Supplemental Materials for Perceptions of Childhood Unpredictability, Delay Discounting, Risk-Taking, and Adult Externalizing Behaviors: A Life History Approach

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Table 1. Sample demographic characteristics in Study 1a and 1b

|  |  |  |  |
| --- | --- | --- | --- |
| Study 1a |  | Study 1b |  |
| Variable | *N (%)* or *M (SD)* |  |  |
| Age (years) | *M*=19.58 (2.40)  (Range 16 to 55) | *M*=35.08 (11.45)  (Range 18 to 70) |  |
| Sex | 89 male, 258 female, 2 other | 97 male, 229 female, 4 transgender, 2 other |  |
| Race  American Indian  Alaska Native  Asian  Black or African American  Native Hawaiian or Pacific Islander  White  Multiracial  Prefer not to say  Other | 0 (n.a.)  0 (n.a.)  13 (4%)  48 (14%)  3 (<1%)    274 (79%)  0 (n.a)  0 (n.a)  11 (3%)  0 (n.a) | 1 (<1%)  0 (n.a.)  18 (5%)  38 (11%)  3 (<1%)    257 (77%)  10 (3%)  0 (n.a)  5 (2%)  0 (n.a.) |  |
| Hispanic or Latino  Yes  No  Prefer not to say | 77 (22%)  272 (78%)  0 (n.a) | 43 (13%)  289 (87%)  0 (n.a) |  |
| Current Annual Household Income  $10,000 or less  $10,001 - $19,999  $20,000 - $29,999  $30,000 - $39,999  $40,000 - $49,999  $50,000 - $59,999  $60,000 - $69,999  $70,000 - $79,999  $80,000 - $89,999  $90,001 - $99,999  $100,000 - $149,999  $150,000 or more | 23 (7%)  29 (8%)  29 (8%)  18 (5%)  20 (6%)  17 (5%)  16 (5%)  20 (6%)  3 (<1%)  14 (4%)  80 (23%)  80 (23%) | 25 (8%)  20 (6%)  38 (11%)  39 (12%)  28 (8%)  38 (11%)  31 (9%)  25 (8%)  16 (5%)  21 (6%)  33 (10%)  18 (5%) |  |
| Childhood Annual Household Income  $15,000 or less  $15,001 - $25,000  $25,001 - $35,000  $35,001 - $50,000  $50,001 - $75,000  $75,001 - $100,000  $100,001 - $150,000  $150,000 or more  Prefer not to say | 6 (2%)  19 (5%)  37 (11%)  36 (10%)  48 (14%)  66 (19%)  59 (17%)  77 (22%)  1 (<1%) | Less than $10,000  $10,000-$19,999  $20,000-$29,999  $30,000-$39,999  $40,000-$49,999  $50,000-$59,999  $60,000-$69,999  $70,000-$79,999  $80,000-$89,999  $90,000-$99,999  $100,000-$149,999  $150,000 or more | 12 (4%)  20 (6%)  44(13%)  46(14%)  32(10%)  48(15%)  28 (8%)  20 (6%)  23 (7%)  12 (4%)  29 (9%)  18 (5%) |

Table 2. Sample demographic characteristics in study 2

|  |  |
| --- | --- |
| Variable | *N (%)* or *M (SD)* |
| Age (years) | *M*=25.68 (10.19)  (Range 18 to 72) |
| Gender | 169 men, 465 women, 6 transgender, 3 other |
| Race  American Indian  Asian  Native or Pacific Islander  Black or African American  White  Multi-racial  Unknown/Did not report  Other | 5 (<1%)  29 (5%)  1 (<1%)  66 (10%)  497 (77%)  26 (4%)  11 (2%)  8 (1%) |
| Hispanic or Latino  Yes  No  Unknown/Did not report | 111 (17%)  519 (81%)  13 (2%) |
| Current Annual Household Income  $10,000 or less  $10,001 - $19,999  $20,000 - $29,999  $30,000 - $39,999  $40,000 - $49,999  $50,000 - $59,999  $60,000 - $69,999  $70,000 - $79,999  $80,000 - $89,999  $90,001 - $99,999  $100,000 - $150,000  $150,001 or more | 35 (5%)  35 (5%)  52 (8%)  45 (7%)  53 (8%)  30 (5%)  36 (6%)  44 (7%)  33 (5%)  32 (5%)  120 (19%)  128 (20%) |
| Childhood Annual Household Income |  |
| $15,000 or less | 37 (6%) |
| $15,001 - $25,000 | 63 (10%) |
| $25,001 - $35,000 | 72 (11%) |
| $35,001 - $50,000 | 90 (14%) |
| $50,001 - $75,000 | 106 (17%) |
| $75,001 - $100,000 | 105 (16%) |
| $100,001 - $150,000 | 83 (13%) |
| $150,000 or more | 87 (14%) |

Study 1a: Risk-taking

In Study 1a, we also investigated the associations between perceptions of childhood ecologies and risk-taking using the Balloon Analogue Risk-taking Task (BART; Lejuez et al., 2002) and Iowa Gambling Task (IGT; Bechara et al., 1994).

**BART**

The BART is a well-validated task that provides a behavioral index of risky decision-making. In this task, participants have the opportunity to accumulate symbolic monetary rewards (5 cents per pump) by blowing up virtual balloons. Each click of the mouse pumps air into the balloon. However, if the balloons are overinflated, the balloon can explode and all rewards for that balloon are lost. Thus, on each balloon, participants must weigh the potential of gaining more rewards versus the risk of losing all rewards by overinflating a balloon. The BART reflects real-world situations where excessive risk produces diminishing returns and has been used in previous research (e.g., Maner et al., 2007; Griskevicius et al., 2013). The BART was coded such that each balloon began with a 1/128 chance of the balloon popping on the first pump. Each subsequent pump had an increasing probability of popping: on the second pump, there was a 1/127 chance of the balloon popping; on the third pump, a 1/126 chance, and so on until either (i) the balloon popped, (ii) the participant collected their reward for that trial, or (iii) the balloon reached pump 128 where the chance of popping was 1/1 (100%). The task included a total of 15 balloons. Following previous research, the dependent variable was participants’ adjusted average pump count, which is the mean number of pumps for non-exploded balloons (See Lejuez et al., 2002).

Hierarchical regression analyses were used to test the association between unpredictability and risk-taking. Given their significant correlation with one another, in the first step, we entered unpredictability and harshness. This allowed us to account for their overlap while assessing their associations with risk-taking. In the second step, we entered demographic predictors (sex, race, ethnicity, current income, childhood income, and age) to assess whether any observed associations with unpredictability (and/or harshness) would be observed over and above those covariates. Race was coded to compare Black/African American participants to non-Black/ African American participants; Ethnicity was coded to compare Hispanic participants to non-Hispanic participants. Regression results are reported in Table S1.

Table S1. Regression analyses: Predictors of Risk-Taking (BART)(adjusted average pump count) in Study 1a

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .05 | 0.58 | .56 | .04 |
| Harshness | .00 | 0.06 | .96 | .00 |
| Unpredictability | .05 | 0.66 | .51 | .04 |
| Harshness | .13 | 1.27 | .21 | .08 |
| Sex | -.05 | -0.79 | .43 | -.05 |
| Racial minority status | -.03 | -0.46 | .64 | -.03 |
| Ethnic minority status | .05 | 0.70 | .48 | .04 |
| Current income | -.01 | -0.11 | .92 | -.01 |
| Childhood income | .17 | 1.55 | .12 | .10 |
| Age | -.04 | -0.64 | .52 | -.04 |

Note. N=271. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

In the first step, neither unpredictability nor harshness were associated with risk-taking. When demographic covariates were entered in step 2, neither unpredictability, harshness, nor any of the demographic predictors were significantly associated with risk-taking.

Secondary analyses explored the possible interaction between unpredictability and harshness. We added the interaction of those two variables (after centering both predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The interaction term was nonsignificant (*B* = -.06, *t* = -0.76, *p* = .45, *partial r* = -.05). Thus we saw no evidence that the relation between unpredictability and risk-taking on the BART was moderated by levels of harshness.

In addition to the possible moderating effects of harshness, we also explored possible moderating effects of participant sex. We added to the models described above an interaction term including unpredictability and participant sex (both centered prior to calculating the interaction). The interaction term was nonsignificant (*B* = -.01, *t* = -0.22, *p* = .83, *partial r* = -.01). Thus we saw no evidence that the relation between unpredictability and risk-taking on the BART was moderated by participant sex.

*Secondary BART dependent variables*

In addition to the adjusted average pump count dependent variable, we also report a replication of the analyses conducted by Griskevicius et al (2013) – (1) the *total number of explosions* (i.e., number of popped balloons) and (2) the *average number of pumps per balloon*. Regression results using the same 2-step process described above are reported in Table S2 (*total number of explosions)* and in Table S3 (*average number of pumps per balloon)*. We were also interested in the possible interaction between unpredictability and harshness, and unpredictability and participant sex. We therefore added to the regression models a third step where we enter the interaction terms (and their centered predictors).

Table S2. Regression analyses: Predictors of Risk-Taking (BART)(total number of explosions (i.e., popped balloons)) in Study 1a

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .15 | 1.93 | .06 | .12 |
| Harshness | .05 | 0.64 | .52 | .04 |
| **Unpredictability** | **.15** | **1.93** | **.05** | **.12** |
| Harshness | .17 | 1.68 | .10 | .10 |
| Sex | .04 | 0.63 | .53 | .04 |
| **Racial minority status** | **.19** | **2.83** | **.01** | **.17** |
| Ethnic minority status | .12 | 1.91 | .06 | .12 |
| Current income | -.03 | -0.32 | .75 | -.02 |
| **Childhood income** | **.26** | **2.48** | **.01** | **.15** |
| Age | -.00 | -0.05 | .96 | -.00 |

Note. N=271. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

When assessing the total number of explosions (i.e., number of popped balloons), in step 1 neither unpredictability nor harshness emerged as significant predictors, although unpredictability bordered on significance. In step 2, when demographic covariates were entered into the model, unpredictability, but not harshness, emerged as a significant predictor of risk-taking. We also found a significant association between participant race and risk-taking, such that Black/African American participants engaged in more risk-taking than non-Black/African American participants did. Childhood income was also significantly associated with risk-taking, but in an unexpected direction – participants who reported higher childhood income engaged in more risk-taking than participants who reported lower childhood income.

Secondary analyses explored the potential moderating role of harshness and participant sex. We added the interaction of unpredictability and harshness, and unpredictability and participant sex (after centering those predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The unpredictability and harshness interaction was nonsignificant (*B* = .10, *t* = 1.27, *p* = .23, *partial r* = .08), as was the unpredictability and participant sex interaction (*B* = -.04, *t* = -0.66, *p* = .51, *partial r* = -.04). Thus, we found no evidence that the relation between unpredictability and risk-taking was moderated by levels of harshness or participant sex.

Table S3. Regression analyses: Predictors of Risk-Taking (BART)(average number of pumps per balloon) in study 1a

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .12 | 1.58 | .12 | .10 |
| Harshness | .05 | 0.57 | .57 | .04 |
| Unpredictability | .13 | 1.63 | .10 | .12 |
| Harshness | .17 | 1.66 | .10 | .10 |
| Sex | -.05 | -0.83 | .41 | -.05 |
| Racial minority status | .03 | 0.41 | .68 | .03 |
| Ethnic minority status | .08 | 1.26 | .21 | .08 |
| Current income | -.01 | -0.16 | .87 | -.01 |
| Childhood income | .20 | 1.82 | .07 | .11 |
| Age | -.02 | -0.32 | .75 | -.02 |

Note. N=271. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

When assessing the average number of pumps per balloon, in step 1 neither unpredictability nor harshness emerged as significant predictors of risk-taking. In step 2, neither unpredictability nor harshness emerged as significant predictors of risk-taking; none of the demographic predictors were associated with risk-taking, although childhood income was near traditional levels of significance.

Secondary analyses explored the potential moderating role of harshness and participant sex. We added the interaction of unpredictability and harshness, and unpredictability and participant sex (after centering those predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The unpredictability and harshness interaction was nonsignificant (*B* = .05, *t* = 0.66, *p* = .51, *partial r* = .04), as was the unpredictability and participant sex interaction (*B* = -.04, *t* = -0.69, *p* = .49, *partial r* = -.04). Thus, we found no evidence that the relation between unpredictability and risk-taking was moderated by levels of harshness or participant sex.

**IGT**

Participants completed the Iowa Gambling Task (IGT; Bechara et al., 1994), another well-validated measure of risk-taking as reflective of reward-sensitivity (e.g., Crone et al., 2003). Participants begin the task with a small endowment/loan of $2000. Then, participants are presented with four different decks of cards and are asked to make a selection from one of the decks for 100 trials (the number of trials are unknown to the participant). With each card selection, participants can earn money – the amount they earn is only made known to them after they turn the card, and varies with each deck. However, after each turn of the card, participants could also be penalized with a small fee – the amount they are penalized with is only made known to them after they turn the card, and, again, varies with each deck. Subjects are told that the goal of the task is to maximize their earned profit. The reward-to-punishment schedules are pre-programmed. For example, selections made from decks A or B could yield participants $250; selecting a card from decks C or B could yield only $50. However, the overall yield of the decks vary – the punishments are higher in the high-paying decks (A and B), and lower in the low-paying decks (C and B). Decks A and B are similar in that they cost participants the greatest overall net loss – the only differences are that cards selections made from Deck A punish participants more often but in smaller magnitudes, whereas in Deck B the punishments are less often but larger in magnitude. In Decks C and D, the overall net losses are similar – the only differences are that cards selections made from Deck C punish participants more often but in smaller magnitudes, whereas in Deck D the punishments are less often but larger in magnitude. The dependent variable is NET, and it reflects the difference between the total number of selections from advantageous Decks C and D versus disadvantageous decks A and B. A positive NET score suggests an inclination towards advantageous selections; a negative NET score suggests an inclination towards disadvantageous selections.

We used the same hierarchical regression analytical approach as was done with all other analyses. Regression results are reported in table S4.

Table S4. Regression analyses: Predictors of Reward Sensitivity (IGT) in Study 1a

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .06 | 0.60 | .55 | .05 |
| Harshness | .05 | 0.47 | .64 | .04 |
| Unpredictability | .05 | 0.50 | .62 | .04 |
| Harshness | .07 | 0.53 | .60 | .04 |
| Sex | .05 | 0.68 | .50 | .05 |
| Racial minority status | -.07 | -0.78 | .44 | -.06 |
| Ethnic minority status | -.05 | -0.62 | .54 | -.05 |
| Current SES | -.00 | -0.01 | .99 | -.00 |
| Childhood SES | -.00 | -0.01 | .99 | -.00 |
| **Age** | **.17** | **2.18** | **.03** | **.17** |

Note. N=179. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

In the first step, neither unpredictability nor harshness were associated with reward sensitivity. When demographic covariates were entered in step 2, again neither unpredictability nor harshness were associated with reward sensitivity. The only demographic predictor that was associated with reward sensitivity was participant age such that older participants displayed a stronger tendency to engage in risk-taking on the IGT.

Secondary analyses explored the possible interaction between unpredictability and harshness. We added the interaction of those two variables (after centering both predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The interaction term was nonsignificant (*B* = .12, *t* = 1.24, *p* = .22, *partial r* = .10). Thus, we saw no evidence that the relation between unpredictability and risk-taking performance on the IGT was moderated by levels of harshness.

In addition to the possible moderating effects of harshness, we also explored possible moderating effects of participant sex. We added to the models described above an interaction term including unpredictability and participant sex (both centered prior to calculating the interaction). The interaction term was nonsignificant (*B* = -.07, *t* = -0.84, *p* = .41, *partial r* = -.07). Thus, we saw no evidence that the relation between unpredictability and risk-taking performance on the IGT was moderated by participant sex.

Study 1c: pre-registered BART replication

In Study 1c, we aimed to recruit a minimum of 400 participants in order to mirror the minimum recruitment effort from Study 1b (see preregistration). We intentionally oversampled with the assumption that some participants would fail attention checks and/or may not complete the Balloon Analogue Risk Task (BART) given the continuity issues experienced in study one (due to an anticipated difficulty in transitioning from Qualtrics to Inquisit).

Ultimately, we ended up recruiting 527 MTurkers workers. Participants who failed any of the attention checks were automatically dropped. A total of 100 participants had their data excluded as a result of failing at least one of the three attention checks (see preregistration for a priori exclusion criterion). Four hundred-twenty-seven participants remained.

Of the remaining 427 participants, only 370 reached the BART task; the 57 participants who completed our self-report questionnaires but did not complete the task experienced computer error when transitioning from Qualtrics to Inquisit. Of the remaining 370 participants who completed the BART, data from 16 participants were excluded: N = 12 for having an adjusted average pump count (our main dependent variable of interest) score 3 standard deviations above the mean; N = 4 were excluded for having a zero score on the adjusted average pump count. These two exclusion criteria were decided on a priori and can be found in our preregistration. Thus, the final sample size included 354 participants.

Participants completed the same childhood unpredictability (*M* = 2.92, *SD* = 1.52, *α* = .95) and childhood harshness (*M* = 4.13, *SD* = 1.57, *α* = .94) measures as participants in all of our studies did. Participants also completed a modified version of the BART.

More specifically, the coding scheme used to set up the BART in Study 1c differed from the coding scheme used in Study 1a. In study 1a, the BART was set up using the default coding scheme provided by Inquisit by Millisecond (see Study 1a methods for the BART for specific coding instructions). In Study 1c, we re-coded the BART to match the coding scheme used by Griskevicius and colleagues (2013; see experiment 3). All balloon pumps (across all trials) had a fixed 5% chance of popping. Because we wanted to examine if the findings from Griskevicius et al. (2013) would replicate, we also modified the total number of balloon trials and the amount of money participants could earn on any given pump – participants pumped through 10 balloon trials and earned 10 cents per pump (as in Griskevicius et al., 2013).

We used the same hierarchical regression analytical approach as was done with our previous analyses. Regression results are reported in Table S5.

Table S5. Regression analyses: Predictors of Risk-Taking (BART)(adjusted average pump count) in study 1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .03 | 0.49 | .62 | .03 |
| Harshness | -.01 | -0.08 | .94 | -.00 |
| Unpredictability | .02 | 0.37 | .72 | .02 |
| Harshness | .02 | 0.24 | .81 | .01 |
| **Sex** | **.19** | **3.41** | **.001** | **.18** |
| Racial minority status | -.03 | -0.61 | .54 | -.03 |
| Ethnic minority status | .05 | 0.92 | .36 | .05 |
| Current SES | .05 | 0.79 | .43 | .04 |
| Childhood SES | -.03 | -0.37 | .71 | -.02 |
| Age | -.07 | -1.14 | .25 | -.06 |

Note. N=354. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

In the first step, neither unpredictability nor harshness were associated with risk-taking. When demographic covariates were entered in step 2, again neither unpredictability nor harshness were associated with risk-taking. The only demographic covariate that emerged as a significant predictor of risk-taking was participant sex such that men engaged in more risk-taking on the BART than did women.

Secondary analyses explored the possible interaction between unpredictability and harshness. We added the interaction of those two variables (after centering both predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The interaction term was significant (*B* = .13, *t* = 2.27, *p* = .02, *partial r* = .12). To assess the interactive pattern, we calculated simple regression slopes for unpredictability calculated at high (1SD above the sample mean) and low (1SD below the sample mean) levels of harshness. At high levels of harshness, unpredictability was unassociated with risk-taking (*B* = .10, *t* = 1.37, *p* = .17, *partial r* = .08). At low levels of harshness, unpredictability again was unassociated with risk-taking (*B* = -.12, *t* = -1.27, *p* = .21, *partial r* = -.07). Thus, the pattern was difficult to interpret.

In addition to the possible moderating effects of harshness, we also explored possible moderating effects of participant sex. We added to the models described above an interaction term including unpredictability and participant sex (both centered prior to calculating the interaction). The interaction term was nonsignificant (*B* = .10, *t* = 1.89, *p* = .06, *partial r* = .10). Thus, we saw no evidence that the relation between unpredictability and risk-taking was moderated by participant sex.

*Secondary BART dependent variables*

As was done in study 1a, we also report a replication of the analyses conducted by Griskevicius et al (2013) – (1) the *total number of explosions* (i.e., number of popped balloons) and (2) the *average number of pumps per balloon*. Regression results using the same 2-step process described above are reported in Table S6 (total number of explosions) and in Table S7 (average number of pumps per balloon). We also explored possible interactions between unpredictability and harshness, and unpredictability and participant sex.

Table S6. Regression analyses: Predictors of Risk-Taking (BART)(total number of explosions (i.e., popped balloons)) in Study 1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .02 | 0.31 | .76 | .02 |
| Harshness | .09 | 1.46 | .15 | .08 |
| Unpredictability | .00 | 0.01 | .99 | .00 |
| Harshness | .08 | 1.13 | .26 | .06 |
| **Sex** | **.13** | **2.46** | **.01** | **.13** |
| Racial minority status | -.03 | -0.60 | .55 | -.03 |
| Ethnic minority status | .07 | 1.29 | .20 | .07 |
| Current SES | .02 | 0.31 | .76 | .02 |
| Childhood SES | -.06 | -0.83 | .41 | -.05 |
| Age | -.10 | -1.67 | .10 | -.09 |

Note. N=354. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

When assessing the total number of explosions (i.e., number of popped balloons), in step 1, neither unpredictability nor harshness were significantly associated with risk-taking. In step 2, when demographic covariates were entered into the model, again neither unpredictability nor harshness emerged as significant predictors of risk-taking. The only demographic predictor that emerged as a significant predictor of risk-taking was participant sex such that men engaged in more risk-taking than women did.

Secondary analyses explored the potential moderating role of harshness and participant sex. We added the interaction of unpredictability and harshness, and unpredictability and participant sex (after centering those predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The interaction term for unpredictability and harshness was nonsignificant (*B* = .05, *t* = 0.86, *p* = .39, *partial r* = .05).

However, the interaction term for unpredictability and participant sex was significant (*B* = .13, *t* = 2.39, *p* = .02, *partial r* = .13). To assess the interactive pattern, we calculated simple regression slopes for participant sex to examine the association between perceived levels of unpredictability and risk-taking (total number of explosions) in men versus women. For men, higher levels of perceived unpredictability were associated with increased risk-taking (*B* = .23, *t* = 1.95, *p* = .052, *partial r* = .11). That association was not significant in women (*B* = -.06, *t* = -0.86, *p* = .39, *partial r* = -.05).

Table S7. Regression analyses: Predictors of Risk-Taking (BART)(average number of pumps per balloon) in Study 1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| Unpredictability | .02 | 0.25 | .81 | .01 |
| Harshness | -.03 | -0.50 | .61 | -.03 |
| Unpredictability | .01 | 0.20 | .84 | .01 |
| Harshness | -.02 | -0.23 | .82 | -.01 |
| **Sex** | **.19** | **3.43** | **.001** | **.18** |
| Racial minority status | -.02 | -0.32 | .75 | -.02 |
| Ethnic minority status | .01 | 0.09 | .93 | .01 |
| Current SES | .05 | 0.83 | .41 | .05 |
| Childhood SES | -.04 | -0.49 | .62 | -.03 |
| Age | -.08 | -1.38 | .17 | -.08 |

Note. N=354. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

When assessing the average number of pumps per balloon, in step 1, neither unpredictability nor harshness were significantly associated with risk-taking. In step 2, when demographic covariates were entered into the model, again neither unpredictability nor harshness emerged as significant predictors of risk-taking. The only demographic predictor that emerged as a significant predictor of risk-taking was participant sex such that men engaged in more risk-taking than women did.

Secondary analyses explored the potential moderating role of harshness and participant sex. We added the interaction of unpredictability and harshness, and unpredictability and participant sex (after centering those predictors) to the models that included unpredictability, harshness, and all of the demographic factors. The unpredictability and harshness interaction was nonsignificant (*B* = .10, *t* = 1.68, *p* = .10, *partial r* = .09), as was the unpredictability and participant sex interaction (*B* = .09, *t* = 1.68, *p* = .09, *partial r* = .09). Thus, we saw no evidence that the relation between unpredictability and risk-taking was moderated by levels of harshness or participant sex

Study 2: Externalizing Behavior

***Analysis of ESI Subscale Scores***

Hierarchical regression analyses were used to test hypothesized associations between childhood unpredictability and measures of externalizing behavior. Separate analyses focused on predictors of the three main ESI-BF subscales: general disinhibition, callous aggression, and substance abuse. In each analysis, predictors were entered hierarchically to test and isolate any associations between childhood unpredictability and forms of externalizing behavior. In the first step, we entered reports of disruptive maternal changes in childhood (LES composite scores). In the second step, we entered perceptions of childhood unpredictability and harshness as simultaneous predictors. In the third step, we included reports of general depression and individual differences in emotional stability/neuroticism. In the fourth and final step, we entered demographic predictors (sex, race, ethnicity, current income and childhood income, and age) to assess whether any observed associations with unpredictability (and/or harshness) would be observed over those covariates. Race was coded to compare Black/African American to non-Black/African American participants. Ethnicity was coded to compare Hispanic or Latino to non-Hispanic or Latino participants. Regression results are reported in Tables S8-S10.

Unpredictability emerged as a more robust predictor of externalizing behavior than did harshness or disruptive maternal changes (as measured by the LES). Once their overlap was taken into account in Step 2 of the regression models, unpredictability was reliably associated with all outcome variables, whereas harshness was not significantly associated with any of them. In step 3, unpredictability continued to predict disinhibition and callous aggression, but not substance use – however, the relation bordered on significance and is thus suggestive of an association between unpredictability and substance use. Harshness and LES scores did not predict any of the externalizing behaviors. We also observed significant associations between reports of general depression and all three of the externalizing behaviors. Emotional stability/neuroticism emerged as a significant predictor only for general disinhibition.

Including demographic predictors in step 4 left the associations between unpredictability and disinhibition and callous aggression virtually unchanged, although it resulted in unpredictability being reduced to nonsignificance for substance use – however, the relation bordered on significance and is thus at least suggestive of an association between unpredictability and substance use. Harshness and LES scores did not independently predict (over and above unpredictability) any of the facets of externalizing behavior. Reports of general depression continued to predict all of the externalizing behaviors, whereas emotional stability/neuroticism was only associated with general disinhibition. Participant sex was positively associated with general disinhibition and callous aggression, but not substance use. Age was positively associated with general disinhibition, negatively associated with callous aggression, and unrelated with substance use. Childhood income was negatively associated with callous aggression, and racial minority status was negatively associated with substance use. No other demographic covariates emerged as significant predictors of externalizing behavior.

Table S8. Regression analyses: Predictors of General Disinhibition in Study 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| **LES Maternal Changes** | **.13** | **3.21** | **<.001** | **.13** |
| LES Maternal Changes | -.01 | -0.26 | .79 | -.01 |
| **Unpredictability** | **.30** | **6.23** | **<.001** | **.24** |
| Harshness | .04 | 0.81 | .42 | .03 |
| LES Maternal Changes | -.03 | -0.67 | .51 | -.03 |
| **Unpredictability** | **.16** | **3.61** | **<.001** | **.14** |
| Harshness | -.01 | -0.28 | .78 | -.01 |
| **General Depression** | **.32** | **7.21** | **<.001** | **.28** |
| **Emotional Stability** | **-.19** | **-4.43** | **<.001** | **-.18** |
| LES Maternal Changes | -.03 | -0.67 | .50 | -.03 |
| **Unpredictability** | **.15** | **3.41** | **.001** | **.14** |
| Harshness | -.06 | -1.05 | .30 | -.04 |
| **General Depression** | **.31** | **7.10** | **<.001** | **.28** |
| **Emotional Stability**  **Sex** | **-.22**  **.10** | **-5.01**  **2.79** | **<.001**  **.01** | **-.20**  **.11** |
| Racial minority status  Ethnic minority status  Current income  Childhood income  **age** | -.07  .01  -.02  -.03  **.10** | -1.83  0.20  -0.48  -0.42  **2.56** | .07  .84  .63  .68  **.01** | -.07  .01  -.02  -.02  **.10** |

Note. N=637. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

Table S9. Regression analyses: Predictors of Callous Aggression in Study 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| **LES Maternal Changes** | **.05** | **1.29** | **.20** | **.05** |
| LES Maternal Changes | -.03 | -0.68 | .50 | -.03 |
| **Unpredictability** | **.19** | **3.84** | **<.001** | **.15** |
| Harshness | -.01 | -0.10 | .92 | -.00 |
| LES Maternal Changes | -.04 | -0.83 | .41 | -.03 |
| **Unpredictability** | **.16** | **3.04** | **.003** | **.12** |
| Harshness | -.03 | -0.58 | .56 | -.02 |
| **General Depression** | **.16** | **3.18** | **.002** | **.13** |
| Emotional Stability | .02 | 0.48 | .63 | .02 |
| LES Maternal Changes | -.04 | -0.99 | .32 | -.04 |
| **Unpredictability** | **.16** | **3.20** | **<.001** | **.13** |
| Harshness | -.09 | -1.51 | .13 | -.06 |
| **General Depression** | **.16** | **3.21** | **.001** | **.13** |
| Emotional Stability  **Sex** | -.04  **.29** | -0.91  **7.52** | .36  **<.001** | -.04  **.29** |
| Racial minority status  Ethnic minority status  Current income  **Childhood income**  **Age** | .01  .02  .09  **-.17**  **-.09** | 0.35  0.41  1.65  **-2.40**  **-2.14** | .73  .68  .10  **.02**  **.03** | .01  .02  .07  **-.10**  **-.09** |

Note. N=637. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

Table S10. Regression analyses: Predictors of Substance Use in Study 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Beta | t | p | Partial r |
| **LES Maternal Changes** | **.06** | **1.47** | **.14** | **.06** |
| LES Maternal Changes | -.01 | -0.25 | .80 | -.01 |
| **Unpredictability** | **.18** | **3.51** | **<.001** | **.14** |
| Harshness | -.02 | -0.45 | .65 | -.02 |
| LES Maternal Changes | -.02 | -0.50 | .62 | -.02 |
| Unpredictability | .09 | 1.83 | .07 | .07 |
| Harshness | -.06 | -1.25 | .24 | -.05 |
| **General Depression** | **.24** | **4.96** | **<.001** | **.20** |
| Emotional Stability | -.07 | -1.36 | .17 | -.06 |
| LES Maternal Changes | -.01 | -0.27 | .78 | -.01 |
| Unpredictability | .09 | 1.81 | .07 | .07 |
| Harshness | -.06 | -0.89 | .37 | -.04 |
| **General Depression** | **.25** | **5.03** | **<.001** | **.20** |
| Emotional Stability  Sex | -.06  .04 | -1.28  0.99 | .20  .32 | -.05  .04 |
| **Racial minority status**  Ethnic minority status  Current income  Childhood income  age | **-.11**  -.01  .05  -.03  .01 | **-2.68**  -0.18  0.92  -0.39  0.29 | **.01**  .86  .36  .70  .78 | **-.11**  -.01  .04  -.02  .01 |

Note. N=637. Participant sex is coded 0=female, 1=male. Racial minority status compares Black/African American participants (coded 1) to other racial categories (coded 0). Ethnic minority status compares Hispanic (coded 1) to Non-Hispanic (coded 0).

Secondary analyses explored possible interactions between unpredictability and harshness. We added the interaction of those two variables (after centering both predictors) to the models that included disruptive maternal changes in childhood (LES scores), unpredictability and harshness, general depression and emotional stability/neuroticism, and all of the demographic factors. Unpredictability did not interact with harshness to predict general disinhibition (*B* = -.04, *t* = -0.88, *p* = .38, *partial r* = -.04), callous aggression (*B* = -.01, *t* = -0.13, *p* = .90, *partial r* = -.01), or substance use (*B* = -.07, *t* = -1.60, *p* = .10, *partial r* = -.07) – although it should be noted that the significance of the interaction for substance use was at trend levels, and is thus suggestive of a possible interaction.

In addition to possible moderating effects of harshness, we also explored possible moderating effects of participant sex. We added to the models described above an interaction term including participant sex and childhood unpredictability (both centered prior to calculating the interaction). Unpredictability did not interact with participant sex to predict general disinhibition (*B*=-.01, *t*=-0.32, *p*=.75, *partial* *r*= -.01), callous aggression (*B*=-.02, *t*=-0.63, *p*=.53, *partial* *r*= -.03), or substance use (*B*=-.03, *t*=-0.64, *p*=.52, *partial* *r*= -.03).

**Measures recorded**

*All studies*

* Perceptions of Childhood Unpredictability (Maranges et al., under review)
* Perceptions of Childhood Harshness (Maranges et al., under review)
* Adverse Childhood Experiences (ACEs; Felitti et al., 1998; Dube et al., 2003)
* Childhood income
* Current income
* Demographics

*Studies 1a-1c:*

* Biometric measures of life history outcomes
  + Age of menarche (women)
  + “Have you had sexual intercourse before?”
  + Age of sexual debut
  + Number of sexual partners (if any)

*Study 1a*

* 5-Trial Adjusting Delay Discounting Task (DDT; Koffarnus & Bickel, 2014)
* Balloon Analogue Risk-taking Task (BART; V1; Lejuez et al., 2002)
* Iowa Gambling Task (Bechara et al., 1994; Crone et al., 2003)

*Study 1b*

* 5-Trial Adjusting Delay Discounting Task (DDT; Koffarnus & Bickel, 2014)
* Biometric measures of life history outcomes, all mentioned above plus:
  + Age of adrenarche (men)
  + Number of children (if any)
  + Age at first childbirth

*Study 1c*

* Balloon Analogue Risk-taking Task (BART; V2; Lejuez et al., 2002)
* Biometric measures of life history outcomes, all mentioned above plus:
  + Age of adrenarche (men)
  + Number of children (if any)
  + Age at first childbirth

*Study 2:*

* Externalizing Spectrum Inventory-Brief Form (ESI-bf; Patrick et al., 2013)
* Inventory for Depression and Anxiety Symptoms (IDAS; Watson et al., 2007)
* The Personality Inventory for DSM-5-Brief Form (PID-5-BF; Anderson, Sellbom, & Salekin, 2018)
* McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003)
* Posttraumatic Stress Checklist for DSM-5 (PCL-5; Blevins et al., 2015)
* Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz et al., 2010)
* Liebowitz Social Anxiety Scale (LSAS; Baker et al., 2002)
* Autism Spectrum Quotient (AQ-10; Allison, Auyeung, & Baron-Cohen, 2012)
* Life Events Schedule (LES; ages 0-5; Egeland, Breitenbucher, & Rosenberg, 1980)
* Life Events Schedule (LES; ages 6-16; Egeland, Breitenbucher, & Rosenberg, 1980)
* Drug Abuse Screening Test (DAST-10; Skinner, 1982)
* Behavioral Risk Factor Surveillance (alcohol use)
* Behavioral Risk Factor Surveillance System (tobacco use)
* World Health Organization’s Alcohol Use Disorders Identification Test (AUDIT)
* CDC’s National Adult Tobacco Survey (NATS; cigarette smoking)
* CDC’s National Adult Tobacco Survey (NATS; e-cigarette smoking)