



Living, fast and slow: Is life history orientation associated with risk-related personality traits, risk attitudes, criminal outcomes, and gambling?



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ABSTRACT

Life history theory is an influential framework for understanding how organisms allocate time and energy towards important life functions. Life history orientations range on a continuum from “fast” to “slow”. Broadly, fast life histories characterize individuals who tend to engage in impulsive and present-oriented decision-making and behavior, whereas slow life histories characterize individuals who tend to engage in more deliberative, future-oriented decision-making and behavior. We examined whether individual differences in life history orientations are associated with risk-associated personality traits (impulsivity, sensation-seeking, and self-control), risk attitudes in multiple domains, and key risky behavioral outcomes (general gambling involvement, problem gambling tendencies, and criminality). Results indicate that relatively faster life history orientations were broadly associated with higher levels of risk-related traits, attitudes, and outcomes. Exploratory regression analyses indicated that life history orientation explained variance in criminal outcomes even when controlling for risk-relevant individual differences. Together, these findings suggest that life history orientation is broadly associated with a general “taste for risk” and risk-taking behavior.

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Life history theory was originally advanced in evolutionary biology to understand how organisms allocate scarce resources to essential life functions (Stearns, 1992). Life history in humans has been the subject of growing attention, for good reason: it offers a wide explanatory framework for understanding individual differences considered broadly (reviewed in Del Giudice, Gangestad, & Kaplan, 2015). However, empirical evidence linking individual differences in life history with risk-related traits, attitudes, and behavioral outcomes in humans has been limited. Here, we (a) review life history theory in the context of individual differences; (b) present evidence that individual differences in life history orientation should be associated with various manifestations of “taste for risk”, and (c) present a study examining associations of life history with risk-related personality traits, attitudes, and behavioral outcomes.

1.1. Life history theory

Life history theory suggests that fundamentally limited resources in life—time, energy, and effort—force tradeoffs among essential life functions (i.e., growth, reproduction, and parenting; reviewed in Stearns, 1992). Life histories broadly exist on a continuum from “fast” to “slow”. Relatively fast life histories are generally characterized by an

emphasis on reproduction at the expense of growth and parenting effort. Conversely, relatively slow life histories are generally characterized by an emphasis on long-term growth and parenting effort at the expense of immediate reproduction.

Across taxa, life histories evolved in varying environments where different strategies have historically paid off in biological fitness terms (Del Giudice et al., 2015). Insects, for example, generally exhibit fast life histories and tend to inhabit environments with larger fitness payoffs for rapid development, high fertility, low parental investment, short life expectancy, and smaller size (Figueroa et al., 2005). In contrast, most mammals, for example, generally exhibit slow life histories and tend to inhabit environments with larger fitness payoffs for slower development, lower fertility, greater parental investment, longer life expectancy, and larger size (Figueroa et al., 2005). Put simply, organisms with fast life histories exhibit behavioral strategies that focus on proximal (present-oriented) outcomes. Organisms with slow life histories exhibit behavioral strategies that focus on distal (future-oriented) outcomes. In the context of the broader animal kingdom, humans exhibit relatively slow life histories.

1.2. Individual differences and life history orientation

Although life history theory was conceived to explain interspecies differences in tradeoffs between growth, reproduction, and parenting effort, there are meaningful and quantifiable tradeoffs *within* species

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as well. These intraspecies individual differences describe an individuals' *life history orientation*. Just as different environmental contexts gave rise to different life history orientations across species, so too can different environments give rise to different orientations within species. Broadly, non-human organisms that develop in harsh and/or unpredictable environments with short projected time horizons tend to exhibit relatively fast life history orientations characterized by increased risk-taking (boldness), impulsivity, and aggression (reviewed in Del Giudice et al., 2015). Humans are no exception to this observed pattern; individuals who exhibit faster life histories tend to engage more in present-oriented behavior across a wide range of domains (reviewed in Copping, Campbell, & Muncer, 2014; Ellis et al., 2012; Mishra & Lalumière, 2008).

Individuals are not “fixed” into either a fast or slow life history orientation. In general, traits or environments that facilitate shorter time horizons and greater competitive disadvantage (e.g., being poorer, single, having low educational attainment) tend to facilitate more present-oriented, impulsive, and risky behavioral strategies (Copping et al., 2014; Daly & Wilson, 2005; Hill, Ross, & Low, 1997; Wilson & Daly, 1985; reviewed in Mishra, Barclay, & Sparks, 2017). These circumstances are necessarily a product of some interaction of situational factors (e.g., being poor because of a bad economic climate) and embodied factors (e.g., being poor because of not possessing embodied skills or abilities). However, regardless of their source, these traits and/or situations are indicators of one's time horizon and competitive situation (i.e., one's “relative state”; Mishra, Barclay, & Sparks, 2017), and thus serve as inputs into general life history orientation.

1.3. Life history and risk

Growing research has linked life history relevant traits and circumstances (e.g., age, gender, parenting status, subjective and objective life expectancy, economic inequality, perceived competitive disadvantage, the Dark Triad) with risk-taking (e.g., Crysel, Crosier, & Webster, 2013; Eibach & Mock, 2011; Hill & Chow, 2002; Hill et al., 1997; Mishra, Barclay, & Lalumière, 2014; Wang, Kruger, & Wilke, 2009; Wilson & Daly, 1997). These findings suggest that individuals' risk-taking is in part a product of both time horizon cues and competitive (dis-)advantage cues (with shorter time horizons and greater competition facilitating greater risk-taking), consistent with a life history account. Surprisingly little research has linked life history orientation with other risk-related behavioral phenomenon, including personality. A number of stable traits have been robustly associated with risk-taking in multiple domains, including impulsivity, sensation-seeking, and low self-control (e.g., Mishra & Lalumière, 2011). Given that these personality traits represent stable “taste for risk” tendencies, it follows that life history orientation should be robustly associated with these individual differences. Similarly, risk attitudes represent proximate appraisals of the costs and benefits of risk-taking, and should similarly be associated with life history orientation. However, to our knowledge, only one study has examined whether individual differences in life history orientation are associated with personality traits associated with risk-taking; Copping, Campbell, and Muncer (2013) found that two biometric markers of life history orientation (age of puberty and number of sexual partners) were associated with impulsivity and sensation-seeking. No other studies have examined whether life history orientation is associated with individual differences in self-control or risk attitudes.

There has also been little research that has examined psychometrically measured individual differences in life history orientation in the context of risk-related outcomes. Most of the research reviewed above has linked individual life history-relevant traits (e.g., age, gender) with risk-related outcomes. However, some have argued that such individual-level trait analyses (which have been characterized as a “biometric” approach) ignore higher order latent factor structures in life history orientation (Figueredo et al., 2015; but see Copping et al., 2014). Consequently, such measures as the Mini-K (Figueredo et al., 2006) have

been developed to assess latent life history orientation (termed the “psychometric” approach). However, as both Figueredo et al. (2015) and Richardson et al. (2017) note, there is virtue in using multiple (complementary) approaches to assess life history orientation. It remains the case that relatively few studies have examined whether a latent “psychometric” life history orientation factor is associated with risk-related traits, attitudes, and outcomes.

1.4. Overview

The research reviewed above suggests that life history orientation is an important individual difference that is broadly relevant to risk-propensity, risk attitudes, and risk-taking behavior. In the present study, we examined whether life history orientation is associated with (a) individual differences in personality traits associated with risk (i.e., impulsivity, sensation-seeking, low self-control); (b) risk attitudes in multiple domains, (c) general gambling behavior and problem gambling tendencies, and (d) criminal outcomes. This research replicates and extends previous work in several ways.

First, only one study, to our knowledge, has examined the association of life history (assessed through two biometric indicators) and personality traits associated with risk-taking (impulsivity and sensation-seeking; Copping et al., 2013). We replicate and extend this work by examining the association of life history orientation (measured psychometrically) with impulsivity, sensation-seeking, and self-control (a key trait associated with risk-propensity). Furthermore, we examine the association of life history orientation with risk attitudes in multiple domains, an investigation that has not been yet conducted.

Second, only one study has examined the association of life history orientation and gambling (Tifferet, Agrest, & Shlomo, 2011). Although suggestive of a link, this study is limited given its very small sample ($n = 70$) consisting of only men. Furthermore, Tifferet et al. (2011) used only a single measure of problem gambling tendencies (the South Oaks Gambling Screen). The present study involves a very large sample ($n = 742$) of both men and women, and we examine the link between life history orientation and multiple measures of gambling and problem gambling tendencies.

Third, we examined multiple criminal outcomes in the context of life history (having been arrested, charged, convicted, and/or incarcerated for a crime). Previous research linking aspects of life history orientation to criminal outcomes has almost exclusively focused on examination of archival criminal records (e.g., Wilson & Daly, 1997). Furthermore, this research has not utilized the aforementioned “psychometric” approach to assessing life history orientation. We predicted in line with previous research that relatively faster life history associations would be associated with higher levels of traits associated with risk, pro-risk attitudes, greater general gambling involvement and problem gambling tendencies, and with criminal outcomes.

2. Methods and measures

Data were collected on Crowdfunder, an online crowdsourcing platform. Such platforms have been widely used in both clinical and behavioral research (reviewed in Chandler and Shapiro, 2016), and have been shown to be demonstrably useful for gambling research in particular (Mishra & Carleton, 2017). A total of 789 participants entered the study. Of these, 47 exited before completion, leaving 742 participants (325 male, 415 female, 1 trans*, 1 gender not reported; age: $M = 36.4$, $SD = 12.1$, range = 18 to 76). Participant recruitment was restricted to the Anglosphere—western, English-speaking countries with a similar cultural heritage (Australia, Canada, Ireland, New Zealand, United Kingdom, United States)—although we note that all recruited participants ended up reporting being from the United States.

Participants completed several demographic measures: age, gender, employment status, relationship status, household income, personal income, and highest educational attainment. Compensation was \$0.50

USD or the equivalent (i.e., translated into site-specific currencies for some Crowdfunder channels). Participants also completed measures of life history orientation, gambling, risk-propensity, and risk attitudes, as follows. Finally, participants completed an attention check as described in Goodman, Cryder, and Cheema (2013).

2.1. Life history orientation

Life history orientation was measured using the 20-item Mini-K (Figueredo et al., 2006). Responses ranged from -3 (*disagree strongly*) to $+3$ (*agree strongly*). Items were summed with higher scores indicating a relatively “slower” life history orientation.

2.2. Gambling

2.2.1. General gambling involvement

General gambling involvement was measured through self-report of frequency of engagement in 12 different gambling activities in the last year (Mishra, Lalumière, Morgan, & Williams, 2011). Participants reported how frequently they engaged in each behavior, on average, ranging from 1 (*never*) to 7 (*once a week or more*). The dependent measures were (1) diversity of activities, and (2) mean frequency of engagement across all activities.

2.2.2. Problem gambling tendencies

Problem gambling tendencies were measured using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) and the Problem and Pathological Gambling Measure (PPGM; Williams & Volberg, 2010). The PGSI measures frequency of nine outcomes and behaviors associated with disordered gambling. Items were rated on a scale from 0 (*never*) to 3 (*almost always*). The PPGM consists of 14 “yes/no” items and provides three subscale scores: *gambling problems* (e.g., harm to self or others), *impaired control* (e.g., chasing losses), and *other issues* (e.g., rumination on gambling). Both the PGSI and PPGM have been shown to be highly reliable and valid (e.g., Stinchfield et al., 2016; Williams & Volberg, 2014).

2.3. Risk propensity

2.3.1. Impulsivity

Trait impulsivity was measured using *Eysenck's Impulsivity Scale* (EIS; Eysenck, Pearson, Easting, & Allsopp, 1985), which consists of 19 yes/no statements about impulsive behaviors.

2.3.2. Sensation-seeking

Sensation-seeking was measured using the *Brief Sensation-Seeking Scale* (BSSS; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002), consisting of eight items measuring preferences for varied, stimulating experiences and disinhibited behavior. Items were assessed on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

2.3.3. Self-control

Trait self-control was measured using the *Brief Self-Control Scale* (BSCS). The BSCS (Tagney, Baumeister, & Boone, 2004) consists of 13 items measuring self-control rated on a scale from 1 (*not at all like me*) to 5 (*very much like me*).

2.4. Risk attitudes

Risk attitudes in six domains (ethical, financial, health/safety, social, gambling, recreational) were measured using the revised *Domain-Specific Risk-Attitudes Scale* (DOSPERT; Blais & Weber, 2006). Likelihood of engagement in various risk behaviors were rated on a scale from 1 (*extremely unlikely*) to 7 (*extremely likely*).

2.5. Criminal outcomes

Participants reported if they were ever arrested, charged, convicted, or incarcerated for a crime.

3. Results

3.1. Data preparation

Of the 742 participants who completed the study, 690 (93%) correctly completed the attention check item. Participants who failed the attention check were not included. Of those who passed, missing values were observed for the following: age (2), employment status (1), relationship status (1), highest educational attainment (1), household income (3), personal income (7), life history orientation (19), and having ever been arrested (1), charged (2), or convicted (2) for a crime. Number of gambling activities engaged in and mean frequency of gambling involvement were highly correlated ($r = 0.96, p < 0.001$); these two measures were z-scored and summed to create a composite measure called *general gambling involvement* to simplify analyses.

3.2. Descriptive statistics

Descriptive statistics are reported in Table 1. Participants were categorized based on PGSI scores as follows: non-problem or non-gamblers (92.6%); at-risk gamblers (3.8%); problem gamblers (3.6%) (as in Williams & Volberg, 2014). Participants were categorized based on PPGM scores as follows: non-gamblers (83.3%); recreational gamblers (6.8%); at-risk gamblers (3.5%); problem gamblers (2.9%); pathological gamblers (3.5%).

3.3. Biometric and psychometric measures of life history

Previous research has identified numerous biometric and socioeconomic “markers” of life history orientation associated with risk-taking. We examined whether life history orientation was associated with several of these factors (as measured in our demographics). Age was not associated with life history orientation, $r = 0.05, p = 0.20$. Women

Table 1

Descriptive statistics and reliability estimates for relevant variables.

Measure	M (SD)	Median	Reliability
Life history orientation			
MK	1.10 (0.80)	1.15	0.82
Gambling			
PGSI	0.35 (1.61)	0.00	0.91
PPGM-total	0.51 (1.63)	0.00	0.90
GGI-num	2.34 (2.61)	2.00	
GGI-freq	1.45 (0.74)	1.20	
Risk propensity			
EIS	5.33 (3.88)	4.00	0.85
BSSS	21.26 (6.58)	21.00	0.83
BSCS	3.64 (0.79)	3.70	0.88
Risk attitudes			
DOS-I	9.83 (4.00)	9.00	
DOS-G	10.95 (3.25)	11.00	
DOS-H	16.87 (6.39)	16.00	
DOS-R	16.33 (6.45)	15.00	
DOS-S	18.40 (5.26)	18.00	
DOS-E	17.57 (6.29)	17.00	
DOS-T	89.95 (25.61)	87.00	0.89

Notes: MK = Mini-K life history measure; PGSI = problem gambling severity index; PPGM = problem and pathological gambling measure; GGI-Num = general gambling involvement, number of activities; GGI-Freq = general gambling involvement, frequency of engagement; EIS = Eysenck's impulsivity scale; BSSS = brief sensation seeking scale; BSCS = brief self-control scale; DOS = domain specific risk-taking scale; DOS-I = investment subscale; DOS-G = gambling subscale; DOS-H = health/safety subscale; DOS-R = recreational subscale; DOS-S = social subscale; DOS-E = ethical subscale; DOS-T = total score.

Table 2
Correlations between life history orientation and personality traits associated with risk.*, **

	EIS	BSSS	BSCS
MK	−0.35***	−0.21***	0.44***
EIS		0.46***	−0.63***
BSSS			−0.44***

Notes: MK = Mini-K life history orientation score; EIS = Eysenck's impulsivity scale; BSSS = brief sensation-seeking scale; BSCS = brief self-control scale.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

reported significantly slower life history orientations than did men, $t(668) = 5.40, p < 0.001, M_{\text{women}} = 1.24, M_{\text{men}} = 0.92$. Those currently employed showed slower life history orientation than those unemployed, $t(669) = 2.61, p = 0.009, M_{\text{employed}} = 1.15, M_{\text{unemployed}} = 0.96$. Those presently in a relationship exhibited slower life history orientation compared to those who were single, $t(669) = 5.30, p < 0.001, M_{\text{relationship}} = 1.23, M_{\text{single}} = 0.91$. Life history orientation was not associated with personal income, $r(664) = 0.071, p = 0.068$, but was associated with household income, $r(669) = 0.22, p < 0.001$, indicating that those with higher household incomes reported slower life history orientation. Finally, slower life history orientation was associated with greater educational attainment, $r = 0.11, p = 0.004$.

3.4. Life history and risk propensity

Relatively faster life history orientations were associated with greater impulsivity, greater sensation-seeking, and lower self-control (Table 2). Previous research has shown that these risk-propensity traits reduce into a single principal component previously labeled “risky personality” (Mishra et al., 2011). To examine the association of life history orientation with this general factor, we conducted a principal components analysis (without rotation) on impulsivity, sensation-seeking, and self-control. In line with previous findings, a single component explained 67.4% of the variance, with the following loadings: EIS = 0.86, BSSS = 0.75, BSCS = −0.85. This factor was associated with life history orientation, $r(671) = -0.41, p < 0.001$, suggesting that life history orientation has a broad association with “risky personality”.¹

3.5. Life history and risk attitudes

Relatively faster life history orientations were associated with greater risk attitudes in all domains but gambling (Table 3).

3.6. Life history and gambling

Faster life history orientation was associated with general gambling involvement and all measures of problem gambling tendencies (Table 4).

3.7. Life history and criminal outcomes

Participants who reported they had been arrested, $t(668) = 5.17, p < 0.001$, charged, $t(667) = 5.14, p < 0.001$, convicted, $t(668) = 5.31, p < 0.001$, or incarcerated, $t(669) = 4.55, p < 0.001$, for a crime exhibited faster life history orientations (Fig. 1).

¹ The Mini-K scale has three items related to self-control and risk-taking (items 1, 5, 6). We examined whether Mini-K total scores excluding these three items were associated with all dependent measures. This amended Mini-K measure was still significantly associated at zero-sum with all dependent measures (albeit with consistently lower magnitudes), with three exceptions: general gambling involvement, investment risk attitudes, and the impaired control subscale of the PPGM. These results are reported in supplementary materials.

Table 3
Correlations between life history orientation and risk attitudes in six domains.

	DOS-S	DOS-R	DOS-G	DOS-I	DOS-HS	DOS-E	DOS-T
MK	−0.23***	−0.31***	−0.05	−0.08*	−0.35***	−0.29***	−0.30***
DOS-S		0.63***	0.42***	0.45***	0.62***	0.62***	0.80***
DOS-R			0.46***	0.54***	0.69***	0.74***	0.88***
DOS-G				0.57***	0.38***	0.52***	0.64***
DOS-I					0.47***	0.60***	0.72***
DOS-HS						0.63***	0.83***
DOS-E							0.88***

Notes: MK = Mini-K life history orientation score; DOS-S = social risk attitudes; DOS-R = recreational risk attitudes; DOS-G = gambling risk attitudes; DOS-I = investment risk attitudes; DOS-HS = health/safety risk attitudes; DOS-E = ethical risk attitudes; DOS-T = risk attitudes total score.

* $p < 0.05$.

*** $p < 0.001$.

3.8. Regression models

Personality traits associated with risk and risk attitudes have been shown to be robustly associated with criminal outcomes and gambling. Does a psychometric measure of life history orientation contribute significant additional explanatory power when accounting for variance in risk-taking outcomes? To investigate this question, we conducted several exploratory regression analyses.

3.8.1. Criminal outcomes

A logistic regression was conducted to examine the effects of life history orientation, sensation-seeking, impulsivity, self-control, and risk attitudes (total score) on the likelihood that participants reported having been arrested. This model (and all others presented below) also included age and gender given that both have been robustly associated with risk-related traits, behaviors, and outcomes (reviewed in Mishra et al., 2017a). Gender was coded as a dummy variable (1 = male, 0 = female). The regression model for arrests was significant, $\chi^2(7) = 53.41, p < 0.001$. The model explained 13.7% (Nagelkerke R^2) of variance in being arrested, with 86.2% of cases successfully classified.

Logistic regressions with the same predictor variables as above were also conducted for the likelihood that participants were charged, convicted, or incarcerated for a crime. All of the models were significant: charged: $\chi^2(7) = 42.92, p < 0.001$; convicted: $\chi^2(7) = 40.97, p < 0.001$; incarcerated: $\chi^2(7) = 40.94, p < 0.001$. These models explained 12.6%, 13.2%, and 16.5% of variance in being charged, convicted, and incarcerated, respectively (Nagelkerke R^2). Cases were successfully classified as follows: 89.3% (charged); 91.3% (convicted); 94.3% (incarcerated).

In all of these models, life history orientation was a significant predictor of criminal outcomes (all odds ratios $< 0.62, ps < 0.008$), indicating that slower life history orientations are associated with less likelihood of having been arrested, charged, convicted, or incarcerated (Table 5).

3.8.2. General gambling involvement

A linear regression was conducted to examine the effects of life history orientation, sensation-seeking, impulsivity, self-control, and risk attitudes (total score) on general gambling involvement scores (Table 6). The regression model was significant, $F(7, 660) = 23.30, p < 0.001$, adjusted $R^2 = 0.19$. Life history orientation, impulsivity, risk attitudes, and gender were significant individual predictors.

3.8.3. Problem gambling tendencies

Two linear regressions were conducted to examine the effects of life history orientation, sensation-seeking, impulsivity, self-control, and risk attitudes (total score) on problem gambling tendencies as measured by the PPGM (total score) and the PGSI (Table 6). The regression model for PPGM scores was significant, $F(7, 660) = 14.71, p < 0.001$, adjusted $R^2 = 0.13$. Sensation-seeking, impulsivity, and risk attitudes were significant

individual predictors; life history did not account for significant variance in PPGM (total) scores after controlling for other risk-relevant variables. The regression model for PGSI scores was also significant, $F(7, 660) = 10.32, p < 0.001$, adjusted $R^2 = 0.09$. Sensation-seeking, self-control, and risk attitudes were significant individual predictors; life history again did not account for significant variance in PGSI after risk-relevant factors were considered.

4. Discussion

The results indicate that life history orientation measured psychometrically is broadly associated with personality traits associated with risk (impulsivity, sensation-seeking, and self-control), risk attitudes, criminal outcomes, general gambling involvement, and problem gambling tendencies. Our results replicate and extend previous work. Consistent with Copping et al. (2013), we found that relatively faster life history orientations were associated with greater impulsivity and sensation-seeking; we extended these findings by finding support for an association between life history orientation and self-control, as well as with a broader “risky personality” component. We also replicated a previous association between life history and problem gambling tendencies (Tifferet et al., 2011) with a larger and more diverse sample. To our knowledge, we provide the first evidence linking life history orientation with risk attitudes in multiple domains, as well as evidence linking life history orientation to a variety of criminal outcomes. Together, our results provide robust support for a link between relatively faster life history orientations and various manifestations of “taste for risk”.

That we did not observe an association between life history orientation and gambling risk-attitudes was puzzling. We also observed a relatively small association between life history orientation and general gambling involvement. One possibility is that life history orientation is a better predictor of high frequency gambling and/or problem gambling tendencies, rather than general gambling involvement. More generally, life history orientation may be a better predictor of behavioral and trait instantiations of the “generality of deviance”. The generality of deviance framework suggests that various forms of antisocial and risk-taking behaviors co-occur among individuals, and that these behaviors are associated with individual differences in risk-propensity (e.g., Mishra et al., 2017b). We found life history orientation was robustly associated with these traits, as well as with criminal outcomes and problem gambling.

Regression models revealed life history orientation explained variance in all criminal outcomes when controlling for risk-related individual differences and risk attitudes. However, these models provide mixed results for gambling: life history orientation accounted for unique variance for general gambling involvement (although this effect was small), but not for problem gambling tendencies. The inconsistent associations between life history and gambling when controlling for personality traits suggest the possibility that life history has relatively small influence on general gambling involvement and problem gambling

Table 4
Correlations between life history orientation, general gambling involvement, and problem gambling tendencies.

	GGI	PGSI	PPGM-T	PPGM-P	PPGM-I	PPGM-O
MK	−0.09*	−0.11**	−0.13**	−0.14***	−0.09**	−0.13**
GGI		0.54***	0.52***	0.46***	0.47***	0.46***
PGSI			0.63***	0.62***	0.49***	0.59***
PPGM-T				0.92***	0.88***	0.87***
PPGM-P					0.67***	0.76***
PPGM-I						0.65***

Notes: MK = Mini-K life history orientation score; GGI = general gambling involvement; PGSI = problem gambling severity index score; PPGM = problem and pathological gambling measure; PPGM-T = total score; PPGM-P = problems score; PPGM-I = impaired control score; PPGM-O = other issues score.

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

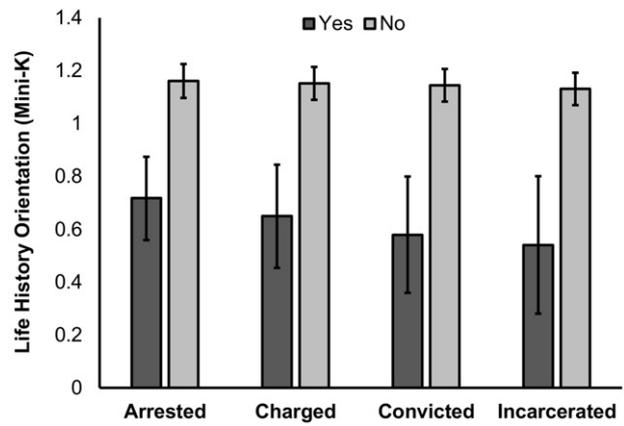


Fig. 1. People who report having been arrested, charged, convicted, or incarcerated exhibit relatively faster life history orientations (indicated by lower scores).

tendencies (further highlighted by the relatively small zero-sum associations between life history and gambling measures).

Life history orientation has been differentially assessed through biometric approaches and psychometric approaches. We assessed life history orientation in the present study using the Mini-K, which represents a psychometric approach. This approach has been criticized in some work (e.g., Richardson et al., 2017), and more generally, self-report measures have inherent limitations. However, as others note, there is virtue in the use of different approaches to assess life history orientation (Figueredo et al., 2015; Richardson et al., 2017). For example,

Table 5
Logistic regression models for criminal outcomes.

	B (SE)	Wald	OR [95% CI]	p
Arrested				
MK	−0.49 (0.16)	8.84	0.62 [0.45, 0.85]	0.003**
BSSS	0.06 (0.03)	4.99	1.06 [1.01, 1.11]	0.03*
EIS	0.01 (0.04)	0.02	1.01 [0.94, 1.08]	0.88
BSCS	−0.18 (0.20)	0.78	0.84 [0.57, 1.24]	0.38
DOS-T	0.01 (0.01)	1.23	1.01 [1.00, 1.02]	0.27
Age	0.03 (0.01)	6.36	1.03 [1.01, 1.05]	0.01*
Gender	−0.38 (0.24)	2.40	0.69 [0.42, 1.11]	0.12
Charged				
MK	−0.57 (0.18)	9.67	0.57 [0.40, 0.81]	0.002**
BSSS	0.03 (0.03)	1.24	1.03 [0.98, 1.09]	0.27
EIS	0.06 (0.04)	2.31	1.07 [0.98, 1.16]	0.13
BSCS	−0.03 (0.23)	0.02	0.97 [0.62, 1.51]	0.89
DOS-T	0.01 (0.01)	1.21	1.01 [0.99, 1.02]	0.27
Age	0.02 (0.01)	3.61	1.02 [1.00, 1.05]	0.06
Gender	−0.19 (0.28)	0.45	0.83 [0.48, 1.43]	0.50
Convicted				
MK	−0.68 (0.20)	11.85	0.51 [0.34, 0.75]	0.001**
BSSS	0.03 (0.03)	0.71	1.03 [0.97, 1.09]	0.40
EIS	0.06 (0.05)	1.51	1.06 [0.97, 1.16]	0.22
BSCS	0.05 (0.25)	0.03	1.05 [0.64, 1.70]	0.86
DOS-T	0.01 (0.01)	1.59	1.01 [1.00, 1.02]	0.21
Age	0.02 (0.01)	3.08	1.02 [1.00, 1.05]	0.08
Gender	−0.31 (0.30)	1.03	0.74 [0.41, 1.33]	0.31
Incarcerated				
MK	−0.62 (0.23)	7.10	0.54 [0.34, 0.85]	0.008**
BSSS	−0.01 (0.04)	0.11	0.99 [0.92, 1.06]	0.74
EIS	0.05 (0.05)	0.75	1.05 [0.94, 1.16]	0.39
BSCS	−0.11 (0.30)	0.15	0.89 [0.50, 1.59]	0.70
DOS-T	0.03 (0.01)	8.31	1.03 [1.01, 1.05]	0.004**
Age	0.04 (0.02)	7.26	1.04 [1.01, 1.07]	0.007**
Gender	0.10 (0.38)	0.08	1.11 [0.53, 2.32]	0.78

Notes: MK = mini-K life history measure; BSSS = brief sensation seeking scale; EIS = Eysenck’s impulsivity scale; BSCS = brief self-control scale; DOS-T = domain specific risk-taking scale (total score).

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Copping et al. (2013) found that two biometric indicators of life history orientation (age of puberty and number of sexual partners) were associated with impulsivity and sensation-seeking. Our results replicate and extend these findings using a psychometric measure of life history (and through examination of self-control). These findings provide more robust support for the hypothesis that life history orientation is associated with risk-relevant individual differences. We look forward to further empirical examination of the association of life history orientation (measured both biometrically and psychometrically) with risk-relevant traits, attitudes, and behavioral outcomes.

Further research is necessary to understand broader links between life history orientation, risk-taking, and canonical measures of personality. Del Giudice et al. (2015) review evidence indicating that higher levels of such personality traits as agreeableness, conscientiousness, and honesty-humility are robustly associated with “slower” life history outcomes, and such traits as openness to experience and extraversion are associated with “faster” life history outcomes. Further research is necessary to examine the associations between canonical personality models (i.e., five-factor models like the Big Five, and six-factor models like the HEXACO), life history orientation, and risk-related traits, attitudes, and behaviors.

It is important to note that our data do not allow for any causal claims to be made. The theoretical framework of life history makes clear predictions that early developmental environments are crucial for calibrating life history orientation in humans (Del Giudice et al., 2015). To examine whether this prediction holds true for risk-related traits, attitudes, and behavioral outcomes, it would be necessary to assess whether early developmental conditions given rise to individual differences in life history orientation, which in turn influence psychological outcomes. There is ample evidence that early developmental environments have a distinct influence on risk-taking outcomes across the lifespan (reviewed in Ellis et al., 2012; Mishra & Lalumière, 2008; Mishra et al., 2017a) but a potential mediation model of developmental effects operating on risk-propensity through life history orientation has yet to be examined.

Table 6

Linear regression models for general gambling involvement and problem gambling tendencies.

	B (SE)	β	t	p
General gambling involvement				
MK	0.24 (0.10)	0.10	2.42	0.02*
BSSS	−0.03 (0.02)	−0.09	−1.81	0.07
EIS	0.05 (0.02)	0.11	2.32	0.02*
BSCS	−0.12 (0.12)	−0.05	−1.02	0.31
DOS-T	0.03 (0.004)	0.40	7.95	<0.001***
Age	−0.01 (0.01)	−0.05	−1.31	0.19
Gender	−0.43 (0.14)	−0.11	−2.98	0.003**
Problem gambling tendencies (PPGM)				
MK	0.08 (0.09)	0.04	0.91	0.36
BSSS	−0.03 (0.01)	−0.13	−2.40	0.02*
EIS	0.08 (0.02)	0.20	4.13	<0.001***
BSCS	−0.17 (0.11)	−0.08	−1.64	0.10
DOS-T	0.02 (0.003)	0.27	5.11	<0.001***
Age	0.001 (0.005)	0.01	0.14	0.89
Gender	−0.15 (0.13)	−0.05	−1.17	0.24
Problem gambling tendencies (PGSI)				
MK	0.05 (0.09)	0.02	0.56	0.58
BSSS	−0.04 (0.01)	−0.15	−2.72	0.007**
EIS	0.02 (0.02)	0.04	0.83	0.41
BSCS	−0.28 (0.11)	−0.14	−2.60	0.009**
DOS-T	0.02 (0.003)	0.29	5.46	<0.001***
Age	−0.003 (0.005)	−0.02	−0.56	0.57
Gender	−0.12 (0.13)	−0.04	−0.91	0.36

Notes: MK = Mini-K life history measure; BSSS = brief sensation seeking scale; EIS = Eysenck's impulsivity scale; BSCS = brief self-control scale; DOS-T = Domain specific risk-taking scale (total score).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.paid.2017.06.009>.

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