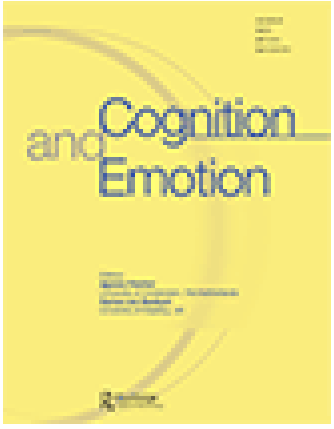

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Keep calm and carry on: Maintaining self-control when intoxicated, upset, or depleted

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Keep calm and carry on: Maintaining self-control when intoxicated, upset, or depleted

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ABSTRACT
This study tested within-person associations between intoxication, negative affect, and self-control demands and two forms of self-control failure, interpersonal conflict, and neglecting responsibilities. Effortful control was hypothesised to act as a buffer, reducing individual susceptibility to these within-person effects. In contrast, reactivity was hypothesised to potentiate the within-person associations. 274 young adults aged 18–27 (56% women, 93% white) completed experience sampling assessments for up to 49 days over the course of 1.3 years. Results indicated independent within-person effects of intoxication, negative affect, and self-control demands on the outcomes. Hypothesised moderating effects of reactivity were not supported. Effortful control did not moderate the effects of self-control demands as expected. However, effortful control exhibited a protective effect when individuals were intoxicated or upset to reduce the likelihood of maladaptive behavioural outcomes.

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Self-control; aggression; ecological momentary assessment; interpersonal conflict; self-regulation

The ability to control and direct behaviour in the service of short- and long-term goals is the cornerstone of adaptive functioning. In this regard, deficits in behavioural control are central to many forms of psychopathology, most notably forms of "externalising" problems such as antisocial personality disorder or substance use disorders (Krueger & South, 2009). Disinhibition is one of the "big-three" temperament factors (Watson, Stasik, Ro, & Clark, 2013), and trait models of self-control suggest that self-control develops via transactions between temperament and socio-environmental factors (Wills & Dishion, 2004). An alternative, or complementary, perspective to trait models of self-control emphasises variability in self-control across time and situation (Muraven & Baumeister, 2000). In this regard, self-control is considered a limited resource and failures in self-control are predicted by factors that deplete self-control resources (Muraven & Baumeister, 2000). The intersection of these two models suggests that trait self-control may act, in part, as a buffer making the individual resilient to acute factors that contribute to self-control failure (Dvorak & Simons, 2009). In the current paper, we examine whether trait self-control moderates daily associations between drinking, negative affect, and self-control demands and two outcomes, neglecting responsibilities and interpersonal conflict.

Trait self-control

Rothbart and Sheese (2007) define temperament as "constitutionally based individual differences in reactivity and self-regulation" (p. 332). In their model, "reactivity" and "self-regulation" are two broad individual difference domains that may be used to organise related constructs. These broad domains share a common theme with several models of self-regulation such as Lieberman's (2007) reflexive- and reflective- systems; Metcalfe and Mischel's

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(1999) hot and cool systems; and Strack and Deutsch's (2004) reflective and impulsive model. In this regard, "reactivity" reflects the speed, duration, and intensity of behavioural and emotional responses to stimuli. Though models differ in some details, underlying reactive processes are posited to be predominantly comprising subcortical functions (e.g., amygdala), are closely tied to emotion-based action tendencies, reflect simple associative processes, and are relatively fast acting (Hofmann, Friese, & Strack, 2009; Lieberman, 2007; Metcalfe & Mischel, 1999; Rothbart, Ahadi, & Evans, 2000; Rothbart & Sheese, 2007). In contrast, Rothbart's "self-regulation" domain is typified by effortful control. Effortful control is characterised by processes that are more deliberative, predominantly executive cortical functions, and facilitates constraint, planning, goal setting, and future orientation (Hofmann, Friese, & Strack, 2009; Lieberman, 2007; Metcalfe & Mischel, 1999; Rothbart & Sheese, 2007). Consistent with these broad domains of reactivity and effortful control, self-regulation is hypothesised to involve interactions between top-down deliberative mechanisms and bottom-up automatic processes (Gross, Sheppes, & Urry, 2011; Oettingen, Gollwitzer, Forgas, Baumeister, & Tice, 2009; Steinberg, 2008).

The influence of self-regulation traits on characteristic patterns of behaviour is believed to arise from several sources including active effects on the environment (e.g., situation selection), typical internal states (e.g., mood regulation or dysregulation), and effects on learning (e.g., acquired preparedness; Corbin, Iwamoto, & Fromme, 2011; McCarthy, Kroll, & Smith, 2001; Simons, Dvorak, & Lau-Barraco, 2009). Though self-regulation traits are relatively stable they can affect typical responses to state and situational factors that vary across time, and such person x situation interactions provide a mechanism by which stable traits affect behaviours that are constantly varying (Mischel & Shoda, 1995). Conversely, the prediction and understanding of behavioural events requires analysis of situational or state factors not only because of their status as stimuli in the stimulus–response relationship, but also because state factors (such as emotional arousal) may affect the functioning of core regulatory processes (Harmon-Jones, Gable, & Price, 2011; Lieberman, 2007; Ward et al., 2008). In this regard, within-person variability in behavioural modulation may be understood by examining situational or state factors that alter effective self-control (Hofmann & Friese, 2008; Mann & Ward, 2004; Muraven & Baumeister, 2000; Tice, Bratslavsky, & Baumeister, 2001).

Situational or state determinants of self-control failure

The resource model of self-control posits that self-control is a limited resource and failures of self-control are most likely when resources are depleted (Muraven & Baumeister, 2000). Much of the research on this model has utilised experimental methods to deplete resources. In addition, the effect of self-control demands has been assessed using experience sampling methods (ESMs). For example, Muraven, Collins, Shiffman, and Paty (2005) found that self-control demands during the day interfered with individuals' ability to limit drinking behaviour during the night. Notably, self-control demands did not directly affect drinking behaviour, but rather specifically moderated success in maintaining self-imposed limits.

Negative affect is another state factor that has been shown to contribute to self-control failure. For example, a series of experimental studies indicates that individuals prioritise mood repair over other self-control goals (Tice & Bratslavsky, 2000; Tice et al., 2001). When negatively aroused, individuals are more likely to engage in behaviour that violates self-control standards. However, this line of research suggests that self-control failure is not such that negative arousal has impaired self-control, but rather that individuals engage in dyscontrolled behaviour when they believe it will improve their mood (Tice & Bratslavsky, 2000; Tice et al., 2001). Alternatively, other models of impulsivity and self-control suggest that heightened negative affect may contribute to disinhibition more directly (Lieberman, 2007).

Finally, alcohol intoxication is associated with pharmacologically based deficits in inhibitory control (Assaad et al., 2006; Weafer & Fillmore, 2008) and, via effects on cognitive functioning, may contribute to behaviour that is determined more by current salient situational or state factors or implicit associations than more distal long-term interests (Steele & Josephs, 1990; Wiers, Beckers, Houben, & Hofmann, 2009). For example, intoxication is associated with increased aggressive behaviour (Pihl, Assaad, & Hoaken, 2003; Quinn, Stappenbeck, & Fromme, 2013; Wiers et al., 2009), sexual risk behaviour (George et al., 2009; Neal & Fromme, 2007), and reduced adherence to goals (Hofmann, Baumeister, Förster, & Vohs, 2012).

Current research

We tested predictors of two examples of self-control failure, neglecting responsibilities and interpersonal conflict. Attending to daily responsibilities requires self-direction, persistence, and motivation to maintain focus on goals. In contrast, interpersonal conflict, such as verbal arguments or physical confrontations, may result from failure to modulate social interactions effectively. At the within-person level (i.e., Level 1), we hypothesised independent positive associations between self-control demands and negative affect during the day and subsequent likelihood neglecting responsibilities and interpersonal conflict during the night. Intoxication during the night was similarly expected to be positively associated with the outcomes. For interpersonal conflict, this may reflect the effects of increased cue dependence or deficits in inhibitory control associated with intoxication. In the context of neglecting responsibilities, this may be better characterised as prioritising drinking over other responsibilities.

We hypothesised that effortful control would attenuate associations between the situational or state risk factors and self-control failure, whereas reactivity was expected to increase associations between the situational or state risk factors and the outcomes (Friese et al., 2009; Hofmann, Friese, & Roefs, 2009; Simons, Carey, & Wills, 2009; Wills, Pokhrel, Morehouse, & Fenster, 2011). At the between-subjects level (i.e., Level 2), effortful control was expected to be associated with fewer instances of interpersonal conflict and neglecting responsibilities (Dvorak, Simons, & Wray, 2011; Mezquita, Stewart, & Ruiperez, 2010; Simons, Dvorak, Batien, & Wray, 2010; Wills et al., 2012; Wills, Walker, Mendoza, & Ainette, 2006). Reactivity, in contrast, was expected to be associated with increased interpersonal conflict and failure to attend to daily responsibilities (Lejuez et al., 2010; Perry & Carroll, 2008; Simons, Carey, et al., 2009; Simons, Gaher, Oliver, Bush, & Palmer, 2005; Wills et al., 2011). Finally, consistent with previous research we examined interactions between effortful control and reactivity, hypothesising that effortful control would modulate the effects of reactivity (Wills et al., 2011).

Method

Participants

Participants were 274 undergraduate college students at two Midwest universities. The sample ranged from 18 to 27 years of age ($M = 19.88$, $SD = 1.37$). The sample was 56% female and was 93% white, 1% African-American, 1% Asian, 1% Native American, 1% Native Hawaiian/Pacific Islander, and 3% other race or did not respond; 3% of the sample were Hispanic. The sample demographic characteristics are comparable to the university populations, which have ~60% women and 6–14% ethnic minorities. Recruitment was conducted through e-mail notices and advertisements in local media. One previous manuscript with this sample has been published (Simons, Wills, & Neal, 2014). We report how we determined the sample, data exclusions, and measures in the study below.

Procedure

Undergraduates between ages 18 and 25 years old who drank at least moderately (i.e., ≥12 drinks/week for women and ≥16 drinks/week for men; Sanchez-Craig, Wilkinson, & Davila, 1995) were invited to participate in the ESM study. Invited participants provided informed consent for the study, completed a set of baseline questionnaires, and were then trained in the use of the PDA (personal digital assistant). Palm handhelds were programmed with PMAT software (Weiss, Beal, Lucy, & MacDermid, 2004), modified by Joel Swendsen and National Center for Scientific Research (CNRS), France. The program was configured to prompt participants to complete brief ~2-minute assessments at 8 random times within 2-hour blocks between 10:00 am and 12:00 midnight. In addition, participants completed a self-initiated assessment each morning shortly after waking, which included assessments of previous night interpersonal conflict not likely to be captured by the random prompts (e.g., assault). In the evening (~5 pm), participants completed a self-initiated assessment that included the self-control demands items. The experience sampling occurred in six measurement bursts (Sliwinski, 2008) over the course of three semesters. Burst 1 was two weeks long and bursts 2–6 were one week each (i.e., 7 weeks total). The design has two advantages over a traditional experience sampling design. First, it captures 49 days of experience sampling while reducing the potential fatigue associated with doing experience sampling over 49 consecutive days. Second, it samples behaviour over a more prolonged interval (e.g., roughly 1.33 years versus 49 days in this case). Additional detail is in Simons et al. (2014). In addition to the measures reported here, the experience sampling assessed additional variables of interest,

including positive affect, marijuana use, alcohol dependence symptoms, and other conduct problems.

Measures

Baseline measures

Effortful control (*planfulness*) was defined by three indicators: (1) A 7-item measure of planfulness (Kendall & Williams, 1982), (2) a 6-item measure of problem-solving (Wills, Cleary, et al., 2001), and (3) a 10-item goal-setting scale (Short Self Regulation Questionnaire (SSRQ): Neal & Carey, 2005). Items were rated on 5-point anchored rating scales and the mean of the three standardised indicators was used in the analyses. The measure had good internal consistency ($\alpha = .80$).

Reactivity *(impulsiveness)* was defined by four indicators: (1) 5 items from the Eysenck impulsivity scale (Eysenck, Pearson, Easting, & Allsopp, 1985), (2) a 7-item motor impulsivity subscale (Patton, Stanford, & Barrett, 1995), (3) an 8-item attention impulsivity scale (Patton et al., 1995), and (4) a 6-item measure of distractibility (Kendall & Williams, 1982). Items were rated on 5-point anchored rating scales and the mean of the four standardised indicators was used in the analyses ($\alpha = .80$).

Experience sampling measures

Negative affect. Negative affect in the previous 30 minutes was assessed by items from subscales of the PANAS-X (Watson & Clark, 1994) and Larsen and Diener's affect circumplex model (Larsen & Diener, 1992). Cronbach's alphas were calculated for one signal per person on one day in each burst. We report the mean of the six estimates. Negative affect was assessed by nine items reflecting sadness, anxiety, and anger: sad, blue, downhearted, nervous, jittery, anxious, angry, hostile, irritable ($\alpha = .80$). Items were rated on 7-point scales ranging from 1 = not at all to 7 = extremely. Previous research supports the internal consistency and criterion validity of these and comparable affect scales assessed by experience sampling (Armeli et al., 2003; Csikszentmihalyi & Larson, 1987; Simons et al., 2010; Simons et al., 2005). Daytime affect was defined as the person's mean across signals between 10 am and 5 pm.

Self-control demands. Self-control demands were assessed by six items completed during the evening assessment. Items were rated on 7-point scales ranging from 1 = not at all to 7 = extremely. Participants rated the extent to which they had to regulate their moods, control their thoughts, deal with stress, or felt overwhelmed that day (Muraven et al., 2005). Two additional items designed for this study assessed the extent to which the participant had to force themselves to do something they did not want to do and the extent to which they forced themselves to not do something they wanted to do. Cronbach's alpha for the 6-item scale was .85.

Alcohol intoxication. Intoxication was assessed by random *in situ* assessments of number of drinks consumed in past 30 minutes (0–6 or more), an estimate of Blood Alcohol Concentration (BAC) (Matthews & Miller, 1979) derived from next morning assessments of total number of drinks (0–25) and hours spent drinking (0–18), and perceived intoxication assessed the next morning (1–7 scale). Hence, alcohol intoxication was derived from 3 daily measures: (1) total number of drinks assessed via experience sampling, (2) an estimate of BAC derived from each retrospective morning report of total drinks, hours spent drinking, participant gender, and weight, and (3) morning reports of perceived intoxication the previous night. The standardised mean of the variables was the estimate of intoxication for each night ($\alpha = .83$).

Interpersonal conflict. Interpersonal conflict was assessed by a combination of *in situ* random assessments and retrospective morning assessments. The items assessed the occurrence of both verbal arguments and physically assaulting someone. The *in situ* random assessments asked if the person had "gotten in an argument or fight in the last 30 minutes." The morning assessment asked (1) "Did you get in a verbal (not physical) argument or fight with someone last night?" and (2) "Did you physically assault anyone last night?" The outcome for the analysis was a dichotomous indicator of endorsing any of the above items for each night.

Neglecting responsibilities. Neglecting responsibilities was assessed by a single item in the *in situ* random assessments. This was defined in the training as not attending to things they were supposed to be doing (e.g., studying, responsibilities of daily living, etc.). The outcome was a dichotomous indicator of endorsing neglecting responsibilities at any of the random assessments during the night.

Results

Attrition and response analysis

Of 274 participants initially enrolled, 11 were dropped due to poor compliance with the protocol (i.e., did not

complete at least 7 days of assessments with a response rate of >33%), resulting in an analytic sample of 263. The participants in the analysis sample completed on average 79% of the random prompts (25th percentile—Median—75th percentile: 71%–83%–89%), 96% of the morning assessments, and 86% of the evening assessments, a good rate of compliance with the protocol (cf. Piasecki et al., 2011; Shiffman, 2009; Stone & Shiffman, 2002). The mean number of assessment days per participant was 36.36 ($SD = 13.91$). See Simons et al. (2014) for additional detail.

Descriptive statistics

Participants reported interpersonal conflict on 9.9% of the days and neglecting responsibilities on 23.63% of the days. Morning assessments differentiated physical assault and verbal arguments. Of these, physical assault was reported on 0.67% of the days. We calculated the percent of variance at the within- and between- person level following the procedures of (Snijders & Bosker, 1999). For interpersonal conflict, 21.5% of the variance was between- and 78.5% within-person. For neglecting responsibilities, 41.4% of the variation was between- and 58.6% within-person. Participants drank on 27% of the study days and reported drinking an average of 4.73 ($SD = 3.95$) drinks per drinking day. Table 1 contains descriptive statistics. Between-person correlations are in Table 2.

Confirmatory factor analysis

We first tested a confirmatory factor analysis (CFA) of the trait (i.e., between subjects) effortful control and reactivity indicators. The model was tested in Stata 13 with maximum likelihood estimation (StataCorp, 2013). A one-factor model was a poor fit to the data $\chi^2(14, N = 263) = 97.79$, $p < .001$; root mean square error of approximation (RMSEA) = .15 90% confidence interval (CI) (.12, .18); Comparative Fit Index (CFI) = .88. In contrast, the hypothesised two-factor model was a good fit to the data $\chi^2(13, N = 263) = 28.13$, $p = .009$; RMSEA = .07 90% CI (.03, .10); CFI = .98. The two-factor model fit significantly better than the one-factor model $\Delta\chi^2(1, N = 263) = 69.66$, $p < .0001$. Inspection of the modification indices suggested allowing the measurement errors of the Eysenck impulsivity indicator and motor impulsivity indicator to covary. Freeing this error covariance resulted in an improved final model $\chi^2(12, N = 263) = 16.57$, $p = .166$; RMSEA = .04 90% CI (.00, .08); CFI = .99. The respective scale means were used in the multilevel regression analyses.

Multilevel regression analyses

We conducted multilevel logistic regression analyses in Stata 13 (StataCorp, 2013). Intoxication, daytime negative affect, and self-control demands were within-person (i.e., Level 1) predictors and centred at the person-mean. Effortful control, reactivity, and gender were between-person (i.e., Level 2) predictors and centred at the grand-mean. In each model, we first tested for significant random variation in the L1 slopes (i.e., within-person effects) prior to estimating the full models. For the interpersonal conflict analysis, all of the slopes were fixed. For the neglecting responsibilities analysis, intoxication and self-control demands were random and negative affect was fixed. In the neglecting responsibilities analysis, none of the effortful × reactivity interaction effects were significant and hence they were dropped from the model. For the interpersonal conflict analysis, there was a significant effortful control by reactivity interaction predicting the self-control demand slope and hence the interactions on the intercept and self-control demands slope were retained. Indicators for day of the week and university were included as covariates at level 1 and 2, respectively.

Table 1. Descriptive statistics.

	M (*SD*)	Range	Skew
Interpersonal conflict	0.10 (0.29)	1 (yes)/0 (no)	
Neglecting responsibilities	0.24 (0.42)	1 (yes)/0 (no)	
Negative affect	1.49 (0.63)	1.00–6.89	2.23
Alcohol intoxication	−0.01 (0.87)	−0.53 to 8.13	2.17
Self-control demands	2.65 (1.22)	1.00–7.00	0.72
Effortful control	0.00 (0.79)	−2.06 to 2.02	0.29
Reactivity	0.00 (0.85)	−2.63 to 1.98	−0.27
Gender		115M/148W	
Age	19.88 (1.37)	18–27	1.31

Notes: $N = 263$ for gender, age, effortful control, and reactivity variables. *N*'s range from 8715 to 9435 for L1 variables.

Table 2. Between-person correlations.

	1	2	3	4	5	6	7	8	9
1. Interpersonal conflict	–								
2. Neglecting responsibilities	.23	–							
3. Intoxication	.12	.03	–						
4. Negative affect	.22	.33	.04	–					
5. Self-control demands	.21	.34	.01	.62	–				
6. Effortful control	.04	−.01	−.19	.01	.04	–			
7. Reactivity	.01	−.06	.15	.08	.06	−.58	–		
8. Gender	−.01	−.10	.18	−.14	−.19	−.07	−.08	–	
9. University	.00	.06	.13	−.03	−.06	−.07	−.01	.18	–

Notes: $N = 263$. $r \geq |.13|$, $p < .05$. Gender is coded 0 = women, 1 = men. Interpersonal conflict, neglecting responsibilities, intoxication, negative affect, and self-control demands are the person-means across the days.

As shown in Table 3, intoxication, negative affect, and self-control demands were each significantly associated with the likelihood of interpersonal conflict. As hypothesised, effortful control attenuated the association between intoxication and interpersonal conflict. Interactions in non-linear models may be understood as multiplicative effects (Buis, 2010). Hence, the odds ratio (OR) of 0.81 for the interaction between effortful control and intoxication indicates that for every unit increase in effortful control, the association between intoxication and interpersonal conflict declines by 19% (or a 16% decrease per *SD* increase in effortful control). The interaction is depicted in Figure 1. Data are graphed across the full range of scores. However, it should be noted that there are few cases in the upper tail and hence extrapolating the expected probabilities should be done with caution. An alternative decomposition of the interaction is depicted in Figure 2. Effortful control had a significant inverse association on likelihood of interpersonal conflict only when individuals became more intoxicated. In addition, the interaction between effortful control and reactivity predicted the self-control demands slope. This interaction was different in form than expected and is depicted in Figure 3. The effect of self-control demands on interpersonal conflict was greatest among those with elevated levels of both

Table 3. Mixed effects logistic models of interpersonal conflict and neglecting responsibilities.

	Interpersonal conflict			Neglecting responsibilities		
	OR	SE	*p*-Value	OR	SE	*p*-Value
Intercept model						
Intercept	0.07	0.01	<.001	0.25	0.03	<.001
Gender	1.00	0.17	.986	0.68	0.15	.081
Reactivity	1.18	0.15	.206	0.90	0.15	.524
Effortful control	1.16	0.14	.230	0.86	0.14	.338
RE × EC	1.02	0.11	.785			
Intoxication slope						
Intercept	1.87	0.09	<.001	1.25	0.07	<.001
Gender	1.10	0.09	.249	1.22	0.12	.047
Reactivity	0.91	0.06	.179	1.07	0.09	.370
Effortful control	0.81	0.05	.002	1.03	0.08	.696
Negative affect slope						
Intercept	1.26	0.11	.007	1.10	0.08	.163
Gender	0.77	0.14	.130	0.97	0.15	.866
Reactivity	0.97	0.12	.790	0.91	0.10	.364
Effortful control	0.91	0.12	.454	0.81	0.08	.043
SC demands slope						
Intercept	1.24	0.06	<.001	1.11	0.05	.033
Gender	1.04	0.10	.638	1.02	0.09	.803
Reactivity	1.03	0.07	.722	0.98	0.07	.710
Effortful control	1.07	0.08	.345	1.03	0.07	.665
RE × EC	1.15	0.06	.011			

Notes: 263 persons. University and six orthogonal day-of-week indicators were included, none of which were significant in the interpersonal conflict analysis. For the neglecting responsibilities analysis, Friday and Saturday were associated with reduced neglecting responsibilities relative to Sunday. 8088 for the interpersonal conflict analysis (Mean Obs. per group = 30.8), Wald $\chi^2(24) = 316.93$, $p < .0001$. 8010 observations in the neglecting responsibilities analysis observations (Mean Obs. per group = 30.5), Wald $\chi^2(22) = 118.54$, $p < .0001$.
RE = reactivity, EC = effortful control.

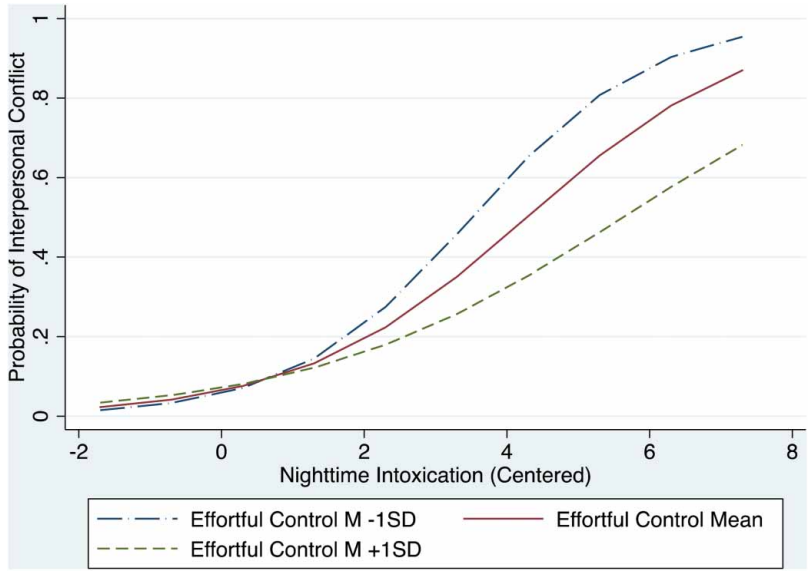

Figure 1. Within-person associations between intoxication and interpersonal conflict as a function of effortful control.
Note: Night-time intoxication is person-mean centred.

effortful control and reactivity. The other hypothesised cross-level interactions were not significant. Contrary to hypothesis, none of the between-person constructs had significant main effects on the likelihood of interpersonal conflict. However, given the cross-level interactions, these effects are conditional upon Level 1 variables.

As shown in Table 3, intoxication and self-control demands both were significantly associated with the likelihood of neglecting responsibilities. As hypothesised, effortful control attenuated the association between negative affect and neglecting responsibilities. Consistent with the moderation effect on intoxication described earlier, the association between

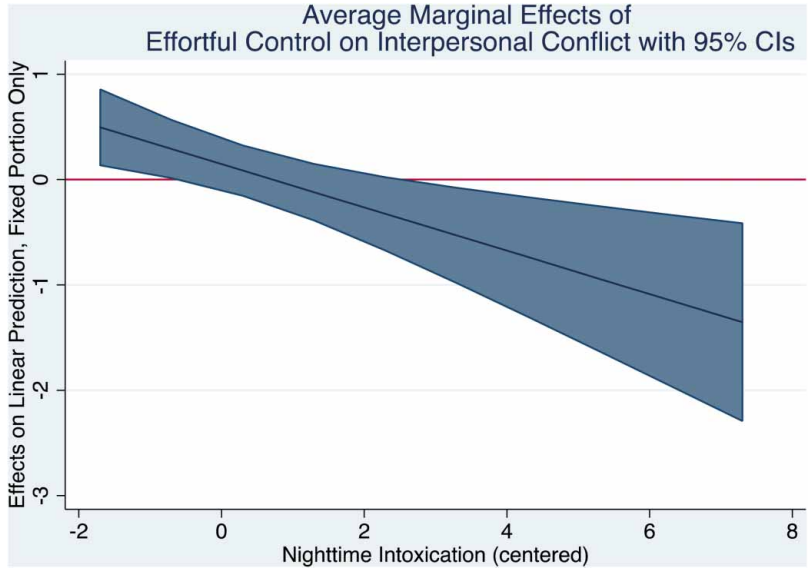

Figure 2. Marginal effects of effortful control on interpersonal conflict as a function of night-time intoxication.
Notes: Effects of effortful control are significant in regions that the 95% confidence band does not overlap the 0 as indicated by the red reference line. Night-time intoxication is person-mean centred.

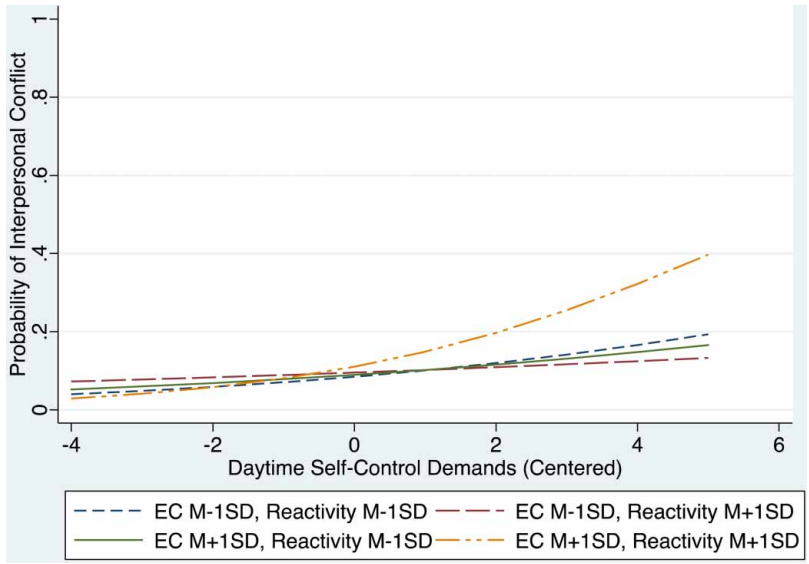

Figure 3. Within-person associations between daytime self-control demands and night-time interpersonal conflict as a function of effortful control and reactivity.
Note: Daytime self-control demands are person-mean centred.

negative affect and neglecting responsibilities decreased by 19% for every unit increase in effortful control (or a 16% decrease per *SD* increase in effortful control. The interaction is depicted in Figure 4. An alternative decomposition of the interaction (Figure 5) indicates the conditional effect of effortful control on neglecting responsibilities as a function of daily variation in negative affect. Effortful control was inversely associated with neglecting responsibilities as daytime negative affect increased. Hence, individual differences in effortful control were apparent only when increased negative affect required exercising effortful control to maintain focus on goal attainment. In addition, there was a significant interaction

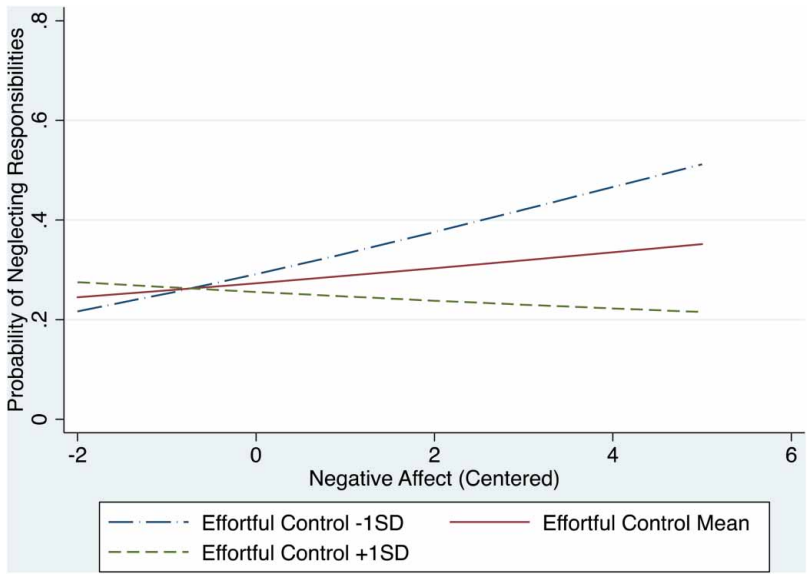

Figure 4. Within-person associations between daytime negative affect and night-time neglecting responsibilities as a function of effortful control.
Note: Daytime negative affect is person-mean centred.

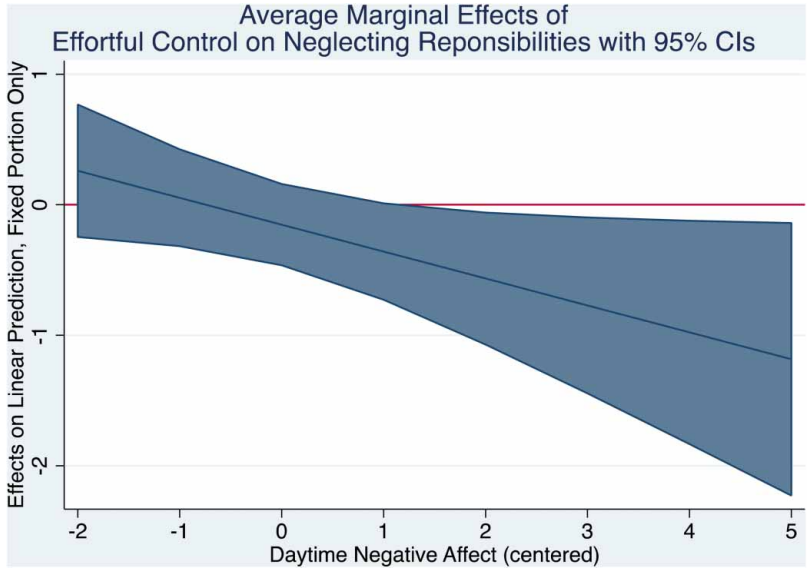

Figure 5. Marginal effects of effortful control on neglecting responsibilities as a function of daytime negative affect.
Notes: Effects of effortful control are significant in regions that the 95% confidence band does not overlap the 0 as indicated by the red reference line. Daytime negative affect is person-mean centred.

between gender and intoxication predicting neglecting responsibilities (OR = 1.22, $p = .047$). The association between intoxication and neglecting responsibilities was stronger for men (OR = 1.39, $p < .001$) than women (OR = 1.14, $p = .089$). Contrary to hypothesis, none of the between-person constructs had significant effects on the likelihood of neglecting responsibilities intercept.

Discussion

The current study tested within-person associations of alcohol intoxication, negative affect, and self-control demands, and two forms of self-control failure, interpersonal conflict and neglecting responsibilities. The hypothesised within-person effects were largely supported. There was mixed support for the hypothesised buffering effects of effortful control. The expected moderating effects of reactivity, in contrast, were largely not supported. These findings are discussed below.

Interpersonal conflict and neglecting responsibilities

This research incorporated a range of predictors and outcomes at the daily level to advance understanding of factors contributing to daily variation in effective self-control. Interpersonal conflict occurred on less than 10% of the study days and fully 78% of the variance existed at the within-person level. This is consistent with the premise that although there are meaningful between-person differences in the ability to effectively manage interpersonal interactions, conflict occurs largely due to situational factors or intrapersonal states that are varying across time. In this regard, interpersonal conflict may reflect brief and infrequent perturbations in an otherwise adaptive pattern of interpersonal functioning. In contrast, neglecting responsibilities occurred relatively frequently, on nearly 25% of the study days, and the variance was more evenly distributed across level, with 41% of the variance between- and 59% within- person. We note that these estimates are based on the current sample and may vary in different populations or time samples. Participant reports of neglecting their responsibilities may reflect a somewhat fluid reprioritisation of activities across the day (e.g., "I can get to that tomorrow"). Interpersonal conflict may be a better example of failure to control behaviour effectively whereas neglecting responsibilities is a mixture of taking the responsibility on in the first place and later efforts to prioritise it in the face of competing activities.

Within-person effects of intoxication

Alcohol intoxication was significantly associated with both interpersonal conflict and neglecting

responsibilities. The effects on interpersonal conflict are consistent with previous experimental (Giancola, 2004; Stappenbeck & Fromme, 2013) and daily process (Neal & Fromme, 2007; Quinn et al., 2013) research on aggression. The observed relationship may represent the effects of alcohol on cognitive processing (Moss & Albery, 2009; Steele & Josephs, 1990). Impaired cognitive processes when intoxicated may undermine individuals' ability to effectively monitor the effects of their behaviour on others, may increase the reactivity to perceived social threats as they are unable to appreciate the larger context, or increase socially inappropriate behaviour because they are unable to consider long-term consequences and standards of conduct. Alternatively, effects could also be explained by the decreased inhibitory control associated with alcohol intoxication (Miller & Fillmore, 2013), such that alcohol impairs the ability to inhibit maladaptive responses that may contribute to conflict, for example, expressions of anger.

In the case of neglecting responsibilities, this relationship may reflect prioritising drinking over other responsibilities. That is, individuals may be neglecting responsibilities in order to drink rather than neglecting responsibilities because they are drinking. In the current design, intoxication and the outcome variables covary at the within-person level, but whether drinking precedes, follows, or co-occurs with the outcomes is not specified. Alternatively, the association could reflect effects of alcohol on cognitive processing and inhibitory control as discussed above. Indeed, Hofmann et al. (2012) found that intoxication impaired individual efforts to resist temptation. Sober participants were relatively successful in resisting desire, but as intoxication increased, individuals were more likely to engage in a variety of tempting behaviours despite efforts to resist.

Within-person effects of self-control demands

The resource model of self-control (Muraven & Baumeister, 2000) posits that each act of self-control draws upon a finite resource responsible for such acts and failures in self-control are most likely to occur when this resource has been depleted. In this regard, self-control refers to the capacity to alter one's responses such that individuals forgo short-term reinforcement, instead selecting behaviours which promote attainment of long-term rewards (e.g., good health, maintaining friendships, etc.; Mead, Alquist, & Baumeister, 2010). As hypothesised, the results indicated that daytime self-control demands had significant positive associations with both neglecting responsibilities and interpersonal conflict. These findings suggest that the degree to which one's daily life requires exertion of self-control is associated with a compromised ability to effectively modulate social interactions and maintain goal-directed behaviour later that same day. From this perspective, the magnitude of daily self-control demands represents a corresponding depletion of self-control resources, increasing likelihood of future self-control failure, similar to those observed under experimental conditions (e.g., Christiansen, Cole, & Field, 2012; Dvorak & Simons, 2009). There has been limited previous research utilising experience sampling or related daily process methods to assess the effects of self-control demands on behaviour. In this regard, Muraven et al. (2005) demonstrated that self-control demands were associated with an increased likelihood of violating self-imposed drinking limits. The current study extends this research by demonstrating effects of self-control demands during the day on both the likelihood of interpersonal conflict and neglecting responsibilities the subsequent night.

Within-person effects of negative affect

As hypothesised, daytime negative affect was significantly associated with interpersonal conflict that evening. However, the marginal effect of negative affect on neglecting responsibilities was not significant. Negative affect prompts emotion regulation, which has been shown to draw on the limited reservoir of domain-general resources supporting acts of self-control (McCarthy, Curtin, Piper, & Baker, 2010; Shiffman, 2005). That is, attempts to manage negative emotions may deplete resources that are needed for future acts of self-control (Martínez-Íñigo, Poerio, & Totterdell, 2013). Alternatively, from a dual-process model perspective, heightened negative arousal is expected to reduce reflective processing and enhance reflexive processing, contributing to impaired deliberative control (Lieberman, 2007). Hence, the effects of negative affect may be viewed as a function of negative affect either impairing self-control related cognitive processes or depleting self-control resources. That being said, the average marginal effect of negative affect was significant for the interpersonal conflict but not the neglecting responsibilities model. Hence, the increase in interpersonal conflict on days when negatively aroused may

be viewed "simply" as a manifestation of the negative mood state. That is, the individual is sad, irritable, and anxious (i.e., upset) and interpersonal conflict may reflect the expression of these emotional states. This may be a direct expression of the emotional action state (Frijda, 2010), as an angry individual may be more likely to lash out towards others either verbally or physically. Alternatively, negative emotions may engender interpersonal conflict in a manner consistent with stress-generation models of depression (Liu & Alloy, 2010). Hence, the effects of negative affect on interpersonal conflict may be viewed more as a direct effect of emotion rather than an indirect one via impaired self-control.

Between-person and cross-level effects

Consistent with hypothesis, effortful control reduced the association between intoxication and interpersonal conflict as well as between negative affect and the likelihood of neglecting responsibilities. The buffering effect of effortful control on associations between intoxication and interpersonal conflict is consistent with laboratory research indicating significant associations between intoxication and aggression only among those low in executive cognitive functioning (Giancola, 2004) and with field research showing a buffering effect of self-control on drug use in response to stressful life events (Wills, Ainette, Stoolmiller, Gibbons, & Shinar, 2008). We extend this to demonstrate buffering effects in an experience sampling study in the natural environment with a broader and more ecologically valid outcome than the analogue shock paradigm utilised in the laboratory. In addition, our results suggest that this effect extends to women as well as men, contrary to the results of Giancola (2004).

The effect of negative affect on neglecting responsibilities was conditional upon levels of effortful control as hypothesised. As shown in Figure 4, individuals low in effortful control responded to increases in negative affect during the day by neglecting responsibilities at night, essentially temporarily abandoning long-term goals. This effect is consistent with research indicating that individuals prioritise mood repair over self-control goals (Tice & Bratslavsky, 2000; Tice et al., 2001). When experiencing heightened negative affect during the day, the individual may shift priorities away from pre-existing responsibilities towards activities designed to alleviate dysphoric affect. Interestingly, however, this effect was evident only among those with poor effortful control. Among those high in effortful control, the reverse was seen. Individuals with good effortful control appeared to respond to increases in negative affect with renewed focus on attending to their responsibilities, a seemingly highly adaptive response.

The interaction between effortful control and negative affect highlights another interesting interpretation of the data. The resource model of self-control emphasises the role of situational factors in determining changes in self-control success over time. Similarly, dual-process models suggest that situational factors such as negative arousal can affect behaviour, in part, by impairing effortful control (Lieberman, 2007). If situational factors temporarily diminished the effects of trait self-control, one should observe an overall effect of self-control on the intercept and then, as intoxication or negative affect increase, they should act to attenuate the effect. However, as seen in Figures 2 and 5, these data are not consistent with this interpretation. Effortful control exhibits an inverse association with the outcomes only as intoxication or negative affect increase. Indeed, neither reactivity nor effortful control, exhibited significant main effects on the likelihood of interpersonal conflict or neglecting responsibilities. Effects of effortful control were evident only when the person was taxed, so to speak. Individual differences in effortful control become apparent only on days when situational factors are acting to increase the likelihood of maladaptive behaviour.

Results of a previous experience sampling study suggested that self-control acts to pre-emptively reduce the likelihood of "temptations" rather than improving resistance to temptations, a main-effect finding (Hofmann et al., 2012). Hence, this differs from the current findings regarding moderating effects of self-control. The current study focused on a narrower range of indicators of self-control failure and focused on behavioural predictors of self-control failure rather than aspects of desire strength and resistance. Interpersonal conflict is not a desired behaviour or "temptation" like those studied by Hofmann and colleagues. However, neglecting responsibilities may be related to giving in to competing desires as studied by Hofmann and colleagues. Given the considerable differences between the studies, it is difficult to compare findings. Nonetheless, our results argue that effortful control does act to buffer against factors contributing to self-control failure and while effortful control may indeed help

individuals avoid temptations, it also acts to help individuals remain in control when situational demands pose the greatest risks. This conclusion is necessarily qualified by the fact that support for the hypothesised buffering effects was limited to 2 of the potential 6 within-person effects studied. The pattern of significant and null findings in respect to the buffering effects of self-control may be attributable to statistical issues (i.e., greater difficulty for demonstrating moderation compared to main-effect relationships) or could be indicative of which within-person associations truly reflect failure of self-control. Further research in natural environments is needed to determine which outcomes are due to transient decrements in self-control.

The interaction between effortful control and reactivity moderated the association between daily self-control demands and interpersonal conflict. This interaction was not of the expected form, as it was expected that the lowest levels of effortful control and highest levels of reactivity would result in the strongest associations between self-control demands and interpersonal conflict (Wills et al., 2011). One possible explanation for this result, though speculative, is that this may reflect the combined effects of frustration and reactivity. Individuals high in effortful control may find unusually high self-control demands as reflecting interference with goal-directed activity resulting in irritability and interpersonal conflict among those with concomitant high reactivity. Given that the interaction between effortful control and reactivity did not affect the other within-person effects on interpersonal conflict nor was associated with the neglecting responsibilities outcome the substantive importance of this finding is unclear.

Finally, it should be noted that neither effortful control nor reactivity exhibited main effects as hypothesised for these outcomes. In addition, hypothesised moderating effects of reactivity were not supported. The reasons for these null findings are unclear. Impulsiveness may tend to affect outcomes regardless of current demand level. Also, from a statistical standpoint the effortful control and reactivity constructs were more highly correlated in this population of heavy drinkers than is typically seen in general populations (Wills et al., 2006) and this may have influenced the results. Furthermore, for both outcomes in this experience sampling study the majority of the variance existed at the within-person level. This may have reduced the likelihood of identifying significant between-person predictors.

Limitations

Limitations of the present study should be noted. First, the sample was predominantly White college students. Thus, these findings may not generalise to other more diverse community or clinical populations. Future research is needed to examine similar relationships in these populations. In addition, although the current design examines functional relationships between effortful control, reactivity, situational risk factors, and self-control failure, causal inferences regarding these associations cannot be made with this non-experimental design. Finally, although the pattern of results supports many of the hypotheses, there are a number of null findings. For example, effortful control and reactivity exhibited moderate associations with drinking in the bivariate analysis, however, neither predicted mean levels of conflict, neglecting responsibilities, nor self-control demands. The relatively small sample at the within- and between- person level may have resulted in limited power to detect cross-level interactions. The significant within-person effects of self-control demands provide some evidence of construct validity and the scale exhibited good internal consistency. However, this is a difficult construct to operationalise in this type of research. Individual responses are inherently a mixture of objective events (e.g., exercising, studying) and perceptions of events (e.g., not wanting to do the behaviour, feeling overwhelmed). This difficulty mirrors those noted for measures of perceived stress (Cohen, Kessler, & Gordon, 1995).

Summary

Daily fluctuations in drinking, negative affect, and demands on self-control resources predicted transient increases in the likelihood of interpersonal conflict and neglecting responsibilities. The pattern of within-person effects of intoxication and self-control demands is consistent with several models of self-control, indicating that situational factors may increase the likelihood of self-control failure either by depleting resources or impairing cognitive processes necessary for adaptive control. The within-person effects of negative affect, in contrast, may be best understood as either direct effects of mood states on interpersonal conflict or efforts to prioritise mood repair over other responsibilities. Effortful control acted as a buffer, reducing the association between intoxication and interpersonal conflict as

well as between negative affect and neglecting responsibilities. However, reactivity did not moderate the within-person effects as hypothesised. Neither effortful control nor reactivity predicted the outcomes at the between-person level. The pattern of significant interactions was such that rather than situational factors temporarily impairing expression of the effortful control trait, individual differences in effortful control became evident only when situational demands made it difficult to keep calm and carry on.

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