

# Brief Self-Report Scales Assessing Life History Dimensions of Mating and Parenting Effort

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## Abstract

Life history theory (LHT) is a powerful evolutionary framework for understanding physiological, psychological, and behavioral variation both between and within species. Researchers and theorists are increasingly integrating LHT into evolutionary psychology, as it provides a strong foundation for research across many topical areas. Human life history variation has been represented in psychological and behavioral research in several ways, including indicators of conditions in the developmental environment, indicators of conditions in the current environment, and indicators of maturation and life milestones (e.g., menarche, initial sexual activity, first pregnancy), and in self-report survey scale measures. Survey scale measures have included constructs such as time perspective and future discounting, although the most widely used index is a constellation of indicators assessing the *K*-factor, thought to index general life history speed (from fast to slow). The current project examined the utility of two brief self-report survey measures assessing the life history dimensions of mating effort and parenting effort with a large undergraduate sample in the United States. Consistent with the theory, items reflected two inversely related dimensions. In regressions including the *K*-factor, the Mating Effort Scale proved to be a powerful predictor of other constructs and indicators related to life history variation. The Parenting Effort Scale had less predictive power overall, although it explained unique variance across several constructs and was the only unique predictor of the number of long-term (serious and committed) relationships. These scales may be valuable additions to self-report survey research projects examining life history variation.

## Keywords

life history theory, mating effort, parental investment, measurement, survey scale

Date received: May 03, 2016; Accepted: September 16, 2016

Thomas Francis' announcement in 1955 that Jonas Salk's polio vaccine was "safe, effective, and potent" was a carefully constructed statement conveying considerable information in a brief message suitable for widespread dissemination. Contemporary survey researchers would benefit from adapting Dr. Francis's technique. In the early 21st century, survey research is more popular than ever before, and online data collection platforms enable participation by anyone connected to the Internet. The boom in survey research may be a great boon to the social sciences as well as other fields and industries utilizing this method; however, there are also challenges that arise from our fast-paced modern world. Survey participants are less willing to fill out inventories of hundreds of items, chafe at repetition in content, and provide lower quality responses to longer instruments (Galesic & Bosnjak, 2009; Porter, Whitcomb, & Weitzer, 2004). Many researchers recruit

noncaptive online samples, where participants receive little or no compensation, and thus, attrition is often a serious concern (Rolstad, Adler, & Rydén, 2001).

Decades ago, it was acceptable and even desirable to develop extensive scales for measuring personality and other psychological attributes. Researchers were motivated to respond to criticisms of nonbehavioral psychological assessments. Contemporary researchers are more likely to recognize the value of efficient measures that effectively measure

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theoretical constructs, have high power of prediction, and create minimal burden for survey participants. Brief scales may even reflect a specific construct better than longer inventories due to the lower conceptual complexity (McGrath, 2005). Fortunately, there is a growing trend in psychological assessment research for creating concise measures to increase efficiency and utility (Donnellan, Oswald, Baird, & Lucas, 2006; Gosling, Rentfrow, & Swann, 2003; Jonason & Webster, 2010). This article describes the development and validation of scales with such properties for assessing the life history dimensions of mating effort and parenting effort.

### *Life History Theory (LHT)*

Core aspects of LHT have been expressed for nearly a century. For example, Fisher (1930/1958) recognized the importance of understanding the physiological mechanisms regulating trade-offs in investment between reproduction and maintenance of the body as well as the life history and environmental factors influencing the relative allocations. Cole (1954) brought increasing attention to the study of life cycle traits and their variations in his paper addressing the simultaneous existence of semelparity and iteroparity. Schmalhausen (1949, as cited in Dobzhansky, 1950) noted that higher fertility results from accelerated development and reproduction associated with greater unpredictability in extrinsic mortality.

Age-specific mortality rates (Harvey & Clutton-Brock, 1985; Promislow, 1992) and the predictability in availability of resources needed for reproduction (Weinrich, 1977) shape an organism's life history. Environments with high unpredictability of future events (including availability of resources, death from predation, etc.) foster the evolution of trait clusters related to rapid and prolific breeding with relatively low investment in offspring (MacArthur & Wilson, 1967; Pianka, 1970). Environments with greater stability and predictability instead foster greater investment in somatic and parental effort, with lower reproductive rates and longer intergenerational times. Because resources are always limited, organisms make trade-offs between different types of effort, including somatic and reproductive effort and mating and parental effort, and investment in current offspring and conservation of resources for potential future offspring (Roff, 1992; Stearns, 1992). Variation in allocations of effort, both between and within species, is partially a product of environmental conditions (Copping & Campbell, 2015; Roff, 1992; Rushton, 1985; Stearns, 1992), and relative allocations are a product of functional adaptations designed to maximize average lifetime inclusive fitness, given the environmental conditions experienced (Gadgil & Bossert, 1970; Roff, 1992; Stearns, 1992).

### *Human Life History Variation*

Rushton (1985) proposed that LHT could be useful in understanding individual differences in human behavioral strategies and physiological functioning. Human life history strategies are partially constrained by physiology (Heath & Hadley,

1998), although they are influenced by environmental circumstances such as socioeconomic, ecological, and cultural conditions. For example, parental investment is lower in foraging cultures, where high pathogen load leads to higher offspring mortality regardless of parental investment (Quinlan, 2007). In the city of Chicago, shorter average neighborhood life expectancies at birth predicted higher homicide rates as well as higher overall mortality rates (Wilson & Daly, 1997).

Individuals living in unpredictable environments develop more present-oriented, riskier behavioral strategies to take advantage of transient opportunities (Chisholm, 1999; Wilson & Daly, 1997). Those living in unpredictable, adverse environments are more likely to experience earlier menarche, earlier ages of reproduction, higher reproductive rates, and violence (Chisholm, 1999; Copping & Campbell, 2015; Copping, Campbell, & Muncer, 2013; Kim, Smith, & Palermiti, 1997) to facilitate early reproduction before death occurs. Adverse environmental conditions predicted preferences for more immediate rewards in urban adolescents, which in turn predicted rates of interpersonal violence and property crimes (Kruger, Reischl, & Zimmerman, 2008). Community college students who had shorter life span estimates and higher estimates of the unpredictability of the future had a higher frequency of risk-taking (Hill, Ross, & Low, 1997).

### *Assessing Human Life History*

Human psychometric assessments of life history are complementary to traditional biometric assessments of developmental parameters used across species, such as spacing of births, length of gestation, weight at birth, length of juvenile dependency, and age at sexual maturity. Psychological measures add value in identifying proximal mental processes or mechanisms guiding behavioral strategies (see Cosmides & Tooby, 1994). Kaplan and Gangestad (2005) argue that an evolutionary psychology approach is crucial for an understanding of human life history variation and that LHT is a powerful guide for understanding the development, nature, and operation of psychological adaptations.

Figueredo and colleagues (2006) argue that a common, partially hereditary, factor underlies human life history parameters and reproductive, familial, and social behaviors. This factor, named differential  $K$  ( $K$  being the maximum species population size that an environment can sustain, see also Rushton, 1985), represents a continuum of strategies, ranging from a focus on short-term gains at the expense of long-term costs, high mating effort, and low parenting effort to long-term strategies, selective mating, and high parental effort. Researchers now describe these strategies as being relatively faster and slower life histories, respectively.

Figueredo et al. (2005) used the Midlife in the U.S. study, a large nationally representative data set, to create the 199-item Arizona Life History Battery. This in turn was used to create the 20-item Arizona Life History Battery–Short Form (ALHB-SF; Figueredo et al., 2006), often called the Mini- $K$ , as it is a briefer assessment of differential  $K$  than the original index.

Higher ALHB-SF scores are proposed to indicate slower life histories. The ALHB-SF contains items that tap into developmental experiences, optimism, perseverance, risk-taking, sociosexuality, bidirectional social support with friends and family members, and community and religious involvement. All of these components are thought to reflect life history speed, and the scale predicts theoretically convergent indicators of slow life history strategy assessed with standard longer instruments (Gladden, Figueredo, & Jacobs, 2008; Figueredo et al., 2006; Figueredo & Wolf, 2009; Sefcek & Figueredo, 2010). The ALHB-SF also demonstrates concurrent or predictive validity (Figueredo et al., 2014; Olderbak, Gladden, Wolf, & Figueredo, 2014; see also Figueredo, Cabeza de Baca, & Woodley, 2013). The ALHB-SF is the most widely utilized self-report life history assessment currently used in psychological research.

Human life history researchers have recently emphasized the need to clearly determine what is being measured by life history indicators (e.g., Copping, Campbell, & Muncer, 2014). As a general indicator of life history speed, the ALHB-SF combines qualitatively different predictors of life history, which also vary somewhat in time frame. Some psychological researchers consider the ALHB-SF a problematic indicator because the range of constructs it represents is so broad (G. Chapman, personal communication, April 29, 2016). Multi-item scales may create scores with ambiguous meanings, hindering the precision of psychological science (Cohen, Cohen, Aiken, & West, 1999). Multi-item measures with disparate content create conceptual complexity, hindering representational accuracy and preventing the precise measurement of constructs, which is necessary for clear answers to empirical questions (McGrath, 2005). These issues are not unique to assessments of human life history, although they may be particularly relevant because life history variation is not limited to a single psychological construct. Because the ALHB-SF is related to numerous important constructs that each influence or predict a range of outcomes, it does not provide clear evidence that any outcome is related to life history speed, as the relationships could be accounted for by personality traits in a standard (i.e., nonevolutionary) psychological model (G. Chapman, personal communication, April 29, 2016).

Another issue with the ALHB-SF is the lack of correspondence with the behavioral dimensions of life history trade-offs recognized by evolutionary biologists, mating effort, and parenting effort (Roff, 1992; Stearns, 1992). Although the ALHB-SF has 3 items on sociosexuality (see below), it does not predict self-reported mating effort (Olderbak et al., 2014). There are no items assessing parental effort.

### *Current Study*

This project examined the utility of brief self-report survey measures assessing the life history dimensions of mating effort and parenting effort with a large undergraduate sample in the United States. Examining the trade-off between investments in parental effort and mating effort may be ideal for a

psychometric approach to life history variation (Kaplan & Gangestad, 2005). Assessing specific aspects of life history may provide stronger predictive power in their respective domains and greater theoretical clarity. Several common psychological constructs covary with life history variation in human reproductive strategies, including romantic attachment style, sociosexuality, and “Dark Triad” personality traits. Such constructs may be useful in examining the predictive validity of psychological life history assessments. These constructs are reviewed below.

### *Romantic Attachment Style*

The attachment system was originally conceptualized as an evolutionary survival strategy for protecting infants from predators (Bowlby, 1969). Belsky, Steinberg, and Draper (1991) reframed the psychological attachment process as an evolved psychological mechanism to evaluate one’s environment and select a reproductive strategy that would likely be successful given these circumstances. Insecure attachment is a response to environmental cues that long-term monogamous relationships are not a viable strategy. There is considerable empirical evidence documenting the relationship between attachment styles and reproductive strategies (see Del Giudice, 2009). For example, women who grow up without substantial father involvement show earlier sexual activity as well as a lack of interest or ability to form and/or maintain long-term monogamous relationships (Belsky, Steinberg, & Draper, 1991; Chisholm, 1999). Del Giudice (2009) proposed that avoidant attachment styles are a component of high mating effort reproductive strategies with an emphasis on short-term and uncommitted mating. Attachment avoidance is characterized by having discomfort with being close to partners and hiding true feelings from them. In contrast, attachment anxiety (concerns that romantic partners do not share an emotional connection and may abandon the partner) may be a mechanism to elicit relationship commitments and additional investment (Del Giudice, 2009).

### *Sociosexuality*

Sociosexuality originally described of individual differences in willingness to engage in uncommitted sexual behaviors (Kinsey, Pomeroy, & Martin, 1948). Simpson and Gangestad (1991) developed the Sociosexual Orientation Inventory (SOI), a brief self-report measure of global sociosexual orientation, which effectively predicts mate choice preferences, courtship behaviors, stability of romantic relationships, and quality of romantic relationships (for a review, see Simpson, Wilson, & Winterheld, 2004). J. J. Jackson and Kirkpatrick (2007) developed a revised SOI measure with separate dimensions for orientations toward short-term and long-term relationships. Short-term mating orientation (STMO) represents interest in uncommitted sexual behaviors and shared 64% variance with the original SOI for men and 71% variance for women. Long-term mating orientation (LTMO) represents interest in long-

term, committed, romantic relationships. These dimensions were largely independent (sharing 18% variance for women and 7% variance for men) and differentially predicted other theoretically relevant variables. Following Kinsey, Penke and Asendorpf (2008) hold that only behavioral differences ultimately matter for evolutionary models of human mating and make an explicit life history-based argument that sociosexual behaviors are the product of allocations of mating effort. Penke and Asendorpf (2008) also developed a revised sociosexuality inventory, with three dimensions: past sexual behaviors, attitudes toward uncommitted sex, and sociosexual desire. There are more basic life history aspects of sexual behavior relevant to young adults that are not assessed by this inventory, including whether an individual has ever had sexual intercourse and the raw number of short-term and long-term relationships they have experienced.

### *The Dark Triad of Personality Traits*

“Dark Triad” personality traits (see Paulhus & Williams, 2002) are associated with short-term mating and exploitive social strategies (Jonason & Webster, 2010) and are thought to represent a relatively fast life history strategy focused on immediate rewards and gratification (Jonason, Webster, Schmitt, Li, & Crysel, 2012). Those high in Machiavellianism have a stronger tendency to manipulate and exploit others, often using deception, and have a focus on self-interest at the expense of morality. These individuals may see other people as instrumental tools. Narcissism is characterized by an unrealistic sense of superiority, a drive to maintain and enhance favorable views of oneself, and a lack of empathy, the capacity to understand or feel what others are experiencing. Psychopathy is characterized by antisocial behavior, impulsivity, and selfishness. As psychopathy represents a disregard of others, those high in psychopathy may lack interest in long-term social relationships such as a committed romantic relationship. These traits all predict attitudes toward uncommitted sex and STMO (Jonason, Li, & Buss, 2010; Jonason & Webster, 2010). Psychopathy is also inversely related to LTMO (Jonason & Webster, 2010).

### *Hypotheses*

In light of recent criticism of the single-factor psychometric approach to human life history speed (see Copping et al., 2014, In Press), this study begins with a confirmatory factor analysis of the new scales and then proceeds to an examination of the correlations among mating effort, parenting effort, and the *K*-factor (as measured by the ALHB-SF) for evidence of unidimensionality. We hypothesize that higher mating effort will be associated with lower *K*-factor scores, and parenting effort will be associated with higher *K*-factor scores. If the associations among these three constructs are moderate to large, suggesting that a higher order life history speed factor is plausible, a model with a second-order factor will be tested. If this model fits the data well, the second-order factor will be scored and

included in the subsequent regressions that examine the predictive power. This approach assesses whether the new mating effort and parenting effort scale scores predict external criteria above and beyond *K*-factor scores as well as higher order life history speed scores (i.e., if indeed a higher order factor subsumes mating effort, parenting effort, and the *K*-factor). If a second-order factor is not plausible, only the first-order factors will be scored and retained for further analysis.

Whatever the higher order structure of the three life history scales, we hypothesize that the new scales (mating and parenting effort) will have unique predictive power (i.e., beyond that of the ALHB-SF scores and higher order life history speed). Mating effort will directly predict attachment avoidance, STMO, whether individuals are sexually active, the number of short-term relationships experienced, unrestricted sociosexual behaviors, and Dark Triad personality traits. Parenting effort will directly predict LTMO, number of long-term (serious and committed) relationships. Because mating effort and parenting effort are life history trade-offs, and these brief scales are unlikely to be perfect measures, mating effort and parenting effort may simultaneously make inverse predictions across constructs and indicators, for example, parenting effort may inversely predict Dark Triad personality traits.

## **Materials and Method**

### *Participants and Design*

The university’s institutional review board approved this project prior to data collection. The study sample included five independent samples of survey participants representing the author’s total participant pool allocation for five academic terms. Ethnically diverse undergraduates at a large Midwestern U.S. public university,  $N = 1,065$ , 51% women, 49% men,  $M$  age = 19,  $SD$  age = 2, completed an online survey hosted by Qualtrics™ in exchange for course credit at their convenience. Participants were asked “What ethnicities do/did your grandparents belong to?” and could check all categories that applied. Participants were proportionally 52% Western European, 37% Eastern European, 10% East Asian, 7% African American, 7% Latino/Latina/Hispanic, 7% South Asian, 5% Arab/Middle-Eastern, 3% Native American/Alaskan native, 1% Pacific Islander, and 7% Other. The sample size enables adequate power ( $1 - \beta > .80$ ) to identify effects corresponding to Cohen’s  $d = .09$  and higher in a two-tailed test. Cohen (1988) categorized effect sizes as small ( $d = .20$ ), medium ( $d = .50$ ), and large ( $d = .80$ ). The original studies were designed to ensure adequate power ( $1 - \beta > .80$ ) for at least medium-sized effects.

### *Procedure*

Participants completed the 20-item ALHB-SF (Figueredo et al., 2006) theorized to assess the latent factor of life history speed, the Dirty Dozen brief assessment of Dark Triad personality traits which reliably assesses Machiavellianism, narcissism,

and psychopathy and reduces item burden by 87% (Jonason & Webster, 2010), the Experiences in Close Relationship Scale–Short Form (Wei, Russell, Mallinckrodt, & Vogel, 2007) assessing attachment avoidance (“I try to avoid getting too close to my partner”) and attachment anxiety (“I worry that romantic partners won’t care about me as much as I care about them”), the STMO and LTMO scales from J. J. Jackson and Kirkpatrick’s (2007) multidimensional sociosexuality inventory, and the Revised Sociosexual Orientation Inventory (SOI-R) Behavior subscale (Penke & Asendorpf, 2008). These items include “With how many different partners have you had sex within the past 12 months?” “With how many different partners have you had sexual intercourse on *one and only one* occasion?” and “With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?” Numerical responses were recoded into values ranging from 1 to 9, and responses were aggregated into an average score (as per Penke & Asendorpf, 2008).

In three of the five survey waves ( $n = 702$ , 53% women,  $M$  age = 19,  $SD$  age = 2), participants also answered 5 additional items on sexual and romantic relationships: “Have you ever had sexual intercourse?” “Approximately how many long-term (serious and committed) relationships have you had in your life?” and “Approximately how many short-term relationships have you had in your life?” This sample size enables adequate power ( $1 - \beta > .80$ ) to identify effects corresponding to  $d = .11$  and higher in a two-tailed test. In two survey waves ( $n = 363$ , 53% women,  $M$  age = 20,  $SD$  age = 3), peer comparison items followed each of the latter 2 items, “Compared with your peers, who are around the same age as you, would you consider this:” with response options “*above average*” (3), “*average*” (2), and “*below average*” (1). This size of this subsample (three of the five survey waves) enables adequate power ( $1 - \beta > .80$ ) to identify effects corresponding to  $d = .15$  and higher in a two-tailed test.

### New Scales: Mating Effort and Parenting Effort

Scale items were originally developed from depictions of mating effort and parenting effort in the evolutionary psychology literature to assess the life history attributes of literary characters (Kruger et al., 2014, 2015). Across Korean, Croatian, Argentinean, Israeli, and Chinese samples, ratings for characters’ attributes reflected two inversely related but partially distinct dimensions, mating effort and parental effort (Kruger et al., 2015), demonstrating an intuitive recognition of these basic life history dimensions. Similar patterns were seen in perceptions of the attributes of female literary characters in Jane Austen novels (Kruger et al., 2013, 2014). Items most central to the theoretical constructs had the highest factor loadings. Items were refined and converted into self-assessments of participant’s own likelihood of exhibiting these behaviors. Items with factor loadings above .40 on the intended construct and below .30 on the other construct and sets with interitem reliabilities above .70 were used to create

scales reduced from 5 (parental effort) and 9 items (mating effort) to 4 items representing each life history dimension (see Kruger et al., 2015).

The question stem read “Please indicate how strongly you agree or disagree with each of the statements as a description of you and what you would do.” Mating effort items included “Wear flashy, expensive clothes,” “Sleep with a large number of people in your lifetime,” “Knowingly hit on someone else’s partner,” and “Attractive to others for a brief sexual relationship.” Parenting effort items included “Good at taking care of children,” “Use most of your money to support your family,” “Be a loyal and faithful wife/husband,” and “Caring and emotionally supportive in a long-term relationship.” The survey program presented these 8 items in a randomized order. Following the format for the ALHB-SF (Figueredo et al., 2006), responses were given on a 7-point labeled scale from “*strongly disagree*” to “*strongly agree*.” Participants with missing data were deleted listwise. Fewer than 2% of cases had missing data, as the survey program prompted participants to complete missing items. Cronbach’s  $\alpha$  was .704 for mating effort items and .610 for parenting effort items.

### Statistical Analyses

Confirmatory factor analyses with AMOS version 21 examined the factor structure of the new scales, comparing one- and two-factor models of inversely related dimensions for mating effort and parenting effort. Criterion fit indices were determined a priori following D. L. Jackson, Gillaspay, and Purc-Stephenson (2009). Modification indices were examined for significant covariance among error terms within each factor, and these relationships were freed in the third model (see Table 1). Zero-order correlations were used to examine the relationships among ALHB-SF, mating effort, and parenting effort. As described, the magnitude of these correlations was examined to determine whether a single higher order life history speed dimension was plausible. Linear regressions were then used (force entered) to examine how constructs predicted each outcome variable.

### Results

Results of the confirmatory factor analyses indicated that the two-factor model for mating effort and parenting effort fit the data better,  $\chi^2(19) = 156.23$ , than the one-factor model,  $\chi^2(20) = 666.59$ ,  $\Delta\chi^2(1) = 511$ ,  $p < .001$  (see Table 1). Freeing three covariances between error terms within parenting effort items further improved the fit of the model,  $\Delta\chi^2(3) = 49$ ,  $p < .001$ . The final model had a good fit to the data (e.g., Comparative Fit Index (CFI) = .94; Root Mean Square Error of Approximation (RMSEA) = .07). As predicted, mating effort and parenting effort factors covaried significantly in an inverse relationship, sharing 4% variance. The zero-order correlations indicated that the  $K$ -factor was positively related to parenting effort,  $r(1,065) = .397$ ,  $p < .001$ , and inversely related to mating effort,  $r(1,065) = -.247$ ,  $p < .001$ . Scale

**Table 1.** Fit Indices for Alternative Theoretical Models.

Model	$\chi^2$	df	$\chi^2/df$	GFI	CFI	NFI	IFI	RMSEA
One factor	667	20	33	.85	.80	.42	.59	.17
Two factor	156	19	8	.97	.91	.90	.91	.08
Two factor—three errors correlated	107	16	7	.98	.94	.93	.94	.07

Note. GFI = Goodness of Fit Index; CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation.

**Table 2.** Standardized Coefficients ( $\beta$ s) for Comparative Predictions Across Five Survey Waves.

Indicator	Avoidance	Anxiety	STMO	LTMO	SOI-R-B	M	N	P
$R^2$	.15	.01	.38	.16	.30	.14	.08	.16
ALHB-SF	-.110***	-.058	-.108***	.119***	-.164***	-.091**	.032	-.220***
Mating effort	.179***	.056	.570***	-.237***	.474***	.342***	.294***	.238***
Parenting effort	-.263***	-.008	-.066*	.213***	-.039	-.014	.050	-.097**

Note.  $N = 1,065$ . Avoidance = attachment avoidance; Anxiety = attachment anxiety (Wei et al., 2007); STMO = short-term mating orientation; LTMO = long-term mating orientation (J. J. Jackson & Kirkpatrick, 2007); SOI-R-B = Revised Sociosexual Orientation Inventory Behavior subscale (Penke & Asendorpf, 2008); ALHB-SF = Arizona Life History Battery—Short Form (Mini-K; Figueredo et al., 2006); M = Machiavellianism; N = narcissism; P = psychopathy (Jonason & Webster, 2010).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

scores for mating effort and parenting effort were inversely related,  $r(1,065) = -.087$ ,  $p = .005$ . Parenting effort demonstrated a stronger association with the  $K$ -factor than mating effort did, Steiger's (1980)  $Z = 15.21$ ,  $p < .001$ . The pattern of correlations among mating effort, parenting effort, and the  $K$ -factor suggested they did not share a higher order factor. The correlation between mating and parenting effort was very small, and the correlation between mating effort and the  $K$ -factor was small. Thus, no test of a model with a higher order factor was undertaken, and regression analyses were conducted using scores from the three scales.

Mating effort was a unique predictor of all constructs except for attachment anxiety, which had no significant predictors (see Table 2). Mating effort was the strongest predictor of STMO, LTMO (inversely), sociosexual behaviors, Machiavellianism, narcissism, and psychopathy.

Parenting effort was the strongest predictor of attachment avoidance (inversely) and uniquely predicted STMO (inversely), LTMO, and psychopathy (inversely). The  $K$ -factor was a unique predictor of attachment avoidance (inversely), STMO (inversely), LTMO, sociosexual behaviors (inversely), Machiavellianism (inversely), narcissism, and psychopathy (inversely); however, it was never the strongest predictor for any construct.

Similar patterns emerged for comparative predictions of constructs included in select survey waves (see Table 3). Mating effort was the strongest predictor of whether participants were sexually active, the number of short-term relationships they have had, and the peer comparison for the number of short-term relationships. Parenting effort was the only unique predictor of the number of long-term (serious and committed) relationships and the peer comparison for the number of long-term (serious and committed) relationships. Parenting effort also uniquely predicted the number of short-term relationships. The  $K$ -factor was a unique inverse predictor of whether participants were sexually active.

**Table 3.** Standardized Coefficients ( $\beta$ s) for Comparative Predictions in Select Survey Waves.

Indicator	SA	ST	LT	ST-PC	LT-PC
$n$	702	702	702	363	363
$R^2$	.10	.07	.02	.09	.04
ALHB-SF	-.113**	-.044	-.026	-.049	.034
Mating effort	.262***	.246***	.087	.285***	.091
Parenting effort	.061	.086*	.116**	.032	.159**

Note.  $n = 702$  and  $n = 363$ . ALHB-SF = Arizona Life History Battery—Short Form (Mini-K; Figueredo et al., 2006); SA = sexually active; ST = number of short-term relationships; LT = number of long-term (serious and committed) relationships; ST-PC = peer comparison for the number of short-term relationships; LT-PC = peer comparison for the number of long-term (serious and committed) relationships.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Discussion

Consistent with LHT, mating effort and parenting effort items formed two inversely related but distinct dimensions that generally demonstrated the predicted relationships with relevant attributes. Both dimensions were related to the  $K$ -factor, with a greater convergence of the  $K$ -factor with parenting effort than mating effort. However, the shared variances, 13% and 9%, respectively, were low enough to indicate that these scales measure distinct constructs, consistent with recent evidence that human life history strategy may be multidimensional (Richardson et al., In Press; Richardson, Dariotis, & Lai, In Press). Both scales demonstrated unique predictive power beyond that of the  $K$ -factor; mating effort in particular evidenced strong relationships with constructs theoretically related to high mating effort strategies.

Overall, results were supportive of the hypotheses. Mating effort directly predicted attachment avoidance, STMO, whether individuals were sexually active, unrestricted

sociosexual behaviors (i.e., number of one-time sexual partners, number of times having sex without intentions of forming a long-term relationship), the number of short-term relationships experienced, perceived high number of short-term relationships compared to peers, and all Dark Triad personality traits. Mating effort was also inversely related to LTMO. Parenting effort directly predicted LTMO, the number of long-term (serious and committed) relationships, high number of long-term (serious and committed) relationships compared to peers. Parenting effort showed a strong unique inverse relationship with attachment avoidance and had a unique inverse relationship with psychopathy. Parenting effort was inversely related to STMO, although it had an unexpected weak unique direct relationship with the number of short-term relationships experienced.

These data also converge with previous findings in the literature. For example, attachment anxiety was only weakly related to STMO, sharing 3% variance in an inverse relationship, and was unrelated to LTMO (J. J. Jackson & Kirkpatrick, 2007). Other attachment measures had relatively weak and inconsistent associations with sociosexuality, although stronger relationships with men's relationship infidelity (Schmitt & Jonason, 2015). Here, attachment anxiety was unrelated to any life history indicator. It is possible that attachment anxiety is more closely related to other factors such as relative mate value and other contextual factors of relationships. Psychopathy shared unique variance with each life history indicator and was directly related to mating effort and was also inversely related to parenting effort and the  $K$ -factor. Previous research found that psychopathy was inversely related to LTMO (Jonason & Webster, 2010). Given that psychopathy is characterized by selfishness and disregard of others, it is not surprising that it is inversely correlated with constructs based in part on close social and romantic relationships.

It is somewhat surprising to see such a weak relationship between mating effort and parenting effort scores (3% shared variance), as these dimensions are typically considered direct trade-offs. Future research with a more population representative sample may determine whether this weak relationship is an artifact of the young age of participants. However, it does call into question the notion that mating effort and parenting effort are merely two aspects of the same continuum. Following initial work on life history across species, evolutionary biologists considered life history dynamics more nuanced than variation along a single  $r/K$  continuum related to the degree of colonization of an environment (Stearns, 1992). All humans are strongly  $K$  selected relative to other animal species, so differential  $K$  theory considers human life history variation within a range near the  $K$  end of the  $r/K$  continuum. Other recent work has also called the one-factor model of life history into question (e.g., Copping et al., 2014; Richardson, Chen, Dai, Hardesty, & Swoboda, 2014; Sibly & Brown, 2007, 2009).

### Limitations

The sample population is residential undergraduates at a highly selective university, nearly all of whom are typical

college student age and attending directly after completing high school. Although there is some variation in background experiences, variation in age, social class, and life experience is truncated compared to the general adult population. For example, participants are unlikely to be parents themselves or to support a family financially. The Parenting Effort Scale may show more predictive power among those with actual parenting experiences.

This is a cross-sectional survey, so all measures are assessing individuals at one point in time. Some measures do reflect a history of experiences, such as the number of relationship partners; however, the validation of these constructs would be enhanced by incorporation into a longitudinal study (see Copping et al., 2014). An ideal study would directly assess developmental conditions across critical life stages and examine psychological and behavioral trajectories across multiple time points from infancy through adulthood.

No scale is a perfect measure, and although the current items have demonstrated their utility, there is likely room for improvement. The low interitem reliability is puzzling, given that scale reliabilities for multiple sets of ratings in previous studies were well above  $\alpha = .75$  (e.g., Kruger et al., 2015; Kruger & Kruger, 2016), although it could be because  $\alpha$  is sensitive to the number of items. This initial inventory will provide a useful tool for life history research and creates a new direction for measurement refinement. Just as there are trade-offs in life history, there are trade-offs in scale properties such as brevity versus comprehensiveness. The brief measures may attenuate the true relationships among constructs. The intention of this project was to maximize measurement efficiency; other projects may prioritize values differently.

### Conclusion

This project provides a new direction for enhancing the assessment of human life history and the development of novel brief assessments of behavioral life history dimensions, mating effort and parenting effort. Consistent with the notion of trade-offs in areas of life history effort, these dimensions demonstrated an inverse relationship. The shared variance was small however and scale scores made differential predictions of outcomes, thus they are unlikely to represent a single dimension. These scales may be valuable additions to self-report survey research projects examining life history variation and further research will help confirm and enhance their utility.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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