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Perfectionism, Personality, and Future-Directed Thinking: Further Insights from Revised Reinforcement Sensitivity Theory

Joachim Stoeber
University of Kent
Philip J. Corr
City, University of London

Author Note

Joachim Stoeber, School of Psychology, University of Kent, Canterbury, United Kingdom; Philip Corr, Department of Psychology, City, University of London, London, United Kingdom.

Correspondence concerning this article should be addressed to Joachim Stoeber, School of Psychology, University of Kent, Canterbury, Kent CT2 7NP, United Kingdom; email: J.Stoeber@kent.ac.uk

Abstract

In a recent study, Stoeber and Corr (2015) examined how three forms of perfectionism (self-oriented, other-oriented, socially prescribed) predicted participants' affective experiences in the past two weeks, and found that revised Reinforcement Sensitivity Theory (rRST) components explained the relations between perfectionism and affective experiences. As an extension, this study investigated whether rRST components—capturing individual differences in the Behavioral Approach System (BAS), Behavioral Inhibition System (BIS), Fight-Flight-Freeze System (FFFS), and defensive fight—also explained the relations between perfectionism and future-directed thinking. 343 university students completed measures of perfectionism, rRST, and positive and negative expectations for the next two weeks. Mediation analyses showed that all BAS components (reward interest, goal-drive persistence, reward reactivity, impulsivity) and the BIS, but not the FFFS and defensive fight, explained how the different forms of perfectionism predicted future-directed expectations. The findings suggest that the BAS and BIS components of rRST, which reflect fundamental emotion-motivational systems of personality, play a role not only in the relations of perfectionism and past affective experiences, but also in those of perfectionism and future-directed thinking.

Keywords: perfectionism; revised Reinforcement Sensitivity Theory; future-directed thinking; positive and negative expectations; optimism; pessimism; hopelessness

1. Introduction

1.1. Revised Reinforcement Sensitivity Theory

The Reinforcement Sensitivity Theory (RST) is a prominent neuropsychological theory of personality explaining individual differences in avoidance- and approach-related behaviors. It assumes the existence of three emotional-motivational systems: one approach system (the Behavioral Approach System [BAS]) and two avoidance systems (the Behavioral Inhibition System [BIS] and Fight-Flight-Freeze System [FFFS]). The most distinctive features of the two avoidance systems are emotional output and defensive direction: The BIS activates behavioral repertoire when moving *toward* threat, eliciting the emotional state of anxiety, whereas the FFFS activates behavior that moves the individual *away* from threat, eliciting the emotional state of fear. Further refinement and theoretical elaboration of RST resulted in a progressive revision of RST (Corr & McNaughton, 2008, 2012; McNaughton & Corr, 2004). Consequently, the latest measure of rRST—the Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ;

Corr & Cooper, in press)—captures individual differences in four components of the BAS (reward interest, goal-drive persistence, reward reactivity, impulsivity), BIS, FFFS, and a defensive fight factor.

1.2. Reinforcement sensitivity, perfectionism, and affective experiences

In a recent study, Stoeber and Corr (2015) demonstrated how rRST also provides new insights for our understanding of multidimensional perfectionism and the relationships that different forms of perfectionism show with affective experiences. In this study, perfectionism was conceptualized as a stable personality disposition, whereas the rRST components were conceptualized as representing neuropsychological mechanisms (or processes) underlying the relationships between perfectionism and affective experiences. A sample of university students completed the RST-PQ and a measure of multidimensional perfectionism differentiating three forms of perfectionism: self-oriented, other-oriented, and socially prescribed (Hewitt & Flett, 1991). Self-oriented perfectionists expect to be perfect, other-oriented perfectionists expect others to be perfect, and socially prescribed perfectionists believe that others expect them to be perfect (see also Hewitt & Flett, 2004).

Using multiple regressions, Stoeber and Corr (2015) found that the three forms of perfectionism showed unique relations with the rRST components. Self-oriented perfectionism showed positive relations with all goal- and reward-oriented BAS components (i.e., BAS reward interest, BAS goal-drive persistence, and BAS reward reactivity), but was unrelated to BAS impulsivity. In addition, self-oriented perfectionism showed positive relations with the BIS and FFFS. In contrast, other-oriented perfectionism showed a negative relation with BIS and a positive relation with defensive fight, whereas socially prescribed perfectionism showed positive relations with the BIS and BAS impulsivity, and a negative relation with BAS goal-drive persistence. Further, mediation analyses found that the rRST components explained the relations that the three forms of perfectionism showed with affective experiences (i.e., how much positive and negative affect students had experienced over the past two weeks). Self-oriented perfectionism predicted more positive affect via BAS reward interest, goal-drive persistence, and reward reactivity, but had mixed effects on negative affect: On the one hand, it predicted less negative affect via BAS goal-drive persistence; on the other, it predicted more negative affect via the BIS. In contrast, other-oriented perfectionism predicted less negative affect via the BIS, whereas socially prescribed perfectionism predicted more negative affect via the BIS and BAS goal-drive persistence.

1.3. Further questions

Stoeber and Corr's (2015) study made a novel contribution to the perfectionism literature because it was the first to explore the unique relations between rRST and multidimensional perfectionism controlling for the substantial overlap of the latter. Moreover, their findings suggest possible pathways from perfectionism, through BAS and BIS components, to experiences of positive and negative affect. In addition, the findings provide support for the theoretical rationale for Stoeber and Corr's linking of rRST and perfectionism theory: Different forms of perfectionism show different profiles of neuropsychological processes reflecting individual differences in emotional-motivational systems that predict avoidance- and approach-related tendencies and associated affect (see also Slade and Owen's [1998] dual process model based on reinforcement theory).

Stoeber and Corr's (2015) study, however, also posed some further questions. First, some of the unique relations between perfectionism and the rRST components were unexpected or challenged previous findings and, therefore, need to be reexamined. As regards self-oriented perfectionism, the unique positive relation with the FFFS was unexpected. Whereas self-oriented and socially prescribed perfectionism have shown positive correlations with fear, socially prescribed perfectionism usually shows larger correlations (Hewitt & Flett, 2004). Hence, socially prescribed perfectionism should have shown a unique positive relation with the FFFS, not self-oriented perfectionism. As regards other-oriented perfectionism, the unique negative relation with the BIS challenges previous studies that found positive or nonsignificant bivariate correlations between other-oriented perfectionism and the BIS (see Stoeber & Corr, 2015, for details and references). Also the positive relation that other-oriented perfectionism showed with defensive fight was a potentially important new finding that would profit from replication. The same goes for the unique positive relation that socially prescribed perfectionism showed with BAS impulsivity.

Second, it could be argued that the BAS and BIS are primarily future-oriented systems, evolving around the expectations of reward and punishment. Consequently, rRST should be more critical in explaining individual differences in future-directed thinking than in past affective experiences. Future-directed thinking is closely linked to psychological adjustment and maladjustment. Positive expectations for the future are an indicator of hope and optimism whereas lack of positive expectations are an indicator of hopelessness, and negative expectations are an indicator of pessimism. Consequently, negative future-directed thinking (negative

expectations, lack of positive expectations) is a vulnerability factor for stress, emotional disorder, and suicide ideation (MacLeod, Byrne, & Valentine, 1996; O'Connor, Connery, & Cheyne, 2000; O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004). Therefore, it comes as a surprise that only few studies have investigated how self-oriented, other-oriented, and socially prescribed perfectionism are related to future-directed thinking, and unfortunately their findings are inconclusive. O'Connor et al. (2004), for example, found that self-oriented perfectionism showed a positive correlation with positive future thinking, whereas other-oriented and socially prescribed perfectionism showed positive correlations with negative future thinking. In contrast, O'Connor et al. (2007) found that other-oriented perfectionism showed a positive correlation with positive future thinking.

1.4. The present study

Against this background, the present study had three aims: (a) to replicate the unique relations that Stoeber and Corr (2015) found between rRST components and self-oriented, other-oriented, and socially prescribed perfectionism; (b) to reinvestigate the unique relations previous research found between the three forms of perfectionism and future-directed thinking regarding positive and negative expectations (MacLeod et al., 1996); and (c) to provide a first investigation of the unique relations between rRST components and positive and negative expectations. As regards the first aim, we expected to replicate all unique relations except the unique positive relation between self-oriented perfectionism and the FFFS (see Sections 1.2 and 1.3). As regards the second aim, we expected self-oriented perfectionism to show a positive relation with positive expectations and socially prescribed perfectionism to show a positive relation with negative expectations, but did not have any expectations for other-oriented perfectionism (cf. O'Connor et al., 2004; O'Connor et al., 2007). As regards the third aim, we expected the goal- and reward-oriented BAS components to show positive relations with positive expectations and the BIS to show a positive relation with negative expectations. (Because the FFFS and defensive fight are systems that mainly react to present threat, not expectations of threat, we did not expect these components to be related to future-directed thinking.) Furthermore, expanding on Stoeber and Corr's (2015) findings, we expected BAS and BIS to mediate the relations of perfectionism and future-directed thinking.

2. Method

2.1. Participants

343 students (46 male, 295 female, 2 undeclared) at the University of Kent were recruited

via the School of Psychology's Research Participation Scheme. Students volunteered to participate for extra course credit and completed all measures online using Qualtrics®. Mean age of students was 19.2 years (*SD* = 3.3), and students indicated their ethnicity as White (65.9%), Asian (14.6%), Black (9.3%), mixed race (7.6%), and other (2.6%).

2.2. Measures

2.2.1. Perfectionism

The Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 2004) was used to measure self-oriented perfectionism (15 items; e.g., "I demand nothing less than perfection of myself"), other-oriented perfectionism (15 items; "If I ask someone to do something, I expect it to be done flawlessly"), and socially prescribed perfectionism (15 items; "People expect nothing less than perfection from me"). The MPS has demonstrated reliability and validity in numerous studies (e.g., Hewitt & Flett, 1991, 2004). Items were presented with the MPS's standard instruction ("Listed below are a number of statements concerning personal characteristics and traits…"), and participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

2.2.2. Reinforcement sensitivity

The RST-PQ (Corr & Cooper, in press) was used to measure BAS reward interest (7 items; e.g., "I regularly try new activities just to see if I enjoy them"), BAS goal-drive persistence (7 items; "I am very persistent in achieving my goals"), BAS reward reactivity (10 items; "I get a special thrill when I am praised for something I've done well"), BAS impulsivity (8 items; "I often do risky things without thinking of the consequences"), the BIS (23 items; "When trying to make a decision, I find myself constantly chewing it over"), the FFFS (10 items; "I am the sort of person who easily freezes-up when scared"), and defensive fight (8 items; "If I feel threatened I will fight back"). The RST-PQ has demonstrated good reliability and validity (Corr & Cooper, in press; see also Corr, 2016). Participants were asked how accurately each statement described them and responded on a scale from 1 (*not at all*) to 4 (*highly*).

2.2.3. Future-directed thinking

The Subjective Probability Task (SPT; MacLeod et al., 1996) was used to measure future-directed thinking differentiating positive and negative expectations. The SPT presents 10 positive events (e.g., "You will make good and lasting friendships," "You will do well on your course") and 20 negative events (e.g., "You will have a serious disagreement with a good friend," "You will fall badly behind in your work"), and participants rate the subjective probability of each event. The SPT has demonstrated reliability and validity in previous studies (e.g., MacLeod et

al., 1996; Stöber, 2000). In the present study, participants were asked to indicate the likelihood that the event would occur in the next two weeks, responding on a scale from 1 (*not likely to occur*) to 7 (*extremely likely to occur*).

2.3. Data screening

Scale scores were computed by summing responses across items. Because multivariate outliers distort the results of correlation and regression analyses, we excluded six participants who showed a Mahalanobis distance larger than $\chi^2(12) = 32.91$, $p < .001$ (Tabachnick & Fidell, 2007), so the final sample comprised 337 participants. Next, we examined whether the variance–covariance matrices of male and female participants differed by computing a Box's *M* test with gender as between-participants factor. Because the test is highly sensitive, it is tested against a $p < .001$ significance level (Tabachnick & Fidell, 2007). The test was nonsignificant with $p = .002$, so all analyses were collapsed across gender. Finally, we examined the reliability of the scale scores which all displayed satisfactory reliability (Cronbach's alphas > .70; see Table 1).

3. Results

3.1. Bivariate correlations

We computed the bivariate correlations between all variables (see Table 1), but—because the aim of our study was to examine unique relations—did not analyze the correlations further and instead focused on the multiple regressions.

3.2. Multiple regressions

3.2.1. Perfectionism predicting reinforcement sensitivity

First, we computed regressions to examine what unique relations the three forms of perfectionism showed with the reinforcement sensitivity components (see Table 2). Self-oriented perfectionism showed the expected positive relations with BAS goal-drive persistence, BAS reward reactivity, and the BIS (and no relation with the FFFS), but failed to show a positive relation with BAS reward interest. Other-oriented perfectionism showed the expected negative relation with BIS and the expected positive relation with defensive fight. In addition, it showed positive relations with all goal- and reward-oriented BAS components. Socially prescribed perfectionism showed the expected positive relations with BAS impulsivity, the BIS, and the FFFS. In addition, it showed a negative relation with BAS goal-drive persistence.

3.2.2. Reinforcement sensitivity predicting future-directed thinking

Next, we computed regressions to examine what unique relations the reinforcement

sensitivity components showed with future-directed thinking (see Table 3). As expected, all goal- and reward-oriented BAS components showed positive relations with positive expectation, whereas BIS showed a positive relation with negative expectations. In addition, BIS showed a negative relation with positive expectations, whereas BAS goal-drive persistence and BAS reward reactivity showed negative relations with negative expectations. Furthermore (and in contrast to the other BAS components), BAS impulsivity showed a positive relation with negative expectations.

3.2.3. Perfectionism and reinforcement sensitivity predicting future-directed thinking

Combining the previous analyses, we then examined how perfectionism and reinforcement sensitivity together predicted future-directed thinking. For this, we computed hierarchical regression analyses with two steps (see Table 4 for details). First, we examined positive expectations. In Step 1, self-oriented perfectionism and other-oriented perfectionism showed positive regression coefficients whereas socially prescribed perfectionism showed a negative coefficient. In Step 2, BAS reward interest, BAS goal-drive persistence, and BAS reward reactivity showed positive coefficients whereas the BIS showed a negative coefficient. Moreover, self-oriented perfectionism and other-oriented perfectionism ceased to show significant coefficients, whereas socially prescribed perfectionism continued to show a significant negative coefficient that was reduced in size, suggesting possible mediation effects of reinforcement sensitivity (Baron & Kenny, 1986). Next, we examined negative expectations. In Step 1, other-oriented perfectionism showed a negative coefficient whereas socially prescribed perfectionism showed a positive coefficient. In Step 2, BAS goal-drive persistence and BAS reward activity showed negative coefficients whereas BAS impulsivity and the BIS showed positive coefficients. Moreover, other-oriented perfectionism ceased to show a significant positive coefficient, whereas socially prescribed perfectionism continued to show a significant positive coefficient that was reduced in size, again suggesting possible mediation effects of reinforcement sensitivity.

3.3. Mediation analyses

Because the pattern of significant versus nonsignificant coefficients in the regression analyses suggested that the relations between perfectionism and future-directed thinking were mediated by reinforcement sensitivity processes (perfectionism → reinforcement sensitivity → positive/negative expectations), we conducted mediation analyses. For this, we used PROCESS

(Hayes, 2013) and tested all indirect effects (IEs) for significance with Sobel tests and 95% confidence-interval bootstrapping. Table 5 shows all significant indirect effects.[1]

As regards positive expectations, self-oriented perfectionism showed mixed effects: positive effects via BAS goal-drive persistence and BAS reward reactivity, and a negative effect via the BIS. In contrast, other-oriented perfectionism showed only positive effects (via BAS reward interest, BAS goal-drive persistence, BAS reward reactivity, and the BIS), whereas socially prescribed perfectionism showed only negative effects (via BAS goal-drive persistence and the BIS). As regards negative expectations, self-oriented perfectionism showed again mixed effects: negative effects via BAS goal-drive persistence and BAS reward reactivity, and a positive effect via the BIS. In comparison, other-oriented perfectionism showed only a negative effect (via the BIS) whereas socially prescribed perfectionism showed only positive effects (via BAS goal drive persistence, BAS impulsivity, and the BIS).

4. Discussion

4.1. The present findings

The present study had three aims (see Section 1.4). As regards the first aim, the study replicated Stoeber and Corr's (2015) finding that the three forms of perfectionism—self-oriented, other-oriented, and socially prescribed perfectionism—showed unique relations with the revised Reinforcement Sensitivity Theory (rRST) components of the Behavioral Approach System (BAS), Behavioral Inhibition System (BIS), Fight-Flight-Freeze System (FFFS), and defensive fight. As expected, self-oriented perfectionism showed positive relations with BAS goal-drive persistence, BAS reward reactivity, and the BIS (but not with the FFFS and BAS impulsivity); other-oriented perfectionism showed a negative relation with the BIS and a positive relation with defensive fight; and socially prescribed perfectionism showed positive relations with the BIS, the FFFS, and BAS impulsivity and also a negative relation with BAS goal-drive persistence. Unexpectedly, self-oriented perfectionism did not show a unique relation with BAS reward interest. Instead, other-oriented perfectionism showed positive relations with all goal- and reward-oriented BAS components.

With respect to the second aim, the study found that self-oriented perfectionism showed a

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[1]See Supplementary Material for the full results including all total, direct, and indirect effects.

unique positive relation with positive expectations only, whereas other-oriented perfectionism showed a positive relation with positive expectations and a negative relation with negative expectations. Socially prescribed perfectionism showed the opposite pattern: a negative relation with positive expectations and a positive relation with negative expectations.

Turning to the third aim, the study found that also the rRST components showed a differential pattern of unique relations with future-directed thinking. As regards positive expectations, all goal- and reward-oriented BAS components showed positive relations whereas BIS showed a negative relation. As regards negative expectations, BAS goal-drive persistence and BAS reward showed negative relations whereas BAS impulsivity and BIS showed positive relations. Furthermore, the rRST components mediated the relations between perfectionism and future-directed thinking showing a differential pattern of indirect effects. Self-oriented perfectionism had positive and negative effects on positive expectations, and positive and negative effects on negative expectations. In contrast, other-oriented perfectionism had positive effects on positive expectations, and negative effects on negative expectations. Socially prescribed perfectionism showed the opposite pattern: negative effects on positive expectations, and positive effects on negative expectations.

The present findings confirm that self-oriented perfectionism is an ambivalent form of perfectionism because it showed positive relations not only with reward- and goal-oriented BAS components, but also with the BIS. Consequently, it had mixed effects on future-directed thinking, showing positive and negative indirect effects on positive and negative expectations. In comparison, other-oriented perfectionism appeared to be an adaptive form of perfectionism. Other-oriented perfectionism showed positive relations with reward- and goal-oriented BAS components and a negative relation with BIS. Consequently, it had only positive indirect effects on positive expectations and negative indirect effect on negative expectations. In contrast, socially prescribed perfectionism was confirmed to be a thoroughly maladaptive form of perfectionism, showing negative relations with reward- and goal-oriented BAS components, but a positive relation with BAS impulsivity in addition to positive relations with the BIS and FFFS. Consequently, socially prescribed perfectionism had negative indirect effects on positive expectations and positive indirect effects on negative expectations. If we regard positive and negative expectations as indicators of optimism versus pessimism, and lack of positive expectations as an indicator of hopelessness (O'Connor et al., 2000), the present findings suggest that other-oriented perfectionists are the most optimistic about the future expecting more positive

events and fewer negative events happening to them. Self-oriented perfectionists are also optimistic, but only expect more positive events (but not fewer negative events). In contrast, socially prescribed perfectionists expect fewer positive events and more negative events. Thus, socially prescribed perfectionists display a pattern of future-directed thinking reflecting pessimism and hopelessness which dovetails with findings linking socially prescribed perfectionism to hopelessness, depression, and suicide ideation (e.g., O'Connor et al., 2004; Roxborough et al., 2012).

Whereas other-oriented perfectionism showed a pattern of relations with rRST components and future-directed thinking suggesting that it is an adaptive form of perfectionism, there are two caveats. First, other-oriented perfectionism also showed a positive relation with defensive fight which is in line with previous finding that other-oriented perfectionism is associated with antagonistic and antisocial personality traits (Stoeber, 2014a, 2014b, 2015). Second, other-oriented perfectionism is also associated with grandiose narcissism (Stoeber, Sherry, & Nealis, 2015). Consequently, other-oriented perfectionists' expectations that—in the next two weeks—many positive events (and few negative events) will happen to them may not be a realistic expectation, but a reflection of narcissistic grandiosity and entitlement.

Finally, our study is the first to examine the relations of rRST and future-directed thinking. As expected, the rRST components explained substantial variance in future-directed thinking over and above perfectionism (see Table 4) with all BAS and BIS components of rRST playing a significant role. Furthermore, the present findings further corroborate Corr and Cooper's (in press) conceptualization of the BAS differentiating BAS impulsivity from the goal- and reward-oriented BAS components. All these BAS components showed positive relations with positive expectations (or negative relations with negative expectations). In contrast, BAS impulsivity—reflecting uncontrolled, undirected, and unreflected behavioral activation (see sample item in Section 2.2.2)—showed a positive relation with negative expectations which dovetails with Corr and Cooper's finding that BAS impulsivity showed positive correlations with psychoticism and trait anxiety, indicating that BAS impulsivity captures maladaptive aspects of the BAS.

4.2. Limitations and future studies

Our study had a number of limitations. First, the sample was predominantly female (86%). Whereas this is representative of British university students in psychology (Universities and Colleges Admissions Service, 2015), future studies should reexamine our findings with samples that have a more balanced proportion of males and females. Second, the study employed a cross-

sectional correlational design. Consequently, the relations found in the regression and mediation analyses of perfectionism and reinforcement sensitivity predicting future-directed thinking should not be interpreted in a causal or temporal fashion. Future studies may profit from employing longitudinal designs to reexamine the mediation effects suggested in the present study. Third, our study focused on Hewitt and Flett's (1991) multidimensional model of perfectionism. Although this is one of the most widely-used models of perfectionism, future studies may profit from extending the present research to other multidimensional models that include self-oriented, other-oriented, and socially prescribed aspects of perfectionism (e.g., Smith, Saklofkse, Stoeber, & Sherry, 2016).

4.3. Conclusions

This is the first study to examine the relations between rRST, multidimensional perfectionism, and future-directed thinking. Our results show consistent associations between the two sets of constructs, and the mediation analyses suggest possible causal pathways from perfectionism through rRST factors to future-directed positive and negative expectations. Although our results need replicating, they open up new avenues of research into the reinforcement sensitivity and personality bases of perfectionism and future-directed thinking.

References

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Corr, P.J. (2016). Reinforcement Sensitivity Theory of Personality questionnaires: Structural survey with recommendations. *Personality and Individual Differences*, 89, 60-64.

Corr, P.J., & Cooper, A. (in press). The Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ): Development and validation. *Psychological Assessment*.

Corr, P.J., & McNaughton, N. (2008). Reinforcement Sensitivity Theory and personality. In P.J. Corr (Ed.), *The Reinforcement Sensitivity Theory of Personality* (pp. 155-187). Cambridge, UK: Cambridge University Press.

Corr, P.J., & McNaughton, N. (2012). Neuroscience and approach/avoidance personality traits: A two stage (valuation–motivation) approach. *Neuroscience and Biobehavioral Reviews*, *36*, 2339-2354.

Hayes, A.F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A*

regression-based approach. New York: Guilford.

Hewitt, P.L., & Flett, G.L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*, 456-470.

Hewitt, P.L., & Flett, G.L. (2004). *Multidimensional Perfectionism Scale (MPS): Technical manual*. Toronto: Multi-Health Systems.

MacLeod, A.K., Byrne, A., & Valentine, J.D. (1996). Affect, emotional disorder, and future-directed thinking. *Cognition and Emotion, 10*, 69-86.

McNaughton, N., & Corr, P.J. (2004). A two-dimensional view of defensive systems: Defensive distance and fear/anxiety. *Neuroscience and Biobehavioral Reviews, 28*, 285-305.

O'Connor, R.C., Connery, H., & Cheyne, W.M. (2000). Hopelessness: The role of depression, future directed thinking and cognitive vulnerability. *Psychology, Health & Medicine, 5*, 155-161.

O'Connor, R.C., O'Connor, D.B., O'Connor, S.M., Smallwood, J., & Miles, J. (2004). Hopelessness, stress, and perfectionism: The moderating effects of future thinking. *Cognition and Emotion, 18*, 1099-1120.

O'Connor, R.C., Whyte, M.-C., Fraser, L., Masterton, G., Miles, J., & MacHale, S. (2007). Predicting short-term outcome in well-being following suicidal behaviour: The conjoint effects of social perfectionism and positive future thinking. *Behaviour Research and Therapy, 45*, 1543-1555.

Roxborough, H.M., Hewitt, P.L., Kaldas, J., Flett, G.L., Caelian, C.M., Sherry, S.B, & Sherry, D.L. (2012). Perfectionistic self-presentation, socially prescribed perfectionism, and suicide in youth: A test of the perfectionism social disconnection model. *Suicide and Life-Threatening Behavior, 42*, 217-233.

Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass, 5*, 359-371.

Slade, P.D., & Owens, R.G. (1998). A dual process model of perfectionism based on reinforcement theory. *Behavior Modification, 22*, 372-390.

Smith, M.M., Saklofske, D.H., Stoeber, J., & Sherry, S.B. (2016). The Big Three Perfectionism Scale: A new measure of perfectionism. *Journal of Psychoeducational Assessment, 34*, 670-687.

Stöber, J. (2000). Prospective cognitions in anxiety and depression: Replication and methodological extension. *Cognition and Emotion, 14*, 725-729.

Stoeber, J. (2014a). How other-oriented perfectionism differs from self-oriented and socially prescribed perfectionism. *Journal of Psychopathology and Behavioral Assessment, 36*, 329-338.

Stoeber, J. (2014b). Multidimensional perfectionism and the DSM-5 personality traits. *Personality and Individual Differences, 64*, 115-120.

Stoeber, J. (2015). How other-oriented perfectionism differs from self-oriented and socially prescribed perfectionism: Further findings. *Journal of Psychopathology and Behavioral Assessment, 37*, 611-623.

Stoeber, J., & Corr, P.J. (2015). Perfectionism, personality, and affective experiences: New insights from revised Reinforcement Sensitivity Theory. *Personality and Individual Differences, 86*, 354-359.

Stoeber, J., Sherry, S.B., & Nealis, L.J. (2015). Multidimensional perfectionism and narcissism: Grandiose or vulnerable? *Personality and Individual Differences, 80*, 85-90.

Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.

Universities and Colleges Admissions Service (2015). End of cycle 2015 data resources: DR3_019_01 acceptances by detailed subject group and sex. Available from https://t.co/5W5Z4N0Iev

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research, 37*, 197-206.

Table 1

Bivariate Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Perfectionism												
1. Self-oriented												
2. Other-oriented	.32***											
3. Socially prescribed	.25***	.23***										
Reinforcement sensitivity												
4. BAS reward interest	.15**	.22***	–.01									
5. BAS goal-drive persistence	.54***	.24***	–.05	.48***								
6. BAS reward reactivity	.24***	.22***	.07	.44***	.41***							
7. BAS impulsivity	.05	.17**	.22***	.30***	.08	.40***						
8. BIS	.22**	–.07	.38***	–.13*	–.01	.12*	.21***					
9. FFFS	.12*	.01	.18**	–.02	.14**	.16**	.22***	.35***				
10. Defensive fight	.12*	.24***	.08	.30***	.20***	.24***	.43***	.09	–.01			
Future-directed thinking												
11. Positive expectations	.20***	.24***	–.23***	.51***	.53***	.40***	.06	–.33***	–.05	.18**		
12. Negative expectations	–.01	–.11*	.37***	–.14*	–.25***	–.09	.20***	.56***	.16**	.00	–.37***	
M	70.43	55.88	56.55	18.03	21.93	29.56	20.44	64.71	25.39	22.94	45.26	65.15
SD	14.75	9.89	12.00	4.25	3.81	4.82	4.62	13.20	6.39	4.06	9.32	20.35
Cronbach's alpha	.90	.71	.82	.81	.84	.79	.74	.92	.80	.73	.84	.92

Note. $N = 337$. BAS = Behavioral Approach System; BIS = Behavioral Inhibition System; FFFS = Fight-Flight-Freeze System; positive/negative expectations = subjective likelihood of experiencing positive/negative events in the next two weeks.

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

Table 2

Perfectionism Predicting Reinforcement Sensitivity Components

	Perfectionism		
Reinforcement sensitivity	Self-oriented	Other-oriented	Socially prescribed
BAS reward interest	.10	.20***	–.09
BAS goal-drive persistence	.56**	.11*	–.21***
BAS reward reactivity	.19***	.16**	–.01
BAS impulsivity	–.05	.14*	.20***
BIS	.20**	–.22***	.38***
FFFS	.10	–.06	.17**
Defensive fight	.04	.22***	.02

Note. $N = 337$. BAS, BIS, FFFS: see Table 1. Standardized regression coefficients from multiple regressions simultaneously entering the three forms of perfectionism as predictors.

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

Table 3

Reinforcement Sensitivity Predicting Future-Directed Thinking

	Reinforcement sensitivity						
Future-directed thinking	BAS reward interest	BAS goal-drive persistence	BAS reward reactivity	BAS impulsivity	BIS	FFFS	Defensive fight
Positive expectations	.22***	.33***	.23***	–.06	–.22***	–.01	.03
Negative expectations	.07	–.21***	–.16**	.18***	.56***	–.02	–.07

Note. $N = 337$. BAS, BIS, FFFS: see Table 1. Standardized regression coefficients from multiple regressions simultaneously entering the reinforcements sensitivity components as predictors.

**$p < .01$. ***$p < .001$.

Table 4

Perfectionism and Reinforcement Sensitivity Predicting Future-Directed Thinking: Hierarchical Regression Analyses

	Positive expectations		Negative expectations	
	ΔR^2	β	ΔR^2	β
Step 1: Perfectionism	.181***		.184***	
Self-oriented		.20***		–.06
Other-oriented		.25***		–.19***
Socially prescribed		–.34***		.43***
Step 2: Reinforcement sensitivity	.326***		.244***	
Self-oriented perfectionism		.02		–.02
Other-oriented perfectionism		.09		–.06
Socially prescribed perfectionism		–.15**		.18***
BAS reward interest		.22***		.07
BAS goal-drive persistence		.30***		–.17**
BAS reward reactivity		.22***		–.15**
BAS impulsivity		–.05		.16**
BIS		–.26***		.50***
FFFS		.00		–.03
Defensive fight		.01		–.06

Note. $N = 337$. BAS, BIS, FFFS, positive/negative expectations: see Table 1. All predictors were entered simultaneously. β = standardized regression coefficient. $^{**}p < .01$. $^{***}p < .001$.

Table 5

Mediation Analyses: Summary of Indirect Effects

Path	IE
Positive expectations (PE)	
Self-oriented perfectionism (SOP)	
SOP → BAS goal-drive persistence → positive expectations	.17***
SOP → BAS reward reactivity → positive expectations	.04**
SOP → BIS ⇨ positive expectations	–.05**
Other-oriented perfectionism (OOP)	
OOP → BAS reward interest → positive expectations	.04**
OOP → BAS goal-drive persistence → positive expectations	.03*
OOP → BAS reward reactivity → positive expectations	.03*
OOP ⇨ BIS ⇨ positive expectations	.06***
Socially prescribed perfectionism (SPP)	
SPP ⇨ BAS goal-drive persistence → positive expectations	–.06***
SPP → BIS ⇨ positive expectations	–.10***
Negative expectations	
Self-oriented perfectionism (SOP)	
SOP → BAS goal-drive persistence ⇨ negative expectations	–.10**
SOP → BAS reward reactivity ⇨ negative expectations	–.03*
SOP → BIS → negative expectations	.10***
Other-oriented perfectionism (OOP)	
OOP ⇨ BIS → negative expectations	–.11***
Socially prescribed perfectionism (SPP)	
SPP ⇨ BAS goal-drive persistence ⇨ negative expectations	.03*
SPP → BAS impulsivity → negative expectations	.03*
SPP → BIS → negative expectations	.18***

Note. $N = 337$. BAS, BIS, positive/negative expectations: see Table 1. IE = completely standardized indirect effect (see Hayes, 2013). → = positive effect, ⇨ = negative effect. See Supplementary Material for the full results.

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

Supplementary Material

Mediation Analyses: Full Results

	Effect[a]
Positive expectations	
Self-oriented perfectionism (SOP)	
Total effect	.13***
Direct effect	.01
Indirect effects	
SOP → BAS reward interest → positive expectations	.01
SOP → BAS goal-drive persistence → positive expectations	.10***
SOP → BAS reward reactivity → positive expectations	.03**
SOP ⇨ BAS impulsivity ⇨ positive expectations	.00
SOP → BIS ⇨ positive expectations	–.03**
SOP → FFFS → positive expectations	.00
SOP → defensive fight → positive expectations	.00
Other-oriented perfectionism (OOP)	
Total effect	.24***
Direct effect	.08
Indirect effects	
OOP → BAS reward interest → positive expectations	.04**
OOP → BAS goal-drive persistence → positive expectations	.03*
OOP → BAS reward reactivity → positive expectations	.03*
OOP → BAS impulsivity ⇨ positive expectations	–.01
OOP ⇨ BIS ⇨ positive expectations	.06***
OOP ⇨ FFFS → positive expectations	.00
OOP → defensive fight → positive expectations	.00
Socially prescribed perfectionism (SPP)	
Total effect	–.27***
Direct effect	–.11**
Indirect effects	

SPP ⇨ BAS reward interest → positive expectations	–.01
SPP ⇨ BAS goal-drive persistence → positive expectations	–.05***
SPP ⇨ BAS reward reactivity → positive expectations	–.00
SPP → BAS impulsivity ⇨ positive expectations	–.01
SPP → BIS ⇨ positive expectations	–.08***
SPP → FFFS → positive expectations	.00
SPP → defensive fight → positive expectations	.00
Negative expectations	
Self-oriented perfectionism (SOP)	
Total effect	–.08
Direct effect	–.03
Indirect effects	
SOP → BAS reward interest → negative expectations	.01
SOP → BAS goal-drive persistence ⇨ negative expectations	–.13**
SOP → BAS reward reactivity ⇨ negative expectations	–.04*
SOP ⇨ BAS impulsivity → negative expectations	–.01
SOP → BIS → negative expectations	.14***
SOP → FFFS ⇨ negative expectations	–.00
SOP → defensive fight ⇨ negative expectations	–.00
Other-oriented perfectionism (OOP)	
Total effect	–.39***
Direct effect	–.13
Indirect effects	
OOP → BAS reward interest → negative expectations	.03
OOP → BAS goal-drive persistence ⇨ negative expectations	–.04
OOP → BAS reward reactivity ⇨ negative expectations	–.05
OOP → BAS impulsivity → negative expectations	.05
OOP ⇨ BIS → negative expectations	–.23***
OOP → FFFS ⇨ negative expectations	–.00
OOP → defensive fight ⇨ negative expectations	–.03
Socially prescribed perfectionism (SPP)	

Total effect	.73***
Direct effect	.31***
Indirect effects	
SPP ⇨ BAS reward interest → negative expectations	–.01
SPP ⇨ BAS goal-drive persistence ⇨ negative expectations	.06*
SPP ⇨ BAS reward reactivity ⇨ negative expectations	.00
SPP → BAS impulsivity → negative expectations	.05*
SPP → BIS → negative expectations	.32***
SPP → FFFS ⇨ negative expectations	–.01
SPP → defensive fight ⇨ negative expectations	–.00

Note. $N = 337$. BAS = Behavioral Approach System; BIS = Behavioral Inhibition System; FFFS = Fight-Flight-Freeze System; positive/negative expectations = subjective likelihood of experiencing positive/negative events in the next two weeks. Indirect effects significance-tested with Sobel and bootstrapping tests (see Hayes, 2013). → = positive effect, ⇨ = negative effect with .00 denoting effects between 0 and .005, and –.00 denoting effects between –.005 and 0. Note that the sign of indirect effects is determined by the signs of the effects it combines. If a predictor X positively predicts a mediator M, and M positively predicts an outcome Y, the indirect effect of X on Y is positive. The same holds if X negatively predicts M, and M negatively predicts Y. In contrast, if X positively predicts M, and M negatively predicts Y, the indirect effect of X on Y is negative. The same holds if X negatively predicts M, and M positively predicts Y. Further note that significant indirect effects are meaningful independent of whether the total effect is significant or not (Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010).

[a]All effects are unstandardized so that total effect = direct effect + indirect effects (except for rounding errors).

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