

HUMAN LIFE HISTORY DIMENSIONS IN REPRODUCTIVE STRATEGIES ARE INTUITIVE ACROSS CULTURES

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ABSTRACT

Psychological research has been criticized for its extensive use of American university students to make broad claims about human psychology and behavior. Critics recommend a broader base of participants because there is substantial variability in experimental results across populations, and North American and Western European psychology pool participants may be outliers in comparison with the rest of the species. This challenge is especially pertinent for claims of species-universal evolved psychological architecture. One such claim has been made regarding recognition of human life history strategies. For example, previous research demonstrates that North American women and men can identify male and female characters with fast (high mating effort, low parental investment) and slow (low mating effort, high parental investment) life history strategies, make accurate predictions about their behavioral tendencies, and respond to them in ways that would facilitate participants' own reproductive success. The current project validates the understanding of fundamental life history dimensions across a wide range of cultures, therefore supporting the idea that there is a universality in human's ability to use, and perceive others' use of, life history strategies. Results for each language sample replicated patterns from North

American participants. Ratings for characters clustered into two dimensions, mating effort and parental investment. Items most central to the theoretical constructs had the highest factor loadings.

Keywords: *life history, mating strategies, human, Literary Darwinism, cross-cultural*

INTRODUCTION

Psychological research has been criticized for its extensive use of American university students to make broad claims about human psychology and behavior (Henrich, Heine, & Norenzayan, 2010). In addition to the restricted age range typical for traditional college students, these samples are often from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations, which may not be an accurate representation of the ranges of human cultural history or even contemporary societies (Henrich, Heine, & Norenzayan, 2010; see also for theoretical view Evenden & Sandstrom, 2011). Critics recommend a broader base of participants because, for some areas of research, there is substantial variability in experimental results across populations, and North American and Western European psychology pool participants may be outliers in comparison with the rest of the species (Henrich, Heine, & Norenzayan, 2010). For example, Henrich, Heine, and Norenzayan (2010) report that classic behavioral economic and social psychology experiments do not replicate when conducted with those in foraging cultures. Thus, the foundation of social sciences, which has extensively relied on WEIRD samples, has been called into question for its ability to account for human behavior. This challenge is especially pertinent for claims of species-universal evolved psychological architecture, common to the field of evolutionary psychology or human ethology. Fortunately, the reliance on WEIRD samples appears to be lower in evolutionary-based research than for social psychology in general, 65% vs. 96% in leading journals (Kurzban, 2013).

A Brief Review of Life History Theory

To explore the issue of whether past research findings are questionable in their reliance on WEIRD samples, we describe a cross-cultural replication of a study demonstrating the recognition of life history dimensions within human sexual reproduction. Theory suggests that there is a continuum representing how individuals make decisions regarding energy allocation towards survival-enhancing acts versus reproductive effort (Kaplan & Gangestad, 2004). This allocation involves critical trade-offs with respect to time, energy and resource investment between current versus future reproduction, quantity versus quality of offspring, and mating versus parental effort. This theory, known as Life History Theory (LHT), is a powerful mid-level theoretical framework used extensively in the life sciences, and can be used to explore various distinct aspects of human evolution such as diet and cognitive

capacity (e.g., Kaplan, Hill, Lancaster & Hurtado, 2000). In recent decades, researchers have applied Life History Theory to explain variation in human psychology and behavior (see, Griskevicius, Tybur, Delton & Robertson, 2011 for a review). LHT models life cycles and life history traits in an ecological context, integrating evolutionary, ecological, and socio-developmental perspectives (Chisholm, 1999; Stearns, Allal, & Mace, 2008). Therefore, LHT illustrates how organisms must make trade-offs in the allocation of resources, and how the optimal degree of a trade-off varies based on social and ecological conditions. Human sexual reproduction includes multiple trade-offs, beginning with the efforts allocated to obtaining sexual partners (mating effort) and ensuring the healthy development of offspring (parental investment). Thus, one might rely on a 'slower' strategy, whereby their rate of reproduction is slow and prioritizes offspring quality, while another person may rely on a 'faster' strategy, emphasizing a fast rate of reproduction which prioritizes the quantity of offspring (Bielby et al., 2007). Some scholars suggest that the psychological study of mating relationships is enhanced by the integration of a life history framework. For example, in a recent article, Kenrick and Griskevicius (2015) use life history to explain why there are sex differences in sexual maturity and preferred ages in mates, why activating mating motives leads to showy displays in human males, and why variations in sex ratios and resources predictably alter sexual competition and marriage patterns.

One way to examine LHT is to focus on the cognitive components that underlie the variation in mating strategies. The burgeoning area of investigation into mating intelligence examines the higher-level cognitive processes that are related to mating outcomes. As Geher and Kaufman (2011) review, mating intelligence changes according to one's adoption of life history strategies. That is, those pursuing a slow strategy are presumed to have "cognitive sets that facilitate long-term mating, often at a cost to success in short-term mating" (p. 605). Likewise, those following a fast strategy are predicted to have cognitive sets that allow success in short-term, but not long-term mating. Signs of mating intelligence should be behavioral outcomes that result in mating success (e.g., number of sexual partners, the qualities of attracted partners), as well as potential reproductive fitness outcomes (e.g., sperm quality; Geher & Kaufman, 2011).

Another way to explore mating intelligence is to address the perceptions people have of other's mating strategies. Cross-sex mind-reading therefore represents one form of mating intelligence, as figuring out the desires of opposite-sex others is critical for mating success (e.g., Geher, 2009). We propose, too, that limiting mating intelligence to the ability to accurately infer the intentions and desires of opposite-sex individuals is shortsighted, as it would also be highly advantageous to be able to learn of same-sex individuals' plans, given the latter may represent mating rivals.

Along these conceptual lines, we recently developed a psychological instrument that may be useful in examining perceptions of life history strategies (Kruger, Fisher, & Jobling, 2003). These perceptions are based on the correspondence between the personality traits of proper and dark (or Byronic or Romantic) heroes of late 18th and early 19th century British Romantic literature and the attributes of slow and fast male mating strategies. Although

these heroic characters are fictional and were created centuries ago, the tenets of Darwinian literary theory suggests that they are just as salient today, as imagined individuals, as they were ages ago. The field of Darwinian literary studies has effectively demonstrated that it is possible to examine texts and arrive at meaningful conclusions about evolved human behaviors, motivations, and emotions (Carroll, 1995). Thus, by analyzing texts, one is actually analyzing human nature, albeit quite indirectly. In other words, although these heroes are characters created by an author, they reflect the human nature of the actual author, as well as of those around who were used for the basis of character development.

Previous work has shown that the proper and dark hero archetypes represent a constellation of distinct personality characteristics, dispositions, and mating strategies (e.g., (Kruger, Fisher, & Jobling, 2003; Kruger & Fisher, 2005a, 2005b, 2008). Proper heroes exemplify long-term mating strategies with reliable paternal investment in offspring; these men are typically law-abiding, compassionate, kind, and monogamous. Dark heroes maximize their reproductive success by having many short-term relationships without parental investment; these characters are socially dominant, rebellious, frequently criminals (although often justified by a tyrannical government), and often promiscuous. We found that North American women's tendencies to choose dark hero cads over proper hero dads for a hypothetical relationship increased as the relationship length decreased, following the type of investment (parental vs. genetic) valued in each type of relationship (Kruger, Fisher, & Jobling, 2003). North American women and men can identify male characters with fast (high mating effort, low parental investment) and slow (low mating effort, high parental investment) life history strategies, make accurate predictions about their behavioral tendencies, and respond to them in ways that would facilitate participants' own reproductive success (Kruger, Fisher, & Jobling, 2003; Kruger & Fisher, 2005a, 2005b, 2008), thereby demonstrating mating intelligence. Women's preferences shift more generally towards males with slow life histories as they age, consistent with their changing pattern of reproductive interests (Tifferet & Kruger, 2010).

The current project examines the understanding of fundamental life history dimensions across a wider range of cultures than previously included; prior work was based on samples from the United States. We propose that, due to the evolutionary basis of life history strategies and the importance of being able to infer accurately the intentions and desires of others, we predict there will be minimal cultural variation in how people comprehend the proper versus dark hero. We predict that across samples, behaviors related to human sexual reproduction will cluster into two distinct, but inversely related dimensions. These results would demonstrate that the proper and the dark hero archetypes are intuitively understood as slow life history "dads" and fast life history "cads" by people in a variety of cultures. Critics could argue that those in British-derived cultures such as the U.S. are merely reflecting the prevailing social norms they have culturally inherited.

METHODS

This research was reviewed by the University of Michigan's Institutional Review Board and classified as exempt from IRB review as it did not collect personal identifiers or sensitive data (e.g., items on illegal behaviors, sexual abuse). Participants were obtained via international colleagues, and completed an on-line or hardcopy survey with separate sections for each character description and ratings. On-line data were collected via surveys on the University of Michigan's Qualtrics™ platform. Participants ($N = 998$) from Eastern and Western Europe, Central and South America, South and East Asia, and the Middle East read translated descriptions of two male characters from novels by Sir Walter Scott. The first, the proper hero Waverley, was from *Waverley* (1814), representing a slow life history male, and the second, the dark hero George Staunton, from *The Heart of Midlothian* (1818), representing a fast life history male. The passages were converted into simplified English, translated into other languages by one set of bi-lingual translators, then back-translated into English by a second set of bi-lingual translators. After this, translators worked together to resolve issues and discrepancies. These passages are now presented.

Simplified English passage used for translation: Waverley

When he was in the army, the other high-ranking officers often argued and fought amongst each other over who should receive the greatest prizes of victory, but he was more annoyed than interested by these arguments. He was also not as concerned as his fellow warriors about military honor. As one of his friends said about him, "Dangerous adventures are not for him. He would never have been his famous ancestor Sir Nigel, a famous warrior, but could be an expert at telling stories and writing poetry about Sir Nigel. He is most suited to be happy in his quiet home, reading books for enjoyment, and enjoying a well-off lifestyle. He will fill his house with tasteful decorations and rare books, and will draw, write poetry, build replicas of ancient buildings, and will stand outside in the clear summer night and watch the deer as they walk by in the moonlight, and he will be a happy man."

Simplified English passage used for translation: George Staunton

He carried himself boldly, somewhat arrogantly, walking bravely and freely. He was very handsome, and would be completely interesting and attractive, except for that indescribable look that excessive pleasures give to one's face, along with bold looks and behavior. The fierce eye, abrupt demeanor, sometimes harsh yet calm tone of voice- the looks, handsome, but now clouded with pride, now disturbed by suspicion, now inflamed with passion - those dark hazel eyes which he sometimes shaded with his cap, as if he were trying to spy on others without them seeing him, those eyes that were now cloudy with sadness, now gleaming with scorn, and now sparkling with fury- did they just express the feelings of man? Or did they unsuccessfully try to hide the wicked plans of something more sinister, disguised as a handsome man?

After reading the descriptions, participants rated each character on the likelihood of exhibiting 14 behavioral attributes of reproductive strategies (adapted from Kruger, 2006). These behavioral attributes represented mating effort (9 items), for example, "Frequently challenge his boss," and "Sleep with a large number of women in his lifetime," and parenting effort (5 items), for example, "Be great with children," and "Use nearly all of his income to support his family." The content of these items was created based on the Evolutionary Psychology literature on reproductive strategies and variation in life history (e.g., Chisholm, 1999; Kaplan & Gangestad, 2004; Stearns, Allal, & Mace, 2008). Mating effort items featured attributes associated with high male mating competition (attempting to poach someone else's partner, getting into physical fights), risky and competitive behaviors, display, and attractiveness to female partners for short-term sexual relationships (see Table 3). Parenting effort items included resource provisioning, investment in offspring, and qualities important for maintaining a long-term romantic relationship.

Five samples were of adequate sizes for Confirmatory Factor Analyses, representing 670 of 782 international participants: 166 Korean (66% female), 150 Croatian (91% female), 146 Argentinean (63% female), 126 Israeli (40% female), 98 Chinese (63% female). Comparative models were examined separately for each sample, including an independence model where items are unique indicators, a one-factor model, a two-factor model, and a two-factor model where error terms were allowed to correlate within factors when Modification Indices for this parameter were 10.0 or above (See Figure 1). The two-factor model without auto-correlated errors is the reference for comparison to the independence and one-factor models. Inter-item scale reliabilities (Cronbach's alphas) were computed for each dimension in each sample.

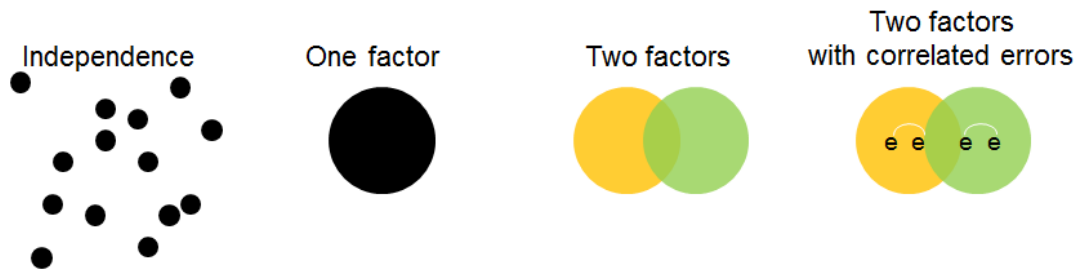


Figure 1. Models tested with Confirmatory Factor Analyses

RESULTS

Across samples, participants' ratings on behavioral attribute items formed two distinct but inversely related behavioral dimensions, mating effort and paternal investment (see Table 1). The two-factor model fit the data better than the one-factor model and independence model. Allowing select error terms to correlate within factors improved the model fit substantially. Both scales evinced excellent inter-item reliabilities across all samples (see

Table 1. Results of Confirmatory Factor Analyses by sample.

Model	χ^2 /d.f.	$\Delta\chi^2$	GFI	CFI	NFI	RMSEA (90%CI)
Korean sample, <i>n</i> =166						
Independence	35.6		.276	.000	.000	.349 - .369
One factor	14.2	2384.16	.620	.678	.663	.190 - .211
Two factors	7.3	534.19	.798	.847	.828	.128 - .150
2F cor. errors	2.3	483.62	.970	.986	.977	.065 - .045
Croatian sample, <i>n</i> =150						
Independence	48.7		.166	0	0	.389 - .409
One factor	13.6	3385.07	.584	.777	.764	.194 - .216
Two factors	6.6	542.25	.796	.902	.887	.126 - .148
2F cor. errors	3.3	395.82	.955	.983	.976	.070 - .107
Argentinean sample, <i>n</i> =146						
Independence	38.2		.197	0	0	.349 - .369
One factor	1.7	2648.85	.65	.779	.762	.172 - .195
Two factors	6.7	318.09	.775	.872	.853	.129 - .152
2F cor. errors	2.7	423.31	.961	.984	.975	.057 - .096
Israeli sample, <i>n</i> =126						
Independence	26		.241	0	0	.313 - .336
One factor	7.0	1821.28	.706	.796	.771	.147 - .172
Two factors	3.2	295.77	.868	.925	.896	.084 - .111
2F cor. errors	1.2	204.88	.977	.996	.983	.000 - .062
Chinese sample, <i>n</i> =98						
Independence	22.83		.245	0	0	.322 - .347
One factor	9.76	1325.89	.586	.661	.638	.198 - .226
Two factors	5.79	311.51	.738	.817	.788	.143 - .171
2F cor. errors	3.19	335.66	.937	.965	.951	.083 - .129

Note: All $\Delta\chi^2$ values are statistically significant at $p < .001$.

Table 2). Items most central to the theoretical constructs had the highest factor loadings (see Table 3). Across samples, the items with the highest loadings on mating effort were "Cheat on his partner," and "Knowingly hit on someone else's girlfriend." Across samples, the items with the highest loadings on parenting effort were "Be great with children," and "Be a good husband." Peripheral attributes, "Lots of fun at parties" and "Work hard at his job

even though he did not like it" had the lowest highest loadings on mating effort and parenting effort, respectively, across samples. Mating and parenting dimensions were inversely related across samples (see Table 2), the shared variance ranged across samples from 13% to 62%.

Table 2. Inter-item scale reliabilities (Cronbach's alphas) and factor covariance by sample

Sample	n	Mating	Parenting	Covariance
Korean	166	.935	.824	13%
Croatian	150	.952	.918	61%
Argentinean	146	.937	.897	62%
Israeli	126	.928	.824	45%
Chinese	98	.873	.924	56%

Note that Mating and Parenting dimensions are inversely related across samples.

Table 3. Standardized regression weights by sample

Item	Kor- ean	Croat -ian	Argen- tinean	Israeli	Chi- nese
Mating					
Cheat on his partner	.977	.939	.884	.895	.874
Knowingly hit on someone else's girlfriend	.947	.979	.876	.988	.651
Get into physical fights	1.00	.852	.931	.945	.647
Sleep with a large number of women in his lifetime	1.00	.856	.847	.747	.752
Go to jail	.816	.840	.849	.839	.568
Be attractive to women for a brief sexual relationship	.544	.742	.552	.759	.600
Frequently challenge his boss	.480	.740	.665	.615	.512
Wear flashy clothes	.505	.575	.627	.629	.543
Lots of fun at parties	.332	.427	.396	.293	.303
Parenting					
Be great with children	1.00	.930	.883	.791	.823
Be a good husband	.866	.906	.900	.817	.871
Be caring and emotionally supportive in a long-term relationship	.748	.956	.846	.835	.891
Use nearly all of his income to support his family	.137	.867	.845	.632	.514
Work hard at his job even though he did not like it	.627	.579	.442	.199	.654

DISCUSSION

Prior work has shown that people readily identify male mating strategies, as portrayed by two fictional characters from Sir Walter Scott: Waverley and George Staunton. These two characters represent the proper and the dark hero, respectively, and thus, typify a “dad” male mating strategy, which is aimed at long-term mating success, and a “cad” male mating strategy, which focuses on short-term mating success. Past research indicates that men and women exposed to descriptions of these heroes can predict various behavioral dispositions that relate to Life History Theory (LHT). Here we provide evidence that past results are not limited to samples from the United States, but are indeed intuitive and readily comprehended in a variety of cultures.

Participants across a diverse range of cultures identify two distinct but inversely related behavioral dimensions in men; mating effort and paternal investment. Thus, these results support our hypotheses, based on a theoretical framework of evolutionary LHT. Our study provides additional evidence for the value of LHT in understanding variation in human psychology and behavior. The findings also show that mating intelligence, as a higher-level cognitive ability, seems to be related to life history, in that it may be the aspect of cognition that allows one to understand the intentions, desires and mating strategies of opposite-sex others. Research indicates that mating intelligence displays individual variation (e.g., Dillon, Adair, Geher, Wang & Strouts, 2015), and therefore, it would be interesting to examine individual differences in comprehension of other’s use of life history strategies.

We also consider it notable that our life history dimension scales had excellent inter-item reliabilities across all samples. Rather than assessing a unitary psychological construct such as self-esteem or attachment anxiety like most psychological inventories, these items were composed of qualitatively different but theoretically related behavioral attributes. Researchers not using an evolutionary perspective may classify violence, sexual promiscuity, and social gregariousness as separate areas and indeed researchers have based their careers on the study of these areas in isolation. However, we expected these qualitatively different behaviors to cluster based on their common relationship to basic dimensions of life history.

There are some limitations that deserve comment. For example, the Chinese sample is smaller than the others by 20% or more, and thus the present results may be less reliable than for other cultures. We do note that we reached the minimum acceptable sample size (70 participants; Bryant & Yarnold, 1995) for a factor analysis of 14 items. Moreover, the stimuli (i.e., the two vignettes describing the proper and the dark hero) we used were based on 19th Century British novels. Although we modified the language to clarify obscure terms, these descriptions represent the conceptions of men from 200 years in the past. Men with relatively fast and slow life histories living in contemporary cultures may be described differently, including a different range of typical behaviors. We did not ask participants if they could identify the characters (though very few North American participants could identify the characters based on the original passages when asked in prior studies), nor did we ask whether there were similar characters that existed in the local folk literature. It would

be potentially interesting to see an up-to-date list of dispositions and behaviors that typify slow and fast life histories for men in these cultures, and compare them to the characters used as our stimuli. Given that there is a proposed evolutionary basis, it is unlikely that there are noticeable differences either due to era or culture.

Although some might consider it unusual to use descriptions of characters from centuries ago, the basis of Darwinian literary studies is that human nature – that is, emotions, motivation and cognition- is revealed through texts (Carroll, 1995). We used these two passages specifically because the personality characteristics that are described seemed consistent with modern conceptualizations of fast and slow male life histories, and because these characters' reproductive strategies depicted in the novels (purposefully excluded in the stimuli) exemplified fast and slow male life histories. Moreover, there is a body of existing work that has relied on these characters, linking these passages to variation in male mating strategies, as well as men and women's ability to understand this variability (Kruger, Fisher, & Jobling, 2003; Kruger & Fisher, 2005a, 2005b, 2008). In the future, it would be potentially informative to examine sex differences in comprehension of fast versus slow strategies, given that women tend to be more accurate in determining men's short-term mating desires, whereas men tend to be more accurate in determining women's long-term mating desires (Geher, 2009). Thus, it may be the case that women are more prone to trusting a description of a male with a fast life history strategy, but are skeptical about a description of a male with a slow life history strategy.

Despite the fact that we used simplified descriptions of two characters from centuries ago, our results clearly show a cross-cultural understanding in men's use of fast versus slow life history strategies. We are reassured that the concepts most central to high mating effort and high parenting effort had the highest loadings on their respective dimensions. Overall, our study demonstrates the utility of a life history approach for understanding psychological and behavioral variation related to reproductive strategies. This integrative framework holds the promise of advancing psychological science across cultures, as well as uniting psychology with the life sciences. We also demonstrate the usefulness of the dad and cad experimental paradigm and our brief psychological scales representing life history dimensions of reproductive strategies.

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