



Attachment anxiety in young adulthood is associated with childhood unpredictability and predicts intentions to engage in unprotected sex

Juliana E. French^{a,*}, Katherine A. Whitley^b, Emma E. Altgelt^a, Andrea L Meltzer^a

^a Florida State University, Department of Psychology, 1107 W. Call St., Tallahassee, FL 32306, United States

^b Spalding University, 901 South Fourth St., Louisville, KY 40203, United States

ARTICLE INFO

Keywords:

Adult attachment anxiety
Childhood unpredictability
Unprotected sex
College students

ABSTRACT

Developing a better understanding of the individual differences associated with people's intentions to engage in unprotected sex is crucial to reducing rates of unplanned pregnancy and the spread of sexually transmitted diseases (STDs) among young adults. We thus used a sample of young adults in the U.S. to examine the extent to which two notable individual differences—romantic attachment insecurity and childhood ecology—account for variability in people's intentions to engage in unprotected sex. Individuals with more (versus less) unpredictable childhood ecologies demonstrated greater attachment anxiety in early adulthood that was associated with stronger intentions to engage in sex without protection against pregnancy (but not against STDs). In contrast, harsh childhood ecologies were unassociated with attachment insecurity and intentions to engage in unprotected sex. We discuss implications and future research directions.

1. Introduction

Unprotected sex can lead to unplanned pregnancy and the spread of sexually transmitted diseases (STDs). Recent U.S. estimates suggest that there are nearly 3 million unplanned pregnancies annually (Finer & Zolna, 2016), which is notably higher than all other industrialized countries (see Sedgh, Singh, & Hussain, 2014), and approximately 20 million new cases of STDs (Centers for Disease Control & Prevention, 2017). Moreover, more than half of these unplanned pregnancies (Mosher, Jones, & Abma, 2012) and new cases of STDs occur among people younger than 25.

Drawing from the theory of planned behavior (Ajzen, 1991), people's intentions to perform a given behavior are the strongest predictor of whether they subsequently engage in that behavior. For example, people's intentions to use condoms predict whether they subsequently use condoms to protect against pregnancy and STDs (for a meta-analysis, see Albarracin, Johnson, Fishbein, & Muellerleile, 2001). Thus, developing a better understanding of the individual differences associated with young adults' intentions to engage in unprotected sex is crucial to reducing unplanned pregnancy rates and the spread of STDs.

Accordingly, we aimed to examine the extent to which two notable individual differences—romantic attachment insecurity and childhood ecology—account for variability in people's intentions to engage in unprotected sex. As will be seen, we reasoned that relatively insecurely

(versus securely) attached individuals would report stronger intentions to engage in unprotected sex, and that such attachment insecurity would be due, at least in part, to experiencing more (versus less) unpredictable childhood ecologies.

1.1. Attachment insecurity and unprotected sex

One notable individual difference associated with people's relationship beliefs and experiences, including their sexual attitudes and behaviors (Feeney, Peterson, Gallois, & Terry, 2000), is their romantic attachment style. According to attachment theory (Bowlby, 1969), people's working models of attachment vary along two continuous dimensions: attachment anxiety and attachment avoidance (Brennan, Clark, & Shaver, 1998). Attachment anxiety involves hyperactivation of the attachment system whereas attachment avoidance involves deactivation of the attachment system (Mikulincer & Shaver, 2003). As such, anxiously attached individuals often worry about partner abandonment and thus seek partner proximity and affection whereas avoidantly attached individuals often fear closeness and intimacy.

Not surprisingly, individual differences in both attachment anxiety and avoidance are associated with people's sexual behaviors and attitudes (Feeney et al., 2000). Indeed, individuals high (versus low) in attachment anxiety or avoidance are more likely to engage in

* Corresponding author.

E-mail addresses: french@psy.fsu.edu (J.E. French), kwhitley@spalding.edu (K.A. Whitley), altgelt@psy.fsu.edu (E.E. Altgelt), meltzer@psy.fsu.edu (A.L. Meltzer).

uncommitted sex (French, Altgelt, & Meltzer, 2019) and sex that is not mutually initiated (Hazan & Zeifman, 1994). Moreover, individuals high (versus low) in attachment insecurity report more negative attitudes toward condom use (Feeney, Kelly, Gallois, Peterson, & Terry, 1999; Feeney et al., 2000)—though the association between attachment avoidance and condom use emerges somewhat inconsistently (Sakaluk & Gillath, 2016; Strachman & Impett, 2009).

1.2. Childhood ecologies and attachment insecurity

People's early interactions with their primary caregivers heavily influence their adult romantic attachment styles (Mikulincer & Shaver, 2003), though theory and corresponding evidence suggest that aspects of people's childhood ecologies also play an important role. According to life history theory (Ellis, Figueredo, Brumbach, & Schlomer, 2009), two notable factors of people's childhood ecologies—harshness and unpredictability—impact their relationship-related behaviors in adulthood (Brumbach, Figueredo, & Ellis, 2009). Harshness refers to rates of mortality in the environment and is often operationalized (in Western societies) as socioeconomic status and family income whereas unpredictability refers to fluctuations in perceived mortality and is often operationalized as ecological changes (e.g., paternal transitions, relocation, employment-status changes; Belsky, Schlomer, & Ellis, 2012) and unpredictable parenting (Hill, Ross, & Low, 1997). As others have argued (Szepeswol & Simpson, 2019), comfortable, predictable childhood ecologies (characterized by responsive, consistent parenting) promote positive expectations regarding the dependability of others, which promotes romantic attachment security; in contrast, harsh, unpredictable childhood ecologies (characterized by harsh, unpredictable parenting) promote concerns regarding the dependability of others, which promotes romantic attachment insecurity. Although work drawing from life history theory often considers the collective influence of harshness and unpredictability (e.g., Chang et al., 2019), attachment theory may be used to argue that childhood unpredictability (but not harshness) predicts adult attachment insecurity, in part because it is the only ecological parameter that is operationalized in terms of parental responsiveness. Indeed, parental responsiveness is the strongest predictor of attachment insecurity (Mikulincer & Shaver, 2003).

Recent empirical work has indeed provided support for the idea that unpredictability uniquely predicts romantic attachment (e.g., Sung et al., 2016). One recent cross-cultural study, for example, demonstrated that childhood unpredictability (but not harshness) was associated with elevated romantic attachment anxiety (but not avoidance) (Barbaro & Shackelford, 2019). A 32-year, longitudinal study similarly demonstrated that childhood unpredictability (but not harshness) was indirectly positively associated with both romantic attachment anxiety and avoidance (Szepeswol, Simpson, Griskevicius, & Raby, 2015).

1.3. Overview of the current study

Together, these findings suggest the unpredictability of people's childhood ecologies should be associated with their later romantic attachment insecurity, which should be associated with their intentions to engage in unprotected sex. Although previous work has examined other sexually relevant outcomes (e.g., pubertal timing; Belsky et al., 2012; Sung et al., 2016), we are not aware of any research that has specifically examined intentions to engage in unprotected sex; the goal of the current study was to do so. We thus recruited a large sample of young adults, who completed measures assessing their childhood harshness and unpredictability, attachment insecurity, and intentions to engage in unprotected sex. We predicted that childhood unpredictability (but not harshness) would be positively associated with romantic attachment insecurity, which would be positively associated with intentions to engage in unprotected sex. We did not specify a priori whether (a)

childhood unpredictability would be associated with attachment anxiety versus avoidance (though prior research suggests an association with attachment anxiety only; Barbaro & Shackelford, 2019) or (b) attachment anxiety versus avoidance would be associated with people's intentions to engage in unprotected sex (though prior research suggests only attachment anxiety is associated with such behaviors; Strachman & Impett, 2009).

2. Method

2.1. Participants

We recruited 371 undergraduates from a large, southeastern U.S. university to participate in an online study. We a priori excluded one participant who failed to complete the childhood-harshness measure, one who failed to complete the attachment-insecurity measure, and two who failed to complete one of the items assessing intentions to engage in unprotected sex. Thus, our final sample was comprised of 367 participants (193 women). An a priori power analysis indicated that we needed 314 participants to detect a small-to-medium effect (effect-size $r = 0.20$, which is similar to the effect size reported in related research, see Szepeswol et al., 2017) with 95% power. Participants were on average 19.22 ($SD = 1.96$) years of age, and 47.6% reported being in a casual or serious romantic relationship; the sample was also somewhat diverse (nearly 30% self-identified as non-White; see the Supplemental Material for more demographic information).

2.2. Procedure and measures

We directed participants to Qualtrics.com, where they provided consent and completed measures assessing their childhood harshness and unpredictability, attachment insecurity, and intentions to engage in unprotected sex, as well as a related covariate—recent uncommitted sex (see Szepeswol et al., 2017). We compensated all participants with course credit.

2.2.1. Childhood ecology

We modified an existing measure (see Griskevicius, Delton, Robertson, & Tybur, 2011) to assess childhood harshness. Specifically, participants indicated the extent to which they agreed with the following four statements tapping their relative socioeconomic status using a 5-point scale (1 = Strongly disagree; 5 = Strongly agree): (a) "My family usually had enough money for things when I was growing up," (b) "I grew up in a relatively wealthy neighborhood," (c) "My family struggled financially when I was growing up," and (d) "When I was growing up, I felt poor compared to other people." After reverse-scoring the necessary items, we averaged items to form an index of childhood harshness ($\alpha = 0.88$); higher scores indicate harsher ecologies.

We assessed childhood unpredictability using a modified version of the Family Unpredictability Scale (Ross & Hill, 2000), which required participants to indicate their agreement with 22 statements modified to describe the stability of their childhood ecologies (e.g., "It was hard to predict at what time meals would be;" "My parents kept changing their mind about rules for me") using a 5-point scale (1 = Not at all; 5 = Extremely). Notably, others (Hill et al., 1997) have used this measure to operationalize childhood unpredictability. After reverse-scoring the necessary items, we averaged items to form an index of childhood instability ($\alpha = 0.90$); higher scores indicate more unpredictable ecologies.

2.2.2. Attachment insecurity

We assessed attachment insecurity using the Adult Attachment Questionnaire (Simpson, Rholes, & Nelligan, 1992), which assesses attachment anxiety (9 statements) and avoidance (8 statements). Participants indicated the extent to which they agreed with each statement using a 7-point scale (1 = Strongly disagree; 7 = Strongly agree). After

Table 1
Descriptive statistics and correlations among all variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Childhood harshness	–							
(2) Childhood unpredictability	.35***	–						
(3) Attachment anxiety	.06	.35***	–					
(4) Attachment avoidance	.12*	.32***	.39***	–				
(5) Sex without protection against pregnancy	–.00	.21***	.19***	.09†	–			
(6) Sex without protection against STDs	.04	.13*	.08	.02	.67***	–		
(7) Recent uncommitted sex	.11*	.20***	.12*	.20***	.30***	.32***	–	
(8) Gender	.03	–.05	–.03	–.07	–.18***	–.12*	–.24	–
<i>M</i>	2.22	2.22	3.51	3.09	2.10	2.25	2.56	–
<i>SD</i>	0.99	0.61	1.13	1.16	1.79	1.93	1.92	–

Note. *N* = 367. Gender is coded such that –1 = Men and 1 = Women; given its dichotomous nature, we do not report descriptive statistics for Gender.

† *p* < .10.

* *p* < .05.

*** *p* < .001.

reverse scoring the necessary items, we averaged items comprising each subscale (anxiety, $\alpha = 0.83$; avoidance, $\alpha = 0.84$); higher values reflect greater attachment insecurity.

2.2.3. *Intentions to engage in unprotected sex*

We assessed the extent to which participants expected to engage in two forms of unprotected sex during the subsequent six months: (a) “sex without protection against pregnancy” and (b) “sex without protection against STDs,” using a 7-point scale (1 = Not at all likely; 7 = Extremely likely). Both items were highly correlated ($r = 0.67$); given that each accounts for a sizeable portion of unique variability (55%), however, we opted a priori to analyze them separately.

2.2.4. *Covariate*

As noted, childhood unpredictability is indirectly associated with more frequent uncommitted sex through romantic attachment insecurity (see Szepeswol et al., 2017); thus, it is important to demonstrate that any associations between childhood unpredictability, attachment insecurity, and intentions to engage in unprotected sex emerge independent of recent uncommitted sex. We thus assessed recent uncommitted sex using the 3-item behavioral subscale of Penke and Asendorpfs (2008) revised sociosexuality inventory. After following their scoring recommendations (using a 9-point response format), we averaged items to form an index of recent uncommitted sex ($\alpha = 0.91$); higher scores reflect more frequent recent uncommitted sex.

3. Results

3.1. *Descriptive statistics and preliminary analyses*

We first examined the descriptive statistics for and correlations among all variables and covariates (see Table 1).¹ A few results are worth highlighting. First, childhood harshness and unpredictability were positively correlated; likewise, attachment anxiety and avoidance were positively correlated. Second, childhood harshness was positively associated with attachment anxiety and recent uncommitted sex whereas childhood unpredictability was positively associated with both components of attachment insecurity and all sex-related constructs. Third, consistent with other work (Szepeswol et al., 2017), childhood

¹ We provide information regarding the range and distribution of our predictor variables in the Supplemental Materials. As can be seen, all variables (nearly) spanned the full range of each scale. Nevertheless, childhood harshness and unpredictability were positively skewed whereas attachment anxiety was negatively skewed. We thus conducted exploratory analyses replicating our key models but using log-transformed versions of these variables. All results remained unchanged (see the Supplemental Materials for details).

harshness, childhood unpredictability, and attachment insecurity were positively associated with recent uncommitted sex, supporting our a priori decision to control for it. Fourth, participants reported relatively low intentions to engage in unprotected sex—indeed, both scores fell below the scale’s midpoint (sex without protection against pregnancy: $t(366) = -20.29, p < .001$; sex without protection against STDs: $t(366) = -17.37, p < .001$); nevertheless, there was substantial variability in both items, and participants used the scale’s full range. Finally, participants on average trended toward reporting stronger intentions to not protect against STDs (versus pregnancy), $t(366) = -1.86, p = .064$. It is worth noting that, consistent with prior work (Turchik & Garske, 2009), men ($M = 2.44, SD = 1.94$) reported stronger intentions to not protect against pregnancy than women ($M = 1.79, SD = 1.60$), $t(336.26) = 3.49, p = .001$; likewise, men ($M = 2.48, SD = 2.07$) reported stronger intentions to not protect against STDs than women ($M = 2.04, SD = 1.78$), $t(343.85) = 2.21, p = .028$. Given these sex-differentiated intentions, we decided to additionally control for gender in our analyses (as will be seen, all associations remained unchanged when we no longer controlled for gender).

3.2. *Is childhood ecology indirectly associated with intentions to engage in unprotected sex through attachment insecurity?*

We predicted that childhood unpredictability (but not harshness) would be associated with romantic attachment insecurity, which would be associated with intentions to engage in unprotected sex. To test this indirect effect, we followed the three-step procedure outlined by Tofghi and MacKinnon (2011). First, we estimated the association between the predictors (childhood harshness and unpredictability) and the putative mediators (attachment anxiety and avoidance), controlling for related covariates. Second, we estimated the association between the putative mediators and the outcome (intentions to engage in unprotected sex), controlling for the predictors and related covariates. Finally, we multiplied these associations together to estimate the indirect effect.

3.2.1. *Testing the association between childhood ecology and attachment insecurity*

We predicted that childhood unpredictability (but not harshness) would be positively associated with romantic attachment insecurity, though we did not predict whether the association would emerge on attachment anxiety versus attachment avoidance. We thus estimated a multivariate regression model in SPSS 23 that regressed attachment anxiety and avoidance onto childhood harshness (standardized) and unpredictability (standardized), controlling for recent uncommitted sex (standardized) and gender (Men = –1, Women = 1; see Supplemental Material for all syntax).

Table 2
Associations between attachment insecurity and intended unprotected sex, controlling for childhood ecology and uncommitted sex.

	Intended sex without pregnancy protection			Intended sex without STD protection		
	b	CI _{95%}	r	b	CI _{95%}	r
Intercept	2.11***	[1.94: 2.28]	–	2.25***	[2.06: 2.44]	–
Recent uncommitted sex	0.44***	[0.26: 0.62]	.24	0.60***	[0.40: 0.79]	.29
Gender	–0.20*	[–0.38: –0.03]	.12	–0.08	[–0.28: 0.11]	.04
Childhood harshness	–0.15	[–0.33: 0.04]	.08	–0.04	[–0.24: 0.16]	.02
Childhood unpredictability	0.28**	[0.08: 0.48]	.14	0.17	[–0.05: 0.39]	.08
Attachment anxiety	0.23*	[0.03: 0.42]	.12	0.09	[–0.12: 0.30]	.04
Attachment avoidance	–0.10	[–0.29: 0.10]	.05	–0.17	[–0.38: 0.05]	.08

Note. For all parameters, *df* = 360. We coded gender such that –1 = Men and 1 = Women, and all other predictor variables are standardized. Effect-size *r* is reported.

* *p* < .05.
 ** *p* < .01.
 *** *p* < .001.

Childhood unpredictability was indeed positively associated with romantic attachment insecurity, $F(2361) = 28.44, p < .001$ (anxiety: $b = 0.41, 95\%$ Confidence Interval (CI_{95%}) [0.29: 0.53], $t(362) = 6.73, p < .001, effect-size r = 0.33$; avoidance: $b = 0.33, CI_{95\%} [0.21: 0.45], t(362) = 5.35, p < .001, effect-size r = 0.27$) whereas childhood harshness was unassociated with romantic attachment insecurity, $F(2361) = 0.93, p = .395$ (anxiety: $b = -0.08, CI_{95\%} [-0.20: 0.04], t(362) = -1.30, p = .195$; avoidance: $b = 0.00, CI_{95\%} [-0.12: 0.12], t(362) = 0.00, p = .999$). A follow-up analysis explored whether the associations between childhood unpredictability and attachment insecurity continued to emerge when we no longer controlled for the covariates; they did (both *ps* < 0.001). A second and third follow-up analysis explored whether these associations differed across participants' gender or race (White/Caucasian = 0, All other races = 1); they did not (moderation by gender: all *ps* ≥ 0.243; moderation by race: all *ps* ≥ 0.322). A final follow-up analysis explored whether these associations differed across participants' relationship status (Single = 0, Partnered = 1); only the association between childhood unpredictability and attachment anxiety differed (*p* = .008), emerging more strongly among partnered participants, $b = 0.54, CI_{95\%} [0.37: 0.70], t(355) = 6.33, p < .001, effect-size r = 0.32$, than among single participants, $b = 0.23, CI_{95\%} [0.08: 0.39], t(355) = 3.00, p = .003, effect-size r = 0.16$ (for all other effects, all *ps* ≥ 0.309). This latter, unpredicted moderation may be due, at least in part, to relatively stronger activation of the romantic attachment system among partnered (versus single) participants.

3.2.2. Testing the association between attachment insecurity and intentions to engage in unprotected sex

We predicted that attachment insecurity would be positively associated with intentions to engage in unprotected sex, though we did not make strong predictions regarding whether the association would involve attachment anxiety versus avoidance or protection against pregnancy versus STDs. We thus estimated a second multivariate regression model that regressed participants' intentions to engage in sex without protection against pregnancy and without protection against STDs onto their attachment insecurity (both standardized), controlling for childhood ecology (both standardized) and covariates.

Results are reported in Table 2. Attachment anxiety was indeed uniquely positively associated with intentions to engage in unprotected sex, $F(2359) = 3.02, p = .049$, though attachment avoidance was unassociated, $F(2359) = 1.19, p = .305$. Specifically, attachment anxiety was positively associated with intentions to not protect against pregnancy but unassociated with intentions to not protect against STDs. A follow-up analysis explored whether this association continued to emerge as significant when we no longer controlled for the covariates; it did (*p* = .027). Another follow-up analysis explored whether it differed across participants' gender; it trended toward significance (*p* = .099),

emerging among men, $b = 0.42, CI_{95\%} [0.12: 0.71], t(359) = 2.77, p = .006, effect-size r = 0.14$, but not among women, $b = 0.12, CI_{95\%} [-0.12: 0.35], t(359) = 0.97, p = .332$. Two final follow-up analyses explored whether it differed across participants' race or relationship status; it did not (race: *p* = .612; relationship status: *p* = .278).

3.2.3. Testing the indirect association between childhood unpredictability and intentions to engage in unprotected sex

Indirect effects can only emerge when the associations between the predictor and mediator and between the mediator and outcome emerge as significant. We thus only examined the extent to which childhood unpredictability was indirectly associated with intentions to engage in sex without protection against pregnancy through attachment anxiety. Specifically, we used the RMediation package in R (Tofighi & MacKinnon, 2011) to multiply the two associations together ($b = 0.09$) and estimate the corresponding CI_{95%} [0.01: 0.18]. The CI did not contain zero suggesting that people who experienced more (versus less) childhood unpredictability reported stronger intentions to engage in sex without protection against pregnancy through elevated attachment anxiety.

4. Discussion

We examined the extent to which the unpredictability of people's childhood ecologies was indirectly associated with their intentions to engage in unprotected sex through their romantic attachment insecurities. Results demonstrated that individuals who experienced more (versus less) childhood unpredictability demonstrated heightened romantic attachment anxiety that was associated with greater intentions to engage in sex without protection against pregnancy. Childhood harshness was unassociated with romantic attachment insecurities.

It is worth noting that childhood unpredictability was not indirectly associated with intentions to protect against STDs. Combined with our finding that participants reported stronger intentions to not protect against STDs (versus pregnancy), these findings may suggest that childhood unpredictability and attachment anxiety are associated with people's willingness to use hormonal contraceptives (which protect against pregnancy but not STDs) but not condoms (which protect against both pregnancy and STDs). Nevertheless, we did not assess people's preferred method of protection; thus, future research would benefit from exploring this possibility. It is additionally worth noting that attachment avoidance was unassociated with intentions to protect against pregnancy. Although unpredicted, it is consistent with other empirical work (Strachman & Impett, 2009). We speculate that, because individuals high (versus low) in attachment avoidance seek emotional independence (Mikulincer & Shaver, 2003), they may be less inclined to engage in intimacy-enhancing behaviors such as having unprotected sex (Santelli et al., 1996). Future research should examine this and

other potential mechanisms.

Several factors limit interpretations of the current findings until they can be replicated and extended. First, unprotected sex is a sensitive topic (Krumpal, 2013) and thus issues such as social desirability may have inhibited individuals' willingness to report such behaviors. Although assessing people's *intentions* of future behaviors rather than *actual* behaviors may have created psychological distance that made disclosure easier, some people may still have been hesitant to respond honestly. Our estimates may thus be somewhat conservative. Second, although we used attachment theory to predict that childhood harshness would be unassociated with attachment insecurity, the ecological harshness common to modern-day Western samples is notably lower than most ancestral ecologies and thus the null association that emerged here may be unique to such samples (see Szepesenwol et al., 2015). Additionally, this null association may have emerged due to our operationalization of harshness. Attachment theory posits that the quality of parental responsiveness most strongly impacts romantic attachment. Although it is possible that harsh ecologies involve parental unresponsiveness, our measure failed to incorporate unresponsiveness. Future research may thus benefit from adopting a broader harshness measure. Third, all data are correlational and thus cannot support strong causal claims. Although our assessments of past childhood ecology, current attachment insecurity, and future behavioral intentions helps to support temporal precedence, only experimental designs permit causal conclusions. Of course, ethical concerns preclude experimental manipulations that may promote unprotected sex; thus, future research should consider utilizing longitudinal methods (e.g., Simpson, Griskevicius, Kuo, Sung, & Collins, 2012; Szepesenwol et al., 2017) to better establish temporal precedence. Such longitudinal methods would additionally help attenuate biased reports of childhood ecology due to memory bias.

These limitations notwithstanding, the current study has important theoretical implications. Most notably, these findings add to growing literature highlighting the importance of childhood ecologies in shaping individual differences in later reproductive motivations and behaviors (Ellis et al., 2009). Recent research, for example, demonstrates that childhood ecologies are associated with timing of sexual maturity (Belsky, Houts, & Fearon, 2010; Sung et al., 2016), sexual debut (James, Ellis, Schlomer, & Garber, 2012; Simpson et al., 2012), and first reproduction (Nettle, 2010).² Consistent with the idea posited by life history theory that early experiences impact *reproductive* behaviors specifically and not sexual behaviors generally, childhood unpredictability was indirectly associated with intentions to protect against pregnancy but not STDs in the current study.

Our research additionally supports the ideas that childhood unpredictability (a) has a greater indirect influence on later sexual outcomes than does childhood harshness and (b) impacts people's sexual outcomes through their romantic attachment orientations (particularly attachment anxiety). As other work has demonstrated, this latter association emerges through received maternal support (Simpson et al., 2012; Szepesenwol et al., 2015). Future research would benefit from examining this potential mechanism in the context of unprotected sex.

CRedit authorship contribution statement

Juliana E. French: Conceptualization, Methodology, Formal analysis, Writing - original draft, Project administration. **Katherine A. Whitley:** Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft. **Emma E. Altgelt:** Writing - review & editing. **Andrea L. Meltzer:** Conceptualization, Formal analysis, Data curation, Writing - original draft, Supervision.

Declaration of Competing Interest

None.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.paid.2020.109858.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin*, 127, 142–161.
- Barbaro, N., & Shackelford, T. K. (2019). Environmental unpredictability in childhood is associated with anxious romantic attachment and intimate partner violence perpetration. *Journal of Interpersonal Violence*, 34, 240–269.
- Belsky, J., Houts, R. M., & Fearon, R. P. (2010). Infant attachment security and the timing of puberty: Testing an evolutionary hypothesis. *Psychological Science*, 21, 1195–1201.
- Belsky, J., Schlomer, G. L., & Ellis, B. J. (2012). Beyond cumulative risk: Distinguishing harshness and unpredictability as determinants of parenting and early life history strategy. *Developmental Psychology*, 48, 662–673.
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment* (2nd ed.). New York: Basic Books.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford Press.
- Brumbach, B. H., Figueredo, A. J., & Ellis, B. J. (2009). Effects of harsh and unpredictable environments in adolescence on development of life history strategies. *Human Nature*, 20, 25–51.
- Centers for Disease Control and Prevention. (2017). *Sexually transmitted disease surveillance, 2016*. Atlanta: U.S. Department of Health and Human Services.
- Chang, L., Lu, H. J., Lansford, J. E., Skinner, A. T., Bornstein, M. H., Steinberg, L., et al. (2019). Environmental harshness and unpredictability, life history, and social and academic behavior of adolescents in nine countries. *Developmental Psychology*, 55, 890–903.
- Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental dimensions of environmental risk: The impact of harsh versus unpredictable environments on the evolution and development of life history strategies. *Human Nature*, 20, 204–268.
- Feeney, J. A., Kelly, L., Gallois, C., Peterson, C., & Terry, D. J. (1999). Attachment style, assertive communication and safer-sex behavior. *Journal of Applied Social Psychology*, 29, 1964–1983.
- Feeney, J. A., Peterson, C., Gallois, C., & Terry, D. J. (2000). Attachment style as a predictor of sexual attitudes and behavior in late adolescence. *Psychology & Health*, 14, 1105–1122.
- Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008–2011. *New England Journal of Medicine*, 374, 843–852.
- French, J. E., Altgelt, E. E., & Meltzer, A. L. (2019). The implications of sociosexuality for marital satisfaction and dissolution. *Psychological Science*, 30, 1460–1472.
- Griskevicius, V., Delton, A. W., Robertson, T. E., & Tybur, J. M. (2011). Environmental contingency in life history strategies: The influence of mortality and socioeconomic status on reproductive timing. *Journal of Personality and Social Psychology*, 100, 241–254.
- Hazan, C., & Zeifman, D. (1994). Sex and the psychological tether. In K. Bartholomew, & D. Perlman (Eds.), *Advances in personal relationships, vol. 5. Attachment processes in adulthood* (pp. 151–178). London: Jessica Kingsley Publishers.
- Hill, E. M., Ross, L. T., & Low, B. S. (1997). The role of future unpredictability in human risk-taking. *Human Nature*, 8, 287–325.
- James, J., Ellis, B. J., Schlomer, G. L., & Garber, J. (2012). Sex-specific pathways to early puberty, sexual debut, and sexual risk taking: Tests of an integrated evolutionary-developmental model. *Developmental Psychology*, 48, 687–702.
- Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: A literature review. *Quality & Quantity*, 47, 2025–2047.
- Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. *Advances in Experimental Social Psychology*, 35, 56–152.
- Mosher, W. D., Jones, J., & Abma, J. C. (2012). Intended and unintended births in the United States: 1982–2010. *National Health Statistics Reports*, 55, 1–27.
- Nettle, D. (2010). Dying young and living fast: Variation in life history across English neighborhoods. *Behavioral Ecology*, 21, 387–395.
- Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of Personality and Social Psychology*, 95, 1113–1135.

² Such findings may not generalize to non-WEIRD samples (Sear et al., 2019).

- Ross, L. T., & Hill, E. M. (2000). The family unpredictability scale: Reliability and validity. *Journal of Marriage and Family*, *62*, 549–562.
- Sakaluk, J. K., & Gillath, O. (2016). The causal effects of relational security and insecurity on condom use attitudes and acquisition behavior. *Archives of Sexual Behavior*, *45*, 339–352.
- Santelli, J. S., Kouzis, A. C., Hoover, D. R., Polacsek, M., Burwell, L. G., & Celentano, D. D. (1996). Stage of behavior change for condom use: The influence of partner type, relationship and pregnancy factors. *Family Planning Perspectives*, *28*, 101–107.
- Sear, R., Sheppard, P., & Coall, D. A. (2019). Cross-cultural evidence does not support universal acceleration of puberty in father-absent households. *Philosophical Transactions of the Royal Society B*, *374*, 20180124.
- Sedgh, G., Singh, S., & Hussain, R. (2014). Intended and unintended pregnancies worldwide in 2012 and recent trends. *Studies in Family Planning*, *45*, 301–314.
- Simpson, J. A., Griskevicius, V., Kuo, S. I., Sung, S., & Collins, W. A. (2012). Evolution, stress, and sensitive periods: The influence of unpredictability in early versus late childhood on sex and risky behavior. *Developmental Psychology*, *48*, 674–686.
- Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology*, *62*, 434–446.
- Strachman, A., & Impett, E. A. (2009). Attachment orientations and daily condom use in dating relationships. *Journal of Sex Research*, *46*, 319–329.
- Sung, S., Simpson, J. A., Griskevicius, V., Kuo, S. I. C., Schlomer, G. L., & Belsky, J. (2016). Secure infant-mother attachment buffers the effect of early-life stress on age of menarche. *Psychological Science*, *27*, 667–674.
- Szepeswol, O., Griskevicius, V., Simpson, J. A., Young, E. S., Fleck, C., & Jones, R. E. (2017). The effect of predictable early childhood environments on sociosexuality in early adulthood. *Evolutionary Behavioral Sciences*, *11*, 131–145.
- Szepeswol, O., & Simpson, J. A. (2019). Attachment within life history theory: An evolutionary perspective on individual differences in attachment. *Current Opinion in Psychology*, *25*, 65–70.
- Szepeswol, O., Simpson, J. A., Griskevicius, V., & Raby, K. L. (2015). The effect of unpredictable early childhood environments on parenting in adulthood. *Journal of Personality and Social Psychology*, *109*, 1045–1067.
- Tofighi, D., & MacKinnon, D. P. (2011). RMediation: An R package for mediation analysis confidence intervals. *Behavior Research Methods*, *43*, 692–700.
- Turchik, J. A., & Garske, J. P. (2009). Measurement of sexual risk taking among college students. *Archives of Sexual Behavior*, *38*, 936–948.