



The Influence of Attachment Style, Self-protective Beliefs, and Feelings of Rejection on the Decline and Growth of Trust as a Function of Borderline Personality Disorder Trait Count

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Abstract

Borderline personality disorder (BPD) is associated with paradoxical trust behaviours, specifically a faster rate of trust growth in the face of trust violations. The current study set out to understand whether attachment style, self-protective beliefs, and feelings of rejection underpin this pattern. Young adults ($N=234$) played a 15-round trust game in which partner cooperation was varied to create three phases of trust: formation, dissolution, and restoration. Discontinuous growth modelling was employed to observe whether the effect of BPD trait count on trust levels and growth is moderated by fearful or preoccupied attachment style, self-protective beliefs, and feelings of rejection. Results suggest that the slower rate of trust formation associated with BPD trait count was accounted for by feelings of rejection or self-protective beliefs, both of which predicted a slower rate of trust growth. The faster rate of trust growth in response to trust violations associated with BPD trait count was no longer significant after self-protective beliefs were accounted for. Interventions targeting self-protective beliefs and feelings of rejection may address the trust-based interpersonal difficulties associated with BPD.

Keywords Borderline personality disorder · Trust · Cooperation · Attachment style · Rejection · Social cognition

Relational disturbances are a hallmark feature of borderline personality disorder (BPD) and are present among subclinical populations (Tolpin et al., 2004), persisting even after symptoms remit (Zanarini et al., 2010). Individuals with BPD tend to have intense relationships marred by conflict, instability, and rupture (Bouchard et al., 2009; Clifton et al., 2007; Lazarus et al., 2020). Aberrant trust processes have been proposed as a contributor to impaired interpersonal functioning in BPD (Poggi et al., 2019). Trust behaviours have been examined using behavioural economic experimental paradigms such as the trust game (Berg et al., 1995). Evidence suggests that in these trust game interpersonal exchanges, BPD is associated with reduced cooperation (King-Casas et al., 2008) and increased mistrust (Unoka et

al., 2009), even when engaging with a cooperative partner (Abramov et al., 2020; Liebke et al., 2018).

Currently, very little is known about the mechanisms that underpin the trust practices of individuals with BPD. Individuals with BPD typically develop mistrustful models of others, endorsing beliefs that others will betray, exploit, and deceive (Barazandeh et al., 2016; Bhar et al., 2008). As such, trust behaviours among individuals with BPD may be modulated by these beliefs. There is also growing evidence that situations or states which typically promote prosocial behaviours appear to have a paradoxical effect among individuals with borderline pathology (Abramov et al., 2020; Ebert et al., 2013; Liebke et al., 2018). For example, individuals with BPD appear to engage in less trusting behaviours following social acceptance than following social rejection (Liebke et al., 2018), suggesting rejection experiences may play a mechanistic role in trust processes in BPD. More recently, evidence suggests individuals who endorse many BPD symptoms appear to withhold trust when engaging with a partner whose actions appear trustworthy and cooperative, yet make more trusting gestures when that partner becomes uncooperative (Abramov et al., 2020). A similarly

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paradoxical effect was observed among individuals with BPD who compared to controls, appeared to become less trusting following administration of the neuropeptide oxytocin, known for its prosocial effects on behaviour and used by researchers to activate the attachment system (Ebert et al., 2013), highlighting the potential role of attachment disturbance in modulating trust behaviours among individuals with BPD. The current study aims to understand the mechanisms underpinning the paradoxical trust behaviours associated with BPD by examining whether attachment style, self-protective beliefs, and feelings of rejection moderate the effects of BPD trait count on trust behaviours in response to cooperative and uncooperative partner play in a social exchange.

A brief overview of the trust game will be provided followed by a detailed rationale for the relationship between the study variables, BPD, and trust. In the trust game, trust is operationalized as the proportion of a monetary endowment (monetary units, MU) an individual, known as the *trustor*, is willing to entrust to an anonymous party, the *trustee* (Berg et al., 1995). The amount sent is multiplied by a factor before being received by the trustee who then has the option of returning a proportion to the trustor, which may result in a loss or profit to the trustor. Previous research has used the trust game to examine trust as a dynamic phenomenon whereby trustee reciprocity (trustworthiness) has been modified to create phases of trust (e.g., Abramov et al., 2020; Audrey Korsgaard et al., 2018; Fulmer & Gelfand, 2013; Liebke et al., 2018). Specifically, these are *trust formation* (initial stage of trust game where trustee reciprocity is held at levels that incur no loss and potential gain to the trustor), *trust dissolution* (trustee reciprocity results in loss to the trustor, constituting a violation of trust), and *trust restoration* (trustee reciprocity returns to pre-violation levels, constituting gestures of trust reparation).

Attachment Style and Trust

The socially atypical vicissitudes in trust associated with borderline pathology can be understood through the lens of attachment theory (Bowlby, 1969, 1973, 1980). Aetiological models of BPD suggest it is a disorder that in part stems from attachment disturbances arising from suboptimal, adverse, or invalidating caregiver experiences (Fonagy et al., 1995; Gunderson & Lyons-Ruth, 2008; Linehan, 1993). Interpersonal trust involves the belief that a person cares about one's needs and can be depended upon (Rempel et al., 1985) and securely attached individuals believe that significant others will be available, caring, and responsive, leading Mikulincer (1998) to conclude that trust is an integral tenet of secure attachment. The adult attachment styles associated

with BPD are fearful-avoidant attachment, and to a lesser extent, anxious-preoccupied attachment (Agrawal et al., 2004). Both styles endorse a negative model of the self in terms of personal insecurity, but those endorsing a more preoccupied style seek intimacy and connection while those endorsing a fearful attachment style avoid or find it difficult to become close to and dependent on others (Bartholomew & Horowitz, 1991). Research looking at trust and attachment style has used a dual-dimensional conceptualization of adult attachment. The dimension of attachment-related anxiety, refers to the degree to which an individual is worried about being rejected by the other, and attachment-related avoidance, refers to the degree to which strategies are used to downregulate attachment needs in relational contexts, with high scores indicating a discomfort with being close or dependent on the other (Fraley et al., 2015). Both fearful and preoccupied attachment styles reflect increased attachment-related anxiety, but only the fearful attachment style also has elevated levels of attachment-related avoidance.

The findings on the effect of attachment insecurity on trust behaviours are varied, and almost exclusively studied in non-clinical populations. Anxiously attached individuals were found to be more hesitant and more mistrustfully inconsistent in their responses in a social dilemma game (M. J. McClure et al., 2013). Likewise, under conditions of uncertainty where participants could randomly gain or lose money, participants became more cooperative, but this effect was muted among individuals with high levels of attachment anxiety or avoidance (Taheri et al., 2018). In contrast, there is some evidence that trust formation is positively associated with attachment anxiety (Fett et al., 2016). Furthermore, individuals with high levels of attachment anxiety may be more willing to self-sacrifice in favour of others. For example, in a bargaining game, anxiously attached individuals were both more generous in how much they were willing to offer the other player and more willing to accept less generous offers by the other player, in comparison to individuals with an avoidant attachment, who offered less and trended towards rejecting more offers (Almakias & Weiss, 2012). The authors suggested that anxiously attached persons are so concerned with gaining acceptance and avoiding abandonment, that they will forego monetary gain. On the other hand, they reasoned that avoidant individuals seek to avoid situations which might activate their attachment system, such as being exploited or unfairly rejected by the other. By making small offers, avoidant individuals can reason that any rejection that ensues was due to the low offer rather than a personal rejection (Almakias & Weiss, 2012). Curiously, this pattern observed in avoidantly attached individuals was found to reverse after administration of the neuropeptide oxytocin (De Dreu, 2012). However, the effects of oxytocin on those with a fearful attachment style

appears to be detrimental to cooperation. In a mixed sample of patients with BPD and healthy controls who played a game that incentivised mutual cooperation, those with a preoccupied attachment style became more cooperative following administration of oxytocin, while individuals with a fearful attachment style became less cooperative (Bartz et al., 2011). This finding was replicated by Ebert (2013) who found a similar effect among individuals with BPD. This suggests that a fearful attachment style may promote distrust and reduced willingness to cooperate under conditions of attachment arousal.

The current study examines whether attachment style underpins trust behaviours associated with BPD, and if so, whether there is a different effect based on the nature of the attachment disturbance. The extant research suggests that attachment anxiety is associated with heightened ambivalence about trusting but greater willingness to self-sacrifice in interpersonal transactions. Attachment avoidance appears to be associated with increased mistrust and a greater likelihood of behaving in a self-protective manner. Activation of attachment arousal also appears to have an adverse effect on trust behaviours for fearfully attached individuals, who report high levels of both attachment anxiety and avoidance. Endorsement of a fearful attachment style is expected to amplify the negative relationship between BPD and trust, thereby promoting lower levels of trust, while endorsement of a preoccupied attachment style is expected to mitigate that relationship, promoting higher levels of trust.

Self-protective Beliefs and Trust

Individuals with BPD endorse the belief that others will deceive, betray, and exploit (Barazandeh et al., 2016; Bhar et al., 2008). While none of the studies in the BPD literature have specifically examined the effect of holding such a priori beliefs on behavioural trust, there is evidence that in the absence of feedback regarding actual partner trustworthiness during a trust game, BPD is associated with greater mistrust (Unoka et al., 2009). Dubbing these findings as representative of ‘unbiased trust,’ Unoka and colleagues (2009) also found that patients with BPD predict a less favourable outcome of the game than controls, suggesting that their comparatively mistrustful behaviour and predictions may reflect a disposition towards perceiving others as untrustworthy. The current study will examine the effect of the a priori belief that one must protect oneself from betrayal by others on the relationship between BPD and trust behaviours. It is anticipated that self-protective beliefs will amplify the negative relationship between BPD and trust behaviours.

Feelings of Rejection and Trust

Interpersonal trust may also be influenced by negative affect that is present before the interpersonal exchange or elicited during the exchange. Events related to social rejection or abandonment in particular are known precipitants of emotional distress in BPD (Chapman et al., 2015; Staebler et al., 2011; Stiglmayr et al., 2005). Increased negative emotional arousal has been demonstrated to modify social processing in BPD (Dziobek et al., 2011; Wolff et al., 2007). Poggi and colleagues (2019) proposed that the mistrustful appraisals that are believed to underpin relational disturbances in BPD, may do so in conjunction with rejection sensitivity, another known mechanism of atypical social processing in BPD populations (Foxhall et al., 2019). Rejection sensitivity refers to a cognitive-affective processing disposition in which inevitable rejection by others is anxiously presumed, readily perceived, and overreacted to, often with hostility, attempts to control the other, or withdrawal (Downey & Feldman, 1996). Individuals high in rejection sensitivity expect that others will reject them and approach relationships with hypervigilance and hypersensitivity to signs of potential rejection, responding to actual or perceived rejection in ways that may compromise the relationship.

Rejection sensitivity has been found to mediate the relationship between BPD traits and an untrustworthiness bias for appraisals of neutral unfamiliar faces (Miano et al., 2013; Richetin et al., 2018). However, when it comes to trust behaviour, rejection and acceptance appear to have a paradoxical effect for individuals with BPD. For example, Liebke et al. (2018) primed participants with a social activity in which they experienced either social acceptance or social rejection. Among participants with BPD, those who had been primed with acceptance feedback invested significantly less than those primed with feedback of rejection. The more positive the feedback was, relative to what was expected, the smaller the corresponding investment. The authors suggested that receiving feedback of social acceptance, particularly when one expected to be rejected, triggered defences in those with BPD resulting in more withholding behaviour (Liebke et al., 2018). The current study will examine the impact pre-existing feelings of rejection on the relationship between BPD and trust behaviours. It is predicted that baseline feelings of rejection moderate the relationship between BPD and trust behaviours by increasing mistrustful behaviours during the cooperative phases of the trust game and increasing trustful behaviours during the uncooperative phases of the trust game.

Finally, there is evidence suggesting that females exhibit less trusting behaviours in the trust game (Johnson & Mislin, 2011). Given the gender bias associated with BPD (American Psychiatric Association, 2013), the main effects

of gender will be controlled. Cognitive reflective ability, that is, the ability to engage in conscious deliberation rather than respond impulsively (Frederick, 2005), has also been associated with a greater propensity to trust in the trust game (Corgnet et al., 2016). As BPD has been associated with deficits in executive functioning impairments (see G. McClure et al., 2016; Ruocco, 2005), social problem-solving (see Lazarus et al., 2014), altered decision making (see Paret et al., 2017), and increased impulsivity in interpersonal contexts (Berenson et al., 2016), the main effects of cognitive reflective ability will be controlled.

Method

The study was approved by the University of Wollongong ethics committee (HE2017/253). All participants provided informed consent. These data are part of a larger research project from which there has been one publication (Abramov et al., 2020). The current study is focused on data not previously published.

Participants

Participants ($N = 234$; 64% female; $M = 20.87$ years, $SD = 5.66$ years) were undergraduate students from a large Australian university who were invited to take part in an online study looking at the relationship between economic decision making and personality variables in exchange for course credit.

The Trust Game

The current study used a 15-round version of the trust game (Berg et al., 1995) with trust operationalized as the proportion of allocated monetary units (MU) sent to a trustee for investment (Ben-Ner & Halldorsson, 2010). At the start of each of round the trustor was allocated 100 MU by the experimenter and given the option to send the trustee any proportion from 0 to 100% for investment. The amount sent was automatically tripled, and the trustee could repay any proportion from 0 to 100% of the tripled investment to the trustor.

Procedure

Participants were all assigned the role of trustor and were paired with another anonymous participant who was, in fact, a computer program. Trustee repayments were programmed so that following rounds 1–4 and 8–14, repayments were randomized to fall between 34 and 44% of the tripled investment, providing the trustor with a return the equivalent of

the original investment plus up to 32% profit. Following rounds 5–7, trustee repayments were randomized to fall between 0 and 10% of the tripled investment, providing the trustor with a return equivalent to losing 70–100% of their original investment¹. This loss was designed to simulate a trust violation. Based on this repayment schedule, trustor investments can be divided into three distinct trust phases: formation (rounds 1–5), dissolution (rounds 6–8), and restoration (rounds 9–15). Overall, the average MU invested per round for each of the trust phases was 46.16 ($SD = 18.95$) during formation, 24.54 ($SD = 19.14$) during dissolution, and 38.4 ($SD = 23.29$) during restoration.

Measures

Trust

The number of MU's (0–100) that participants sent to the trustee in each round, represents a single behavioural measure of trust. Each participant provided 15 trust measures in total.

BPD

The McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003) was used to assess DSM-5 BPD trait count. The MSI-BPD is a 10-item screening instrument for BPD, with very good internal consistency (Cronbach's $\alpha = 0.84$, $N = 234$). BPD in the current study is operationalized as the number of MSI-BPD items endorsed (0–10), rather than a clinical diagnosis. The current sample endorsed a median of one BPD trait ($M = 1.63$, $SD = 2.34$). While MSI-BPD requires endorsement of 7 out of 10 items for clinical diagnoses of BPD, endorsement of three or more items is reflective of sub-clinical borderline pathology (CLPS: Gunderson et al., 2011).

Attachment Style

The Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) is a 4-item questionnaire designed to measure adult attachment style. The RQ consists of four paragraphs, each describing an attitude toward relationships as representative of one of four attachment styles (secure, dismissing, preoccupied, and fearful). For the current study only the preoccupied and fearful attachment styles were reported. Fearful attachment was characterized as: "I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt

¹ Due to rounding to the nearest whole number, investments of \$1 did not incur a loss.

if I allow myself to become too close to others.” Preoccupied attachment was characterized as: “I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don’t value me as much as I value them.” Participants were asked to rate each paragraph on an 11-point Likert-type scale of 0 (not at all like me) to 10 (very much like me).

Self-protective Beliefs

Self-protective beliefs were assessed using the Personality Beliefs Questionnaire—Borderline Personality Subscale (PBQ-BPD; Butler et al., 2002), a 14-item subset of the Personality Beliefs Questionnaire (PBQ; Beck & Beck, 1991). The PBQ-BPD subscale was developed on the basis of PBQ items that discriminated 84 BPD patients from 204 patients with other personality disorders (Bhar et al., 2008; Butler et al., 2002). Participants were asked to endorse each of the 14 items on a 5-point Likert-type scale from 0 (“I don’t believe it at all”) to 4 (“I believe it totally”). The subscale has demonstrated adequate internal consistency and discriminant validity (Butler et al., 2002). A study examining the factor structure of the PBQ-BPD using exploratory factor analysis found three factors: dependency, distrust, and the belief that one should take preemptive action to avoid threat (Bhar et al., 2008). In the current study, the three items comprising this preemptive action factor were used to provide a measure of self-protective beliefs (e.g. “People will get me if

I don’t get them first”). Cronbach’s alpha was $\alpha = .74$, $N = 234$.

Feelings of rejection

Feelings of rejection were assessed using four items used previously in a study that assessed affective states in patients with BPD (Gadassi et al., 2014). Before playing the game participants were prompted to rate on a 5-point Likert-type scale (0 = not at all, 4 = extremely) the extent to which they were currently experiencing specific emotions related to rejection (e.g. “At the present moment I feel rejected by others”). In the current study, internal consistency for pre-game rejection (Cronbach’s $\alpha = 0.74$, $N = 234$) was adequate, but lower than the 0.91 found in a sample of BPD patients (Gadassi et al., 2014).

Cognitive Reflective Ability

Cognitive reflective ability was measured using the Cognitive Reflection Test (CRT; Frederick, 2005), a three-item measure of the willingness to engage in deliberation during a cognitive task. Each item is a deceptively simple mathematical problem in which an intuitive/impulsive yet incorrect answer must be suppressed in order to calculate the correct response. The number of items answered correctly were summed to provide a CRT score ranging from 0 to 3. The overall sample mean of 1.03 was consistent with previous findings (see Frederick, 2005).

Table 1 Coding and interpretation of change variables in the discontinuous growth model

Round (R)	TIME	Dissolution Transition (DT)	Dissolution Slope (DS)	Restoration Transition (RT)	Restoration Slope (RS)
Measurement occasion in the trust game	Linear change of MUs transferred in the formation phase (R1 to R5)	Difference in level of MUs transferred immediately following the trust violation (R6 vs. R5)	Linear change of MUs transferred in the dissolution phase (R6 to R8)	Difference in level of MUs transferred immediately following the trust repair (R9 vs. R8)	Linear change of MUs transferred in the restoration phase (R9 to R15)
1	0	0	0	0	0
2	1	0	0	0	0
3	2	0	0	0	0
4	3	0	0	0	0
5	4	0	0	0	0
6	4	1	0	0	0
7	4	1	1	0	0
8	4	1	2	0	0
9	4	1	2	1	0
10	4	1	2	1	1
11	4	1	2	1	2
12	4	1	2	1	3
13	4	1	2	1	4
14	4	1	2	1	5
15	4	1	2	1	6

Data Analyses

The NLME package (Pinheiro et al., 2019) included in the open source software R (R Development Core Team, 2018) was used to conduct mixed-effect discontinuous growth modelling (DGM) analyses (Bliese & Lang, 2016; Singer & Willett, 2003). These analyses assessed investment occasions (rounds) at Level 1 nested within individuals at Level 2.

Level 1 parameters were coded based on the framework recommended by Singer and Willett (2003) and Bliese and Lang (2016) to create a matrix of time covariates that examine change in the average level of trust between each of the trust phases (i.e., formation, dissolution, and restoration) along with the growth of trust within each phase. To examine how individuals respond first to a trust violation and then to a trust restoration, change variables were such that the transition coefficients reflected the previous stage as the baseline for interpretation while the growth coefficients reflected growth relative to nil growth. *Time* was coded to capture the linear growth in trust during the formation phase. *Dissolution transition* (DT) and *Dissolution slope* (DS) were coded to represent the change in the average level of trust moving from the formation phase to the dissolution phase and the rate of trust growth during the dissolution phase, respectively. *Restoration transition* (RT) and *Restoration slope* (RS) were coded to represent the change in the average level of trust moving from the dissolution phase to the restoration phase and rate of trust growth during the restoration phase, respectively. The full DGM time-covariate matrix is presented in Table 1. Due to space constraints, the authors wish to encourage those interested in further understanding of the covariate matrix to read Bliese and Lang (2016) and/or Bliese, Kautz, and Lang (2020).

Initially Level 1 change was examined by including only Level 1 predictors into the DGM. Next, the influence of between-individual factors was examined by including BPD and one of the other Level 2 predictors (preoccupied attachment, fearful attachment, self-protection beliefs, feelings of rejection) to account for differences in Level 1 change, while also controlling for the main effects of gender and cognitive ability. All tests conducted were two-tailed, and a criterion level of $p < .10$ was used for all cross-level interactions effects to account for insufficient power to detect cross-level interactions as a result of reduced parameter reliability in multilevel analysis (Snijders & Bosker, 1999).

Results

Descriptive Data and Intercorrelations

Table 2 presents the means, standard deviations, and intercorrelations for BPD, attachment styles, self-protective beliefs, and pre-game feelings of rejection. BPD had a medium positive association with fearful attachment style, self-protective beliefs, and pre-game feelings of rejection, and a small positive association with preoccupied attachment style. Trust formation has a small negative association with BPD. None of the other trust phases is significantly associated with any of the predictors.

To understand the mechanisms underpinning the trust behaviour patterns associated with BPD, a series of 4 models were created which, in addition to including BPD as a predictor, also examined the effects of individuals differences in preoccupied and fearful attachment styles, self-protective beliefs, and feelings of rejection (see Table 3). To be consistent with previous research (Abramov et al., 2020), the main effects of gender and cognitive reflective ability were also

Table 2 Intercorrelations, Means, and Standard Deviations of Study Variables

	1	2	3	4	5	6	7	8
1 BPD	(0.84)							
2 Preoccupied Attachment	0.25	-						
3 Fearful Attachment	0.34	0.35	-					
4 Self-Protective Beliefs	0.38	0.26	0.31	(0.74)				
5 Feelings of Rejection	0.34	0.26	0.24	0.38	(0.74)			
6 Trust _{Formation}	-0.18	0.03	-0.08	-0.11	-0.12	-		
7 Trust _{Dissolution}	-0.01	0.06	-0.07	0.06	0.00	0.34	-	
8 Trust _{Restoration}	-0.08	0.11	-0.04	0.07	-0.02	0.44	0.55	-
Mean	1.63	4.20	4.56	1.03	2.25	46.16	24.54	38.40
SD	2.34	2.70	2.93	0.88	0.80	18.95	19.14	23.29
N	234	233	233	234	234	234	234	234

Trust_{Formation} reflects average trust during the formation phase. Trust_{Dissolution} reflects average trust during the dissolution phase. Trust_{Restoration} reflects average trust during the restoration phase

Spearman correlations are reported in the lower half. Alphas are reported on the diagonal. Values equal to or above |0.22| are significant at $p < .01$ level. Values equal to or above |0.18| are significant at $p < .05$ level. Values equal to or above |0.16| are significant at $p < .10$ level

Table 3 Discontinuous Mixed-Effects Growth Models Predicting Trust as a Function of BPD Trait Count (BPD), Attachment Style, Self-Protective Beliefs, and Feelings of Rejection, after Controlling for Gender and Cognitive Reflective Ability

Moderator:	Model 1		Model 2		Model 3		Model 4		Model 5	
	None		Preoccupied Attachment		Fearful Attachment		Self-Protective Beliefs		Feelings of Rejection	
	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE
Intercept	49.14***	2.02	48.73***	2.08	49.11***	2.11	48.35***	2.12	49.04***	2.11
Level 2—Between Individual										
Gender (Female)	-4.30*	2.15	-4.15†	2.18	-4.25*	2.16	-4.34*	2.16	-4.26†	2.17
CRA	2.34*	1.04	2.36*	1.05	2.40*	1.03	2.33*	1.04	2.39*	1.04
BPD	0.17	1.49	0.09	1.71	0.56	1.92	-1.67	1.97	-0.43	1.75
Moderator			-1.26	1.59	-1.01	1.62	0.81	1.71	1.31	1.65
BPD * Moderator			0.98	1.46	-0.01	1.54	1.74	1.32	0.19	1.40
Level 1—Within Individual										
Time	-0.08	0.57	0.11	0.60	-0.12	0.62	0.31	0.62	0.09	0.60
DT	-20.74***	2.40	-21.41***	2.52	-20.61***	2.59	-20.85***	2.58	-21.42***	2.52
DS	-0.76	1.16	-0.64	1.21	-0.73	1.24	-1.12	1.25	-0.64	1.23
RT	10.55***	1.86	9.49***	1.93	9.57***	2.00	10.21***	2.02	10.11***	1.97
RS	1.29**	0.40	1.32**	0.42	1.34**	0.43	1.16**	0.43	1.32**	0.42
Time * BPD	-1.12†	0.57	-1.20†	0.65	-1.14	0.74	0.08	0.75	-0.32	0.66
Time * Moderator			1.29*	0.61	-0.04	0.62	-1.08†	0.65	-1.49*	0.62
Time * BPD * Moderator			-0.63	0.56	0.07	0.59	-0.81	0.50	-0.44	0.53
DT * BPD	2.13	2.40	1.56	2.72	1.44	3.09	-1.03	3.13	-1.17	2.75
DT * Moderator	-	-	-1.93	2.54	2.16	2.62	6.30*	2.72	6.18*	2.61
DT * BPD * Moderator	-	-	2.37	2.34	-0.24	2.48	0.23	2.10	1.80	2.22
DS * BPD	2.33*	1.16	3.14*	1.31	3.56*	1.48	2.08	1.52	3.06*	1.34
DS * Moderator	-	-	-1.29	1.22	-2.53*	1.25	-0.82	1.32	-1.47	1.27
DS * BPD * Moderator	-	-	-0.76	1.13	-0.33	1.19	0.76	1.02	-0.32	1.08
RT * BPD	-3.83*	1.85	-6.38**	2.09	-6.46**	2.38	-4.25†	2.45	-4.98*	2.15
RT * Moderator	-	-	3.31†	1.95	2.89	2.02	-0.38	2.13	1.40	2.05
RT * BPD * Moderator	-	-	3.40†	1.79	2.45	1.91	0.72	1.64	1.15	1.74
RS * BPD	0.43	0.40	0.48	0.45	0.44	0.51	0.05	0.52	0.55	0.46
RS * Moderator	-	-	-0.10	0.42	0.19	0.43	0.34	0.45	-0.18	0.44
RS * BPD * Moderator	-	-	-0.07	0.39	-0.13	0.41	0.26	0.35	-0.09	0.37
Variance Components										
	Variance	SD	Variance	SD	Variance	SD	Variance	SD	Variance	SD
Intercept	135.12	11.62	144.73	12.03	138.71	11.78	138.80	11.78	141.70	11.90
Time	15.68	3.96	15.41	3.92	15.90	3.99	14.63	3.82	14.07	3.75
DT	554.81	23.55	563.30	23.73	566.50	23.80	533.97	23.11	524.13	22.89
DS	39.01	6.25	38.53	6.21	35.50	5.96	36.75	6.06	36.80	6.07
RT	74.06	8.61	64.52	8.03	78.58	8.86	78.53	8.86	76.64	8.75
RS	13.75	3.71	13.96	3.74	13.91	3.73	13.81	3.72	14.01	3.74
Residual Error	561.01	23.69	561.32	23.69	563.21	23.73	561.20	23.69	560.76	23.68
Pseudo R ²	0.19		0.19		0.19		0.19		0.19	
df (no. of Individuals)	233		232		232		233		233	

†*p* < .10, **p* < .05, ***p* < .01, ****p* < .001, tests are two-tailed, *n*=234 participants, 3510 observations

BPD = Number of BPD traits reported on MSI-BPD. CRA = Cognitive Reflective Ability. DT = Dissolution transition. DS = Dissolution slope. RT = Restoration transition. RS = Restoration slope

BPD, cognitive reflective ability, and all four moderators were *z*-standardized and centered at the sample mean

controlled for. Parameter estimates for the change in trust are provided in Table 3. Model 1 includes only BPD as a predictor of trust, while the remaining models reflect trust as a function of BPD and the following variables: preoccupied attachment style (Model 2), fearful attachment style (Model 3), self-protective beliefs (Model 4), and baseline feelings of rejection (Model 5)

Formation Slope

Growth in trust during the formation stage is represented by the estimates associated with Time. As seen in Model 1 in Table 3, individuals higher in BPD are associated with a decrease in trust growth during the formation stage (Model 1: $est_{Time * BPD} = -1.12, p < .10$). This effect is

visualized in Figure 2 in an earlier publication (Abramov et al., 2020), whereby individuals with higher BPD experienced a decreasing linear trend during the formation stage. This effect was present when controlling for preoccupied attachment style (Model 2: $est_{Time * BPD} = -1.20, p < .10$) and presented a trend towards significance after controlling for fearful attachment style (Model 3: $est_{Time * BPD} = -1.14, p = .12$). However, BPD no longer significantly predicted the rate of trust growth during the formation stage after controlling for self-protective beliefs (Model 4: $est_{Time * BPD} = 0.08, n.s.$) or baseline feelings of rejection (Model 5: $est_{Time * BPD} = -0.34, n.s.$).

Preoccupied attachment style predicted a positive linear trend in MUs transferred during formation after controlling for BPD (Model 2: $est_{Time * Preoccupied} = 1.29, p < .05$). However, preoccupied attachment was not found to significantly moderate the effect of BPD on the rate of MUs transferred during trust formation (Model 2: $est_{Time * BPD * Preoccupied} = -0.63, n.s.$). Conversely, there was no statistical influence of fearful attachment on the growth of trust (Model 3: $est_{Time * Fearful} = -0.04, n.s.$) nor evidence to suggest that fearful attachment moderates the relationship between BPD and the rate of MUs transferred (Model 3: $est_{Time * BPD * Fearful} = 0.07, n.s.$). Self-protective beliefs were associated with a gradual decrease in the number of MUs transferred, after controlling for the influence of BPD (Model 4: $est_{Time * Protection} = -1.09, p < .10$), and there was a trend towards self-protective beliefs moderating the effect of BPD on the MU transfer rate during trust formation (Model 4: $est_{Time * BPD * Protection} = -0.81, p = .11$). As illustrated in Fig. 1, higher levels of self-protective beliefs may exacerbate the negative effect of BPD on the rate of MUs transferred during the formation stage.

Finally, baseline feelings of rejection was significantly associated with declining trust during the formation phase

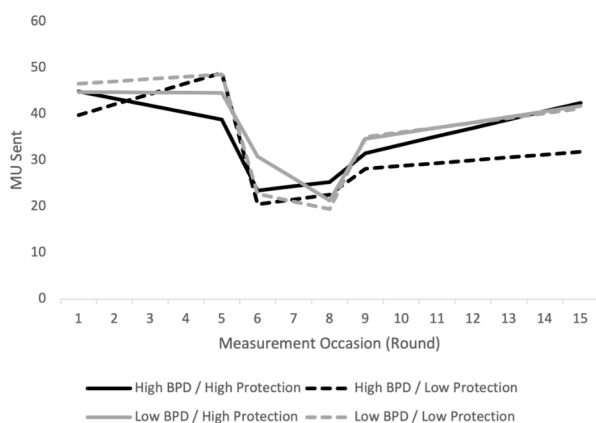


Fig. 1 Influence of BPD on Trust Growth Moderated by Self Protective Beliefs

(Model 5: $est_{Time * Rejection} = -1.49, p < .05$), but there was no evidence to suggest that baseline feelings of rejection moderated the relationship between BPD and the rate of MUs transferred (Model 5: $est_{Time * BPD * Rejection} = -0.44, n.s.$).

Dissolution Transition

BPD did not significantly predict the number of MUs transferred immediately following the trust violation, and this remained the case after accounting for attachment style, self-protective beliefs, and increased feelings of rejection in respective models (see Models 1-5 in Table 3). Self-protective beliefs (Model 4: $est_{DT * Protection} = 6.30, p < .05$) and baseline feelings of rejection (Model 5: $est_{DT * Rejection} = 6.18, p < .05$) were both found to predict a less pronounced decrease in the number of MUs transferred in response to the initial trust violation, after accounting for BPD. However, no significant three-way interactions between the dissolution transition, BPD, and each of the moderator variables were observed (see Models 2-5 in Table 3).

Dissolution Slope

As seen in Table 3, BPD was found to significantly predict a faster rate of growth in the number of MUs transferred during the dissolution phase (Model 1: $est_{DS * BPD} = 2.33, p < .05$). See Figure 2 in an earlier publication for a visual representation (Abramov et al., 2020). Significance was maintained when attachment style and baseline feelings of rejection were accounted for in respective models (see Models 2, 3, and 5 in Table 3). When self-protective beliefs were accounted for, BPD no longer significantly influenced trust growth during the dissolution phase (see Model 4 in Table 3). Only fearful attachment style significantly predicted the rate of MUs transferred during the dissolution phase after accounting for number of BPD symptoms and had a negative effect on growth (Model 3: $est_{DS * Fearful} = -2.53, p < .05$). No significant three-way interactions between the dissolution slope, BPD, and each of the moderator variables were observed (see Models 2-5 in Table 3).

Restoration Transition

BPD was found to significantly predict how many MUs were transferred immediately following the first instance of trust repair (Model 1: $est_{RT * BPD} = -3.83, p < .05$), by reducing the size of the investment. After controlling for each of the moderator variables, this effect continued to be significant. Only preoccupied attachment style was found to predict the size of the restoration transition after accounting for BPD, but in contrast to BPD, the effect was positive (Model 2: $est_{RT * Preoccupied} = 3.31, p < .10$). Preoccupied attachment

was also found to significantly moderate the effect of BPD on the rate of MUs transferred at the restoration transition (Model 2: $\text{est}_{\text{Time} * \text{BPD} * \text{Moderator}} = 3.40, p < .10$). As illustrated in Fig. 2, results suggest that higher levels of preoccupied attachment counteract the negative effect of BPD on the rate of MUs transferred at the restoration transition.

Restoration Slope

BPD did not significantly predict the rate of growth in the number of MUs transferred during the restoration phase, and this remained the case after accounting for attachment style, self-protective beliefs, and baseline feelings of rejection in separate models (see Models 1-5 in Table 3). Additionally, none of the moderator variables was found to predict trust growth during restoration after controlling for BPD, and no significant three-way interactions between the restoration slope, BPD, and each of the moderator variables were observed (see Models 2-5 in Table 3).

Discussion

Summary

The current study used an experimental trust game to examine whether attachment style, self-protective beliefs, and feelings of rejection explain the paradoxical relationship between BPD and trust (Abramov et al., 2020). Results suggest that the relationship between borderline pathology and the trajectory of trust growth when it is forming appears to be influenced by a number of these variables. Endorsing the belief that one needs to take action to protect oneself appears to underlie and possibly reinforce, the effect of BPD on the way trust is formed and potentially dissolved. First, when

such beliefs were controlled for, the decline in trust during the formation phase associated with BPD trait count was no longer significant. Second, there was evidence of a non-significant trend that the gradual decline in trust during the initial phase of the interaction found to be associated with borderline pathology, appeared to become more pronounced as self-protective beliefs increased. Third, self-protective beliefs were associated with a smaller decline in funds sent after the initial trust violation. Moreover, the paradoxical growth in trust in response to multiple, consecutive trust violations that was associated with borderline pathology no longer reached significance when level of self-protective beliefs was taken into account.

Given the relationship between BPD and the expectation of betrayal and abuse by others (Barazandeh et al., 2016; Bhar et al., 2008), it is possible that individuals with a high number of BPD traits entered the game already believing that the other player was untrustworthy and likely to betray. These beliefs may activate the use of self-protecting behaviours, reflected in the increasingly smaller amounts invested during the formation phase. This is also in line with previous research where, compared to healthy controls, individuals with BPD tended to be more pessimistic when predicting trust game outcomes even in the absence of any feedback regarding trustee reciprocity (Unoka et al., 2009). The study authors suggested the lowered expectancies were related to more general beliefs about the trustworthiness of others, rather than beliefs specific to their trust game partner. Indeed, there is evidence that BPD trait count is not associated with perceptions of trust game partner trustworthiness or fairness (Abramov et al., 2020), and individuals with BPD have not been found to differ from healthy controls in the accuracy of their appraisals of trustee fairness (Franzen et al., 2011).

This gives weight to the notion that the mistrustful behaviours exhibited during the beginning of the trust game despite engaging with a cooperative partner, are self-protective responses shaped by past experiences of betrayal, rather than reactions to the actual trustworthiness (reciprocity) of the partner or systematic differences in how reciprocity levels are appraised as indicators of trustworthiness. As such, holding self-protective beliefs may override the experience of an objectively cooperative partner, and it is even possible that the partner's repetitive cooperative exchanges make the anticipated betrayal more salient. Waiting for the 'inevitable' breach of trust with a new, cooperative partner, much like waiting for the other shoe to drop, may then be associated with taking self-protective action to first mitigate the risk by investing defensively, before then trying to salvage the relationship with a less negatively reactive response to the initial trust violation. That is, perhaps the mistrustful stance observed during the formation phase was

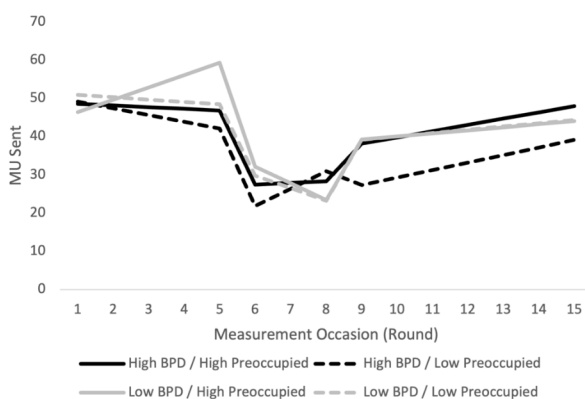


Fig. 2 Influence of BPD on Trust Growth Moderated by Preoccupied Attachment Style

a conscious strategy to obtain evidence that the other will betray, and the initial betrayal having validated the expected ‘rules of engagement’, allowed the high-BPD trait individual to attempt to reengage the trustee by making progressively larger investments. In line with this, De Panfilis et al., (2019) found that in other economic games, BPD patients were more likely than controls to punish their partners when receiving fair offers, but this was not the case when they received unfair offers.

As observed with self-protective beliefs, existing feelings of rejection on trust growth during the initial phase of the game appears to exert a suppressant effect on the rate of trust formation, which potentially explains the declining trust associated with high levels of BPD traits. While rejection sensitivity was not explicitly measured, these results were consistent with previous findings that sensitivity to rejection may mediate the relationship between BPD and negatively biased appraisals of trustworthiness (Miano et al., 2013; Richetin et al., 2018). Greater feelings of rejection were also associated with a less pronounced fall in trust in response to the initial trust violation which, like self-protective beliefs, may reflect an expectation of and therefore less reactivity to rejection or betrayal by the other.

While self-protective beliefs and feelings of rejection appear to reinforce some of the trust patterns observed in individuals with high levels of BPD traits, the findings on attachment insecurity suggest that the influence of borderline pathology on trust patterns occurs *despite* the contrasting effects of attachment insecurity. For example, while borderline pathology was associated with greater mistrust when trust was forming and in response to the initial trust repair effort, a preoccupied attachment style was associated with a faster rate of trust formation, and a more generous response to initial repair. This is in line with previous empirical findings that attachment anxiety is associated with increased interpersonal anxiety in response to affiliative overtures from a potential close other, a strong preference to making affiliative overtures, and a preoccupation with reciprocity (Bartz & Lydon, 2006, 2008; Fett et al., 2016). In fact, as preoccupied attachment increased, the negative effect of BPD on trust behaviours in response to the initial trust repair became less pronounced, suggesting preoccupied attachment style may reflect a more socially normative style of relating, whereby cooperation is rewarded and uncooperativeness is punished, as observed in general populations (Fulmer & Gelfand, 2015; Korsgaard et al., 2018).

In contrast, whereas borderline pathology was associated with a paradoxical growth of trust in response to multiple, consecutive trust violations, individuals reporting higher levels of fearful attachment responded by gradually reducing trust. This may have reflected the importance of reciprocity among those reporting greater levels of attachment

anxiety, although curiously, it was fearful rather than preoccupied attachment that reached significance. However overall, these findings suggest that attachment insecurity does not appear to explain the paradoxical increase in trust behaviours in high BPD trait individuals. These findings suggest that despite the theoretical and empirical links between BPD and preoccupied and fearful attachment styles, attachment insecurity was not found to drive the unusual trust patterns observed in the high BPD trait individuals and may in fact have tempered these patterns.

Limitations & Future Directions

The current study has several limitations. First, a clinical sample of individuals with BPD was not used. Although relational disturbances in nonclinical samples of people with borderline personality symptoms are almost as acute as in clinical samples (Tolpin et al., 2004), it cannot be assumed that individuals with a clinical diagnosis would respond similarly. It is notable however, that despite the modest proportion of participants endorsing a clinically relevant number of BPD traits, there was nevertheless sufficient evidence to suggest these variables play a role in the relationship between BPD and trust growth.

Second, the use of anonymous one-time encounters may not have been sufficient to evoke attachment-salient responses. Previous researchers examining trust have attempted to activate the underlying attachment system by using romantic partners and engaging them in relationship threatening dialogue (Miano et al., 2017) or through the administration of oxytocin (Bartz et al., 2011). Although a trust violation was created with the view that it might elicit an attachment relevant behavioural response, it cannot be assumed that it was sufficient. However, by using unknown partners, the current study offers an important insight into how borderline pathology might influence how new relationships are developed. Finally, a simulated trustee was used rather than an actual human being. While this methodology allowed for the systematization of trustee reciprocity, there is prior evidence that the effect of attachment on cooperation in social contexts was only observed when the participants were partnered with a human rather than a computer (Taheiri et al., 2018). While efforts were made to create the illusion that participants were playing against a human in the study, the possibility remains that the deception was not effective. It is possible that effects may be artificially suppressed.

This research augmented previous trust game studies by examining how attachment style, self-protective beliefs, and feelings of rejection accounted for or modified the relationship between BPD and trust behaviours using an economic exchange game. The cross-disciplinary methodology

provides a prototype for future research looking at interpersonal disturbances as dynamic, dyadic processes. The sample provided a conservative estimate of the complex interaction between BPD symptoms and multiple sources of interpersonal disturbances on trust formation, dissolution, and restoration in a discrete social exchange. It is important for future research to replicate these findings in a clinical sample, as well as examine trust processes for individuals with BPD within other dyads such as friends, family, and romantic unions, to determine whether the findings apply in these more specific and ‘higher stakes’ relationships.

In this study trust behaviours were quantified to explore how various features of the borderline personality might influence the relationship between BPD and trust, to make inferences about what social cognition processes might be altered in individuals with a borderline presentation. The most compelling finding was that the presence of self-protective beliefs and feelings of rejection may have a detrimental effect on how individuals with BPD traits trust in interpersonal exchanges. A potential next step would be to augment these findings by using qualitative methodology to examine how individuals make sense of their own and their partner’s behaviour in such an interaction (Sharp et al., 2011). This process, known as mentalization (Allen et al., 2008; Bateman & Fonagy, 2004), has been found to be compromised among people with BPD (for reviews see Dinsdale & Crespi, 2013; Jeung & Herpertz, 2014; Lazarus et al., 2014; Mitchell et al., 2014; Richman & Unoka, 2015). Meta-analytical findings suggest the deficits observed in BPD are not decoding impairments, but rather relate to the process of reasoning (Németh et al., 2018), that is, reasoning about others’ mental states in order to explain or predict behaviour (Sabbagh, 2004). Examining reasoning would allow researchers to better understand how individuals with BPD experience the mutability of interpersonal exchanges and explore in greater depth how feelings of rejection and beliefs about the need to protect against betrayal by others may compromise the development of trust.

Conclusions

This study built on previous research using discontinuous growth modelling with a trust game to examine the how attachment style, self-protective beliefs, and feelings of rejection might underpin or modify the anomalous trust patterns associated with BPD. The findings reveal that the slower rate that trust is formed among high BPD trait individuals may be underpinned or accompanied by feelings of rejection and beliefs that others will betray so one should act pre-emptively to protect oneself. Attachment insecurity appears to have an influence on trust that is in direct contrast

to the effect that BPD exerts. Finally, BPD remained a robust predictor of faster trust growth in response to the trust violation, potentially being explained by self-protective beliefs, suggesting that there is something unique to the borderline experience that creates paradoxical ways of responding in trust-based situations. Regrettably, this manner of interacting is likely to elicit and compound the interpersonal difficulties such individuals face. The findings highlight the complex nature of borderline relational disturbance, and the need for research that can assess and quantify the internal experience of individuals with BPD to explain the aberrant style of social exchange associated with this personality disorder.

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Authors’ contribution Author 1 developed the study concept and study design and performed data collection. Author’s 1 and 2 performed the data analysis and interpretation. Author 1 drafted the paper, and author’s 2, 3, and 4 provided critical revisions. All authors approved the final version of the paper for submission.

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Declarations & Statements

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

Ethics Approval The study was approved by the University of Wollongong ethics committee (HE2017/253).

Consent Informed consent was obtained from all individual participants included in the stud.

Data, Materials &/or Code Availability The dataset used in this study is held within the Open Science Framework repository and can be accessed at https://osf.io/e35q4/?view_only=746d0f325444ead80081697410395cb. Dataset has not been cited in the current manuscript’s reference list due to the double-blind peer review, but on acceptance the DOI and all relevant details will be added for publication.

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