dog; see Haidt, Koller & Dias, 1993), general disgust sensitivity, and intuitions related to the ethics of autonomy (i.e., *~harm/care and fairness/reciprocity*), community (*~ingroup/loyalty and authority/respect*), and divinity (*~purity/sanctity*). In other words, slow LH strategists scored higher in moralizing across a wide range of moral intuitions and moral emotions that are associated with both individualizing foundations and binding foundations. This is the pattern of correlations we hypothesized would replicate in the studies reported here.

Consistent with the idea that slow LH strategies relate to *binding* foundations, Gladden (2010) reported that psychometric measures of slow LH strategy positively predicted a measure of various forms of in-group bias/favoritism (e.g., toward one's own university, own ethnicity, own country, and own religion), partly via moral disgust intuitions, which also influenced political conservatism. On the other hand, Figueredo et al. (2011) found that slow LH strategists are *lower* in negative ethnocentrism (or bias against an out-group). Both sets of findings were from very similar undergraduate samples. So, the same psychometric slow LH construct evidently predicts *more* reported bias/favoritism aimed at in-group cohesion, but *less* negative/hostile bias against ethnicities. Presumably, in many situations, ingroup loyalty contributes to outgroup hostility, but these findings suggest that positive attitudes toward an ingroup don't necessarily indicate negative attitudes toward other groups. It is possible that slow LH individuals more strongly favor groups they belong to, but also value outgroups contingent on the situational context. For example, negative ethnocentrism may arise when an outgroup is perceived as a threat (e.g., disease threat, violence threat, or cultural threat to traditions or social stability). Potentially supporting this speculation, the structural model reported by Gladden (2010) also indicated that slow LH individuals reported

exhibiting stronger executive control and emotional intelligence, which partly inhibited moral disgust intuitions and (indirectly) ingroup favoritism. So, slow LH individuals may exhibit flexible cognitive control over socially undesirable intuitions such as outgroup hatred when social context demands it.

State-level Demographic Indicators of Slow LH Associate Positively with Individualizing Foundations, but Negatively with Binding Foundations (in some populations)

Other research, using different sorts of indicators of LH strategies, finds positive relationships between slow LH indicators and *individualistic* foundations, but negative associations between slow LH indicators and *binding* foundations. Van Leeuwen et al. (2014) used 2 demographic indicators of LH strategies measured at the population/U.S. state-level: average life expectancy and teenage birth rates in the state. Though the results were not consistent across all groups, among non-Hispanic White participants, slow LH characteristics (i.e., low teenage birth rates, long life expectancy) were positively associated with *individualistic* foundations, but negatively associated with *binding/collectivistic* foundations. Whereas Gladden et al. (2009) (described above) assessed LH strategies *at the individual-level using psychometric measures*, Van Leeuwen et al. (2014) examined *demographic indicators of overall LH strategies at the population level* (i.e., U.S. state-level). Thus, the discrepancy in these two sets of findings may be due to the nature of the very different measures used to assess LH strategies in these studies. *Individual-level psychometric* LH indicators and *population-level demographic* LH indicators may tap different, but perhaps complementary, aspects of human LH strategies (see Copping, Campbell, & Muncer, 2014; Figueredo et al., 2015; Copping, Campbell, Muncer, & Richardson, 2017 for a relevant debate). Alternatively, it's possible that Simpson's Paradox may help explain discrepancies between relationships found comparing different populations with relationships found comparing different individuals (Kievit, Frankenhuis, Waldop, & Borsboom, 2013).

However, not all *psychometric* indicators of human LH strategies have consistently predicted the various moral foundations either. Kawamoto, Van der Linden, and Dunkel (2017) found that higher scores on the General Factor of Personality (GFP), a positive correlate of psychometric measures of slow LH strategies (Figueredo et al., 2004), was positively associated with Ingroup/Loyalty, but not with the other moral foundations.

Parasite-Stress Theory of Values and Sociality Suggests Moral Foundations Depend on Infectious Disease Risk

An alternative theoretical framework, parasite-stress theory, leads to predictions contrary to our life history perspective described above. According to the parasite stress theory of values and sociality, psychological and behavioral features associated with the *binding/collectivistic* moral foundations (e.g., cultural collectivism, in-group assortative sociality, strength of family ties, conservatism religiosity, xenophobia, and ethnocentrism) are disease avoidance adaptations (Thornhill & Fincher, 2014). They argue that, both historically and presently,

infectious disease stress leads humans to *strategically* (adaptively) construct and strategically acquire cultural values and other psychological traits that promote personal survival/reproductive interests under those socio-ecological conditions. Across countries and across states within the U.S.A., Thornhill and Fincher (2014) review considerable evidence that has been found of relationships between variable infectious disease stress and correlates of collectivism (e.g., values associated with *binding* foundations). On other hand, parasite-stress theory predicts liberal values (e.g., gender equality and sexual liberalization), including *individualistic foundations*, strategically arise under conditions of low infectious disease stress. Thus, contrary to our predictions here, parasite-stress theory seems to suggest a negative correlation between *individualistic* and *binding* foundations, at least across populations that vary in infectious disease stress.

LH Strategy and Liberty Foundation

To our knowledge, this will be the first study to test for the relationship between psychometric measures of LH strategies and the liberty moral foundation. Rushton (1985) suggested that slow LH individuals might score lower on attitudes about social freedom (and support social restraint). Similarly, Zhang, Reid, & Xu (2015) theorized that slow LH strategies might predict anti-liberty (pro-censorship) attitudes. They used teenage birth rate across the U.S. as a measure of fast LH strategy and examined relationships with pro-censorship (i.e., anti-free speech attitudes). There was little association, overall, between teenage birth rate and attitudes about freedom of speech/censorship. But, teenage birth rate (i.e., faster LH) did predict more support for press censorship during wartime. These results were taken as inconsistent with or contrary to a life history perspective on liberty.

However, our LH perspective described above suggests that slow LH individuals, at least in the U.S.A. will strongly support individual liberty since it is considered an essential principle that allows “for the individual liberty that is the condition for all moral communities to flourish” (Arnhart, 2012). Arnhart (2012) noted that “political liberty provides the liberal tolerance by which people are free to pursue their moral visions within whatever moral community they join, as long as they do not violate the equal liberty of all others to live their moral lives as they choose”. Arnhart (2012) suggested that such an individual liberty foundation allows WEIRD cultures (often considered especially ‘narrow’ in their moral foundations) to “include religious and conservative moral” communities (as well as liberal and secular moral communities). In other words, the liberty foundation allows for the free expression of concerns related to both the *binding* foundations as well as the *individualizing* foundations (both of which we are expecting to be more important to slow LH strategists), and in that sense, WEIRD cultures may actually be the *broadest* moral cultures. Consistent with this possibility, Iyer et al. (2012) found that, compared to their average scores on the other five foundations, political conservatives scored high on the liberty foundation (including both economic and lifestyle liberty). We hypothesized slow LH strategists might score higher than fast LH strategists on the liberty foundation, as well as the other five moral foundations.

Purpose of the Present Studies

The purpose of study 1 below was to confirm or disconfirm the basic relationships between slow LH strategies and each of the original five moral foundations. We hypothesized that these five moral foundations would positively intercorrelate and that slow LH strategy would predict all five of the moral foundations. We also included measures of two measures of moral emotions, emotional empathy (~compassion) and guilt. These two moral emotions should relate primarily to *Harm/Care* and *Fairness/Reciprocity*. So, we hypothesized that slow LH individuals would score higher on these moral emotions as well.

Study 2 was a conceptual and constructive replication of the first study. The purpose was to strengthen our confidence that the relationships observed are reliable using structural modeling techniques, to generalize previous findings to a geographically different sample (a southwestern and southeastern U.S.A. sample in studies 1 and 2, respectively), to extend the first study by including a sixth moral foundation (liberty foundation), and to consider if political attitudes are a mediating variable partly explaining the relationships between LH and moral foundations. We hypothesized that each of the six moral foundations would positively intercorrelate and slow LH strategy would predict all six moral foundations. We also hypothesized that political conservatism would mediate between LH strategies and binding foundations (positively) and individualistic foundations (negatively). We also investigated whether two other sorts of individual-level LH indicators, perceived life expectancy and the reported age of first sexual intercourse, would predict moral foundations. This was done to consider whether psychometric measures or single-item indicators of LH predict moral foundations better at the individual level (rather than the between population level).

STUDY 1 METHOD

Participants

Two-hundred and sixty-six undergraduate students (82 males and 184 females) enrolled in an introductory psychology course at a southwestern university in the U.S.A. participated. Due to responding highly on an item meant to detect random respondents (i.e. responding that “whether or not someone believed in astrology” was “somewhat relevant” to “extremely relevant”), data from 17 participants were not included in subsequent analyses. After removing these data, there were 244 participants (76 males and 168 females) with a mean age of 19.31 years ($SD=1.77$).

Procedures

Participants completed a series of self-report questionnaires on a personal computer. These questionnaires measured life-history strategies, five moral foundations, moral emotions, and socially desirable responding. Participants signed

up for the study, were provided informed consent electronically, and completed the questionnaires over the internet.

Measures

Moral Foundations Questionnaire (41-items, 5 subscales; Graham et al., 2009) is divided into two parts. Part 1 asks respondents to rate the degree of relevance of a variety of factors that may be considered when deciding whether something is right or wrong. The scale ranges from 0 (not at all relevant) to 5 (extremely relevant) and contains items such as “whether or not someone violated standards of purity and decency”. Part 2 presents participants with statements and asks respondents about their level of agreement with each statement. The scale ranges from 0 (strongly disagree) to 5 (strongly agree) and contains items such as “People should be loyal to their family members, even when they have done something wrong”. Each of the two parts contains items that contribute to one of five moral foundations subscales: *Harm/Care*, *Fairness/Reciprocity*, *Ingroup/Loyalty*, obedience to *Authority/Respect*, and *Purity/Sanctity*.

Toronto Empathy Questionnaire (Spreng, McKinnon, Mar, & Levine, 2009) is a 16-item measure of how often one feels emotional empathy. The scale ranges from 0 (Never) to 4 (Always) and includes items such as “I can tell when others are sad even when they do not say anything.”

TOSCA-3 Guilt Scale (Tangney & Dearing, 2002) is a 16-item measure of one’s propensity for feeling guilt which asks participants to rate the likelihood of feeling guilty in certain hypothetical situations on a scale from 1 (not likely) to 5 (very likely). This scale includes items such as:

“You make plans to meet with a friend for lunch. At 5 o’clock, you realize you stood your friend up.”

- (a) “You’d think you should make it up to your friend as soon as possible.” (reactions indicating other emotions such as shame related to other scales omitted from this example for clarity.)

The *Mini-K Life History Strategy Scale (Mini-K)- Short Form of the ALHB* (Figueredo et al., 2006) is a 20-item measure derived from the *Arizona Life History Battery (ALHB)*; Figueredo, 2007) on a scale ranging from -3 (Disagree Strongly) to +3 (Agree Strongly). Example items include “While growing up, I had a close and warm relationship with my biological father” and “I often get emotional support and practical help from my blood relatives”.

The *High-K Strategy Scale* (Giosan, 2006) is a 22-item measure of LH strategy on a scale ranging from -3 (Disagree Strongly) to +3 (Agree Strongly). Items on this scale include “I seem to get sick a little easier than other people”.

The *RAND 36-Item Health Survey: Version 1 (SF-36)*; Ware & Sherbourne, 1992) is a measure of general health, both physical (e.g. “In general, would you say your health is”; 1=“Excellent” to 5=“Poor”) and emotional (e.g. “Have you been a very nervous person?”; 1=“All of the Time” to 5=“None of the Time”).

Balanced Inventory of Desirable Responding (BIDR-6); Paulhus, 1991) was used to statistically control for socially desirable responding. This measure contains 40 items covering two subscales ranging from -3 (Disagree Strongly) to +3 (Agree Strongly): (1) Self-deceptive Enhancement, which is measured by items such as “I

am a completely rational person”, and (2) Image Management, which is measured by items such as “I never swear”.

Statistical Analyses

We used SAS University Edition to conduct the statistical analyses. We constructed a unit-weighted factor score calculated as the average of participant’s score on the *Mini-K Life History Strategy Scale*, *High K Strategy Scale*, and *Rand-36 item Health Survey*. PROC CORR was used to calculate correlations among measures. PROC GLM was used to statistically control the variance associated with respondent sex, self-deceptive enhancement, and impression management.

STUDY 1 RESULTS

All five moral foundations were statistically significantly positively intercorrelated (r 's between .27 and .67). Slow LH correlated positively and statistically significantly correlated with each of the five moral foundations, even after controlling for both sex and socially desirable responding (r 's between .16 to .35). Slow LH also positively and statistical significantly correlated with reported empathy ($r(242)=.39, p<.05$) and guilt ($r(242)=.29, p<.05$). See Table 1.

Table 1. Pearson Correlation Coefficients with Slow LH Factor (N=244)

Moral Foundation (or Moral Emotion)	Correlations with Slow LH Factor	Correlations with Slow LH Factor, controlling for respondent sex and social desirability
Harm/Care	.26*	.28*
Fairness	.15*	.16*
Ingroup Loyalty	.33*	.35*
Authority/Respect	.30*	.32*
Purity	.26*	.28*
Empathy	.39*	.39*
Guilt	.28*	.29*

Notes.

* $p < .05$.

STUDY 2 METHOD

Participants

One-hundred and seventy-eight undergraduate students (54 males, 123 females, and 1 transgender individual) enrolled in lower-level Psychology courses at

a southeastern U.S.A. state university participated. The mean age of participants was 21.35 ($SD = 5.78$). The sample was approximately 53% white (non-hispanic), 37% black or African-American, 3% Hispanic or Latino, 3% Asian and 4% multiracial.

Procedures

Participants completed a series of self-report questionnaires on a personal computer measuring their life-history strategies, six moral foundations, political values, perceived life expectancy, age first sexual intercourse, early life socioeconomic status, and socially desirable responding. Participants signed up for the study, provided informed consent, and completed the questionnaires over the internet.

Measures

Moral Foundations Questionnaire (30 items; 5 subscales) (Graham, Haidt, & Nosek, 2008). In study 2, we used the updated 30-item version rather than the original and longer measure used in study 1. See description above.

Liberty Foundation Scale (Iyer et al., 2012) is a nine-item measure consisting of two types of questions, answered on scales identical to the Moral Foundations Questionnaire. The measure contains two subscales determined by its creators through factor analysis: (1) Economic/Government Liberty and (2) Lifestyle Liberty. Economic/Government Liberty is measured using six items such as “The government interferes far too much in our everyday lives”. Three items compose to Lifestyle Liberty including “I think everyone should be free to do as they choose, so long as they don’t infringe upon the equal freedom of others”.

K-SF-42 (Figueredo et al., 2017) is an alternative short form for the Arizona Life History Battery (ALHB; Figueredo, 2007.). It has superior psychometric properties compared to the 20-item Mini-K (described in study 1 above). The measure consists of 42 items selected from the ALHB and correlates highly with it. It was used to assess LH strategy on a “fast-slow” continuum.

Perceived Life Expectancy (adapted from Adams, Stamp, Nettle, Milne, & Jagger, 2014; Del Giudice, personal communication) was assessed as the average of 4 self-report items that asked participants to provide estimates of their perceptions of their life expectancy. The 4 items varied in the future time interval on which they assessed their life expectancy (e.g., “What do you think are the chances you’ll be alive 40 years from now?”). The scale ranged from 0% to 100%. Such items have been validated with actual survival data (Adams et al., 2014).

Age of first sexual intercourse (Del Giudice, personal communication) was assessed with a single item that asked “how old were you the first time you had sexual intercourse? Please select “no” if you have never had sexual intercourse. (years of age)”

Political Attitudes were measured with a single item that read “In terms of my political beliefs, I would describe myself as...”. Participants rated themselves on a 7-point scale from Strongly Liberal to Moderate to Strongly Conservative.

Early Environment SES (Black, 2016) was assessed with nine items asking about experiences related to their parents' socioeconomic status up until they were 10 years of age. Participants responded from -3 (Strongly Disagree) to +3 (Strongly Agree). Example items include "I grew up in a relatively wealthy neighborhood" and "My parents couldn't always pay the bills" (reversed). Although childhood SES is related to meaningful life history variation. We chose to statistically control for early environment SES to demonstrate that the relationships found were robust across different levels of SES.

Balanced Inventory of Desirable Responding (BIDR-6; Paulhus, 1991). Described above.

Statistical Analyses

We used SAS University Edition to conduct the statistical analyses. PROC CORR was used to calculate correlations among measures. PROC GLM was used to statistically control the variance associated with respondent sex, self-deceptive enhancement, impression management, and childhood socioeconomic status. PROC CALIS was used to test how the data fit with a path model.

STUDY 2 RESULTS

Consistent with Graham et al. (2009), Gladden et al. (2009), and with our expectation that psychometric measures of life history strategies may account for interrelationships among the various moral foundations, each of the original five moral foundations were statistically significantly positively intercorrelated with one another (r 's between .29 and .64). The correlations of the liberty foundation with Harm ($r(158)=.19, p<.02$), Fairness ($r(158)=.27, p<.001$), Ingroup ($r(158)=.20, p<.02$), Authority ($r(158)=.19, p<.02$), and Purity/Sanctity ($r(158)=.16, p=.05$) were also positive and statistically significant.

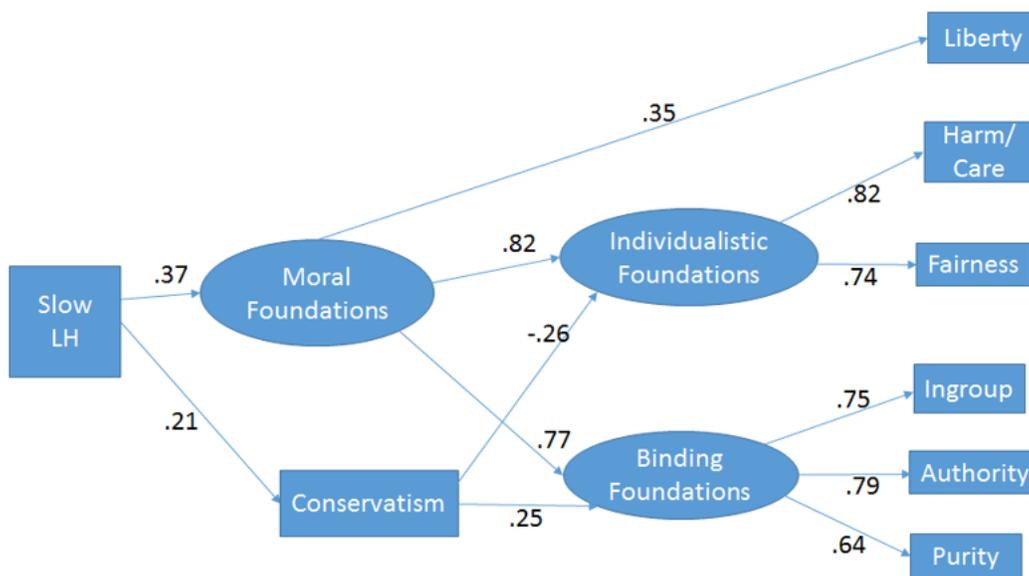
The path-analytic SEM, as theoretically specified, was acceptable by strict Chi-squared statistical criterion ($\chi^2(16)= 19.58, p= .24$), as well as by major practical goodness-of-fit indices (RMSEA=.0377, CFI=.99, NFI=.94). These goodness-of-fit values suggest that the model had an acceptable goodness-of-fit. According to the structural model, the five original moral foundations clustered into two positively correlated higher level factors: (1) *Individualistic foundations* and (2) *Collectivistic/Binding foundations*. A latent general *Moral foundations* factor contributed to both *Individualistic Moral foundations* ($\lambda =.79, p<.01$). *Collectivistic/Binding Moral foundations* ($\lambda =.81, p<.01$). General *Moral foundations* also contributed to *Liberty foundations* ($\lambda =.36, p<.01$).

The latent *Individualistic foundations* factor was composed of concerns with *Harm/Care* ($\lambda=.82, p<.01$) and with *Fairness/Reciprocity* ($\lambda =.74, p<.01$). The latent *Collectivistic/Binding foundations* factor was composed of *Ingroup/Loyalty* ($\lambda =.75, p<.01$), *Authority/Respect* ($\lambda =.79, p<.01$), and *Purity/Sanctity* ($\lambda =.64, p<.01$). These findings are consistent with results reported by Graham et al. (2009) who reported

that *Individualistic* and *Binding foundations* were (unaccountably) positively associated.

Slow LH Strategy positively contributed to general *Moral foundations* ($\beta = .37, p < .01$), and, thus, contributed positively and indirectly to *Individualistic*, *Collectivistic/Binding*, and *Liberty foundations*. General *Moral foundations* mediated between *Slow LH Strategy* and both *Individualistic* and *Collectivistic/Binding foundations*. *Slow LH* also positively and directly contributed to political *Conservatism* ($\beta = .21, p < .01$). Political *Conservatism* partially mediated between *Slow LH* and *Collectivistic/Binding foundations* ($\beta = .25, p < .01$). *Conservatism* also directly inhibited *Individualistic foundations* ($\beta = -.26, p < .01$) (See Figure 1 for a representation of the complete model and its pathway coefficients).

Figure 1. Structural Model of Relations Among LH Strategy, Conservatism, and Moral Foundations



Contrary to expectations based on the results of Van Leeuwen et al. (2014), the correlation between perceived life expectancy and the individualizing foundations was negligible and nonsignificant ($r(156) = .05, p = .51$). The correlation between perceived life expectancy and the binding foundations was positive and approached, but did not reach statistical significance ($r(156) = .15, p = .07$). There was a small, but statistically significant, positive correlation between perceived life expectancy and ingroup/loyalty ($r(156) = .16, p = .05$). None of the correlations between perceived life expectancy with any of the other five moral foundations were statistically significant (r 's between $-.01$ and $.13$).

The correlation between reported age of first sexual intercourse and the individualizing foundations was nonsignificant ($r(154) = .07, p = .36$). The correlation

between age of first sexual intercourse and the binding foundations was also not significant ($r(154) = .04, p = .62$). None of the correlations between age of first sex with any of the six specific moral foundations were statistically significant (r 's between .01 and .09).

Consistent with predictions of life history theory, there was, however, a statistically significant correlation between perceived life expectancy and slow life history strategy ($r(160) = .21, p < .01$). However, contrary to predictions, reported age of first sexual intercourse was not correlated with slow life history strategy, as measured by the K-SF-42.

DISCUSSION

Across two studies, as predicted based on life history theory and previous empirical findings (e.g., Gladden et al., 2009), individual-level psychometric measures of slow LH strategies moderately positively predicted all six moral foundations. In study 2, individualizing and binding foundations were positively correlated. Based on our LH perspective that some variation among the various six moral foundations (including *Liberty*) would be explained by slow LH strategies, we constructed a higher order general moral foundations factor, which mediated between slow LH strategies the specific moral foundations. Slow LH individuals, thus, report experiencing higher levels of a wide variety of moral intuitions including “individualizing”, “binding”, and “liberty” related intuitions. These moral intuitions may guide slow LH individuals toward socially-selected behaviors and adaptive benefits bestowed on them by binding them into cohesive groups and non-zero sum social interactions.

As noted, in a structural model explaining variation in the moral foundations, the predictive contributions of slow LH strategies were partly mediated through a general moral foundations factor (which, ultimately, contributed to all six moral foundations) and partly mediated through political conservatism. In other words, the “liberal” foundations, the “conservative” foundations, and the “libertarian” foundation were positively intercorrelated. Life History strategy appears to partly explain the positive inter-correlations among these six moral foundations (indirectly through a general moral foundations factor). As expected based on past findings, conservatism contributed to increased binding foundations and decreased individualistic foundations. It's worth noting that slow LH strategy was a slightly better predictor than political attitudes at predicting the various moral foundations.

Psychometric (but not demographic) Indicators of LH Predicted Moral Foundations

On the other hand, two individual-level “demographic” indicators (e.g., self-reported perceived life expectancy, age of first sexual intercourse) commonly thought to assess LH strategies mostly failed to predict the moral foundations. The contrast in these findings is similar to the contrast seen between the findings of Gladden et al. (2009), where individual-level psychometric measures of slow LH

were positively associated with measures conceptually similar to both individualistic and binding foundations, and the findings of Van Leeuwen et al. (2014), where population-level demographic indicators were (in one subpopulation) positively associated with individualistic foundations and negatively associated with binding foundations.

Although the nonsignificant relationships of moral foundations with perceived life expectancy and with reported age of first sexual intercourse seems contrary to a LH interpretation of our results, we also found that one of these “demographic” indicators (perceived life expectancy) did significantly correlate with the psychometric measure of LH used in study 2 (the *K-SF-42*). This may suggest a mediating relationship between self-perceived life expectancy and various indicators assessed by the *K-SF-42*. In other words, both anticipated life expectancy and the psychometric measures of LH may be valid indicators of LH strategy, but life expectancy may be relatively “downstream” in the sequence of causality and mediated by various personality, cognitive, and other psychological attributes (e.g., variables assessed by psychometric measures of LH). In other words, they may tap into different aspects of LH strategies that don’t equally predict other empirically related constructs. We decided not to include perceived life expectancy within the structural model in study 2 (and instead to statistically control for it) due to our limited sample size. But, the correlations we reported clearly showed that while psychometric indicators consistently and positively predicted the six moral foundations in undergraduate college samples taken from opposites geographic (southwestern and southeastern) sides of the U.S.A., single-item “demographic” measures did not predict moral foundations. It’s worth pointing out that, even if the psychometric approach to measuring LH strategy were shown to be invalid, as some have suggested (see Copping et al., 2014; 2017 and Figueredo et al., 2015 for a reply) and on which we take no position here, whatever psychometric measures such as the *K-SF-42* are assessing accounted for significant variance in and inter-relationships among the moral foundations in our samples. In contrast, the demographic indicators (at least as measured at the individual self-report level) did not account for significant variance in moral foundations.

Our findings seem contrary to predictions from parasite stress theory that individualistic and collectivistic (binding) foundations will be inversely related (as a result of variation in infectious disease stress). Thornhill and Fincher (2014) suggest, however, that there is a methodological problem with current measures of the *individualistic* foundations because these measures don’t distinguish between the Care/Harm and Fairness/Reciprocity of ingroups compared to outgroups. They predict that collectivists (and conservatives) will exhibit higher *in-group* altruism, care, and fairness, whereas individualists (and liberals) will exhibit higher *out-group* altruism, care, and fairness. Future studies should examine this possibility. However, as noted earlier, slow LH individuals among U.S. college students evidently score higher on in-group favoritism (Gladden, 2010), but lower on negative out-group bias (Figueredo et al., 2011). Cross-cultural differences on this pattern should be investigated.

Limitations

Our results are limited by exclusive reliance on self-report measures and on two “WEIRD” samples from the same country (though from two different regions within that country, which does provide some limited evidence of generalizability across samples). The moral foundations might not positively inter-correlate or might not consistently be positively associated with slow LH measures across very different socio-ecological conditions. Future research on the potential influence of LH strategy on morality-relevant traits should integrate experimental investigations with the individual difference sorts of measures emphasized here. Some specific facets of LH strategy (e.g., executive functioning) are amenable to experimental manipulation and may be adaptively structured to contingently inhibit and disinhibit moral behavior across different situations (e.g., related to in-groups/out-groups)—depending on cultural rules. In addition, shared method variance is a concern due to our exclusive reliance on self-report measures. It’s possible that the various moral foundations would be less positively related if multiple types of measures were used.

Conclusion: Slow LH, Conservatism, and Moral Understanding

As expected based on previous findings (e.g., Iyer et al., 2012), psychometric indicators of slow LH strategies directly and positively predicted political conservatism, which contributed to both increased binding/collectivistic foundations and decreased individualistic foundations. Haidt (2012) argues that conservatives can more easily understand the moral motivations of liberals than liberals can understand the moral motivations of conservatives because of their broader reliance on diverse moral intuitions. Our results suggest that slow LH individuals (rather than conservatives per se) may have a particularly broad grasp of all six moral foundations, including aspects of the *Liberty* foundation. So, slow LH individuals may have the broadest intuitive grasp of diverse moral viewpoints and concerns. Arnhart (2012) argued that a broader grasp of these evolved and universal moral foundations is (prescriptively) better if that means “better in accounting for the widest range of those moral foundations necessary for human happiness” and better in freely allowing for the expression of our groupish nature, which can promote social virtue “so long as they respect the equal liberty of all individuals in that moral pursuit.”

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