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Realistic affective forecasting: The role of personality

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ABSTRACT

Affective forecasting often drives decision-making. Although affective forecasting research has often focused on identifying sources of error at the event level, the present investigation draws upon the "realistic paradigm" in seeking to identify factors that similarly influence predicted and actual emotions, explaining their concordance across individuals. We hypothesised that the personality traits neuroticism and extraversion would account for variation in both predicted and actual emotional reactions to a wide array of stimuli and events (football games, an election, Valentine's Day, birthdays, happy/sad film clips, and an intrusive interview). As hypothesised, individuals who were more introverted and neurotic anticipated, correctly, that they would experience relatively more unpleasant emotional reactions, and those who were more extraverted and less neurotic anticipated, correctly, that they would experience relatively more pleasant emotional reactions. Personality explained 30% of the concordance between predicted and actual emotional reactions. Findings suggest three purported personality processes implicated in affective forecasting, highlight the importance of individual-differences research in this domain, and call for more research on realistic affective forecasts.

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When making decisions, people often engage in affective forecasting, the process of predicting how future events will influence their emotional well-being. People tend to make bad decisions when their affective forecasts are steeped in error, and good decisions when their forecasts are realistic (Dunn & Laham, 2006; Hsee & Zhang, 2010; Wilson & Gilbert, 2005). The social-cognitive error paradigm, popular in this domain of research, has focused on identifying factors that differentially influence predicted versus actual emotional reactions (Hoerger, Quirk, Lucas, & Carr, 2009, 2010; see also, Mathieu & Gosling, 2012), thus resulting in discrepancies or error. In contrast, the "realistic paradigm" (Funder, 1995) seeks to identify factors that comparably explain both predicted *and* actual emotional reactions, accounting for any degree of congruence across individuals in terms of who predicts and experiences more positive or negative reactions. Identifying factors that account for realistic affective forecasting could help to foster a balanced understanding of strengths and weaknesses in affective forecasting.

This investigation provides an illustrative example of the realistic paradigm in affective forecasting research by examining the extent to which personality dually explains predicted and actual reactions to a range of life events and laboratory stimuli, contributing to their concordance. In particular, theoretical evidence (Gray, 1994; also Corr, 2004, 2008) and empirical findings (Canli et al., 2001; Costa & McCrae, 1980; Gross, Sutton, & Ketelaar, 1998; Hoerger & Quirk, 2010; Tellegen, 1985; Zelenski & Larsen, 2001) on dispositional emotionality suggest that individuals who are more extraverted and less neurotic tend to experience more pleasant emotional reactions. The present investigation builds on this body of literature by examining whether neuroticism and extraversion are also associated with predicted emotional reactions. If so, personality could account for some of the relative match across individuals' predicted and actual reactions.

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A historical perspective: the error paradigm as the prevailing zeitgeist

Judgement research has traditionally drawn from two complementary perspectives, the realistic paradigm and the error paradigm (for reviews, see Funder, 1987, 1995, 2012). In the first half of the twentieth century, this research was dominated by the realistic paradigm, which emphasises the ways in which judgements are "good", defined as concordant across raters, stable, beneficial, or predictive of later behaviour (Dymond, 1949; Taft, 1955; Vernon, 1933). With the rise of social and cognitive psychology in the 1980s, the error paradigm gained prominence (Funder, 1995, 2012; Swann & Seyle, 2005), emphasising the ways in which judgements are "bad", or discordant from objective measurements, informant reports, actuarial data, or optimal reasoning. The prevailing focus on error is readily apparent in the emerging field of research on affective forecasting. For example, consistent with the error paradigm, 66% of articles in two recent meta-analyses (Levine, Lench, Kaplan, & Safer, 2012; Mathieu & Gosling, 2012) had titles that described affective forecasting using explicitly negative terms (e.g., *error*, *bias*, *failure*, *ignorance*, and *emotional innumeracy*[1]); no title described affective forecasting positively.

Affective forecasting studies have proceeded at two different levels of abstraction, increasingly shifting from descriptive to mechanistic research. Namely, descriptive studies have focused on the general level of the emotional event, aiming to identify whether forecasts are generally realistic versus error-prone. The central conclusions have been that affective forecasts can be prone to biases towards overestimating or underestimating the emotional intensity of future events (Wilson & Gilbert, 2013), and simultaneously, rank-order concordance is often moderate to high (*r*s from .30 to .50; Mathieu & Gosling, 2012), meaning that people can to some extent realistically gauge whether their emotional reactions will be more or less intense than the reactions of other individuals. Studies have moved towards the more specific question of what mechanisms—situational or individual-difference factors—influence predicted and actual emotional reactions.

Examples of mechanistic research from both the realistic and error paradigms across three common domains of judgement are provided in Table 1. In each domain, error research seeks to identify mechanisms that differentially affect predicted versus actual outcomes. In the affective forecasting domain, for example, emotional regulation strategies can affect actual emotional reactions considerably but bear little on emotional predictions, resulting in error (Dillard, Fagerlin, Dal Cin, Zikmund-Fisher, & Ubel, 2010; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Hoerger, 2012). Relatedly, an attentional bias called focalism, which leads people to focus on the most salient feature of an event, can affect predicted emotional reactions considerably but in some studies has been found to play less of a role in actual reactions, also resulting in error (Hoerger et al., 2009, 2010; Lench, Safer, & Levine, 2011; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). These examples, focused on explaining differential variance in predicted versus actual reactions, contrast with research from the realistic paradigm seeking to identify mechanisms that explain substantive variance in both predicted and actual ratings simultaneously. For example, in the context of weather forecasting (see Table 1), geographic elevation affects regional variation in temperature, and because this information is widely documented, geographic elevation similarly affects weather forecasts, contributing towards them being realistic. Analogously, in the affective forecasting domain, some factors such as personality that shape actual emotional reactions might also underlie emotional predictions, contributing to realistic affective forecasting in terms of the relative positivity or negativity of reactions across individuals. Any particular forecast is likely multidetermined by a combination of concordance-enabling mechanisms that foster realistic forecasts and discordance-enabling mechanisms that foster erroneous forecasts. Although recent trends in psychology have favoured error research, understanding both realistic and error mechanisms is needed as these two complementary perspectives seek to answer different questions about the nature of judgement, such as understanding strengths versus weaknesses.

Personality and affective forecasting accuracy

The realistic paradigm suggests new avenues for incorporating personality research into studies on

[1]The exhaustive list of other error-focused terms includes the following: *cannot predict*, *contrary to affective forecasts*, *do not anticipate*, *do not learn*, *focalism*, *mispredict*, *misunderstand*, *more regret than imagined*, *neglect*, *unaware*, and *underestimating*.

Table 1. Hypothetical examples of the error paradigm and realistic paradigm in three forecasting contexts.

Paradigm	Weather forecasting	Political forecasting	Affective forecasting
Error paradigm	Goal: Identify sources of bias in weather forecasts Examples: Wet bias (overprediction of rain), climate bias (ignoring secular changes in climate)	Goal: Identify sources of bias in political polls (forecasts) Examples: Landline bias (conservative bias in polling only landline phones), organisational bias (bias favouring the polling organisations' views)	Goal: Identify sources of bias in emotional predictions Examples: Immune neglect (bias towards overlooking coping strategies), focalism (bias towards ignoring non-central life events)
Realistic paradigm	Goal: Identify factors influencing both weather forecasts and observed weather, leading them to match Examples: Geographic latitude, geographic elevation, season	Goal: Identify factors influencing both election polls as well as election results, leading them to match Examples: Incumbency status, state of the economy	Goal: Identify factors influencing both predicted and actual emotional reactions, leading them to match in terms of relative ordering across individuals Examples: Neuroticism, extraversion

affective forecasting. We begin by outlining how personality could logically and statistically explain concordance. Consider Figure 1. In this Venn diagram, predicted emotional reactions are realistic to the extent that they overlap with actual emotional reactions (Sections A and B), suggesting relative consistency across individuals in terms of who predicts and experiences more positive or negative reactions. Personality could contribute to realistic affective forecasting in two ways. For one, personality could account for a portion of the shared variance in predicted and actual emotional reactions (Section A), reflecting a general "dispositional emotionality" that influences both predicted and actual emotional reactions to events or stimuli. Some theoretical evidence suggesting a broad role of personality in anticipation, approach motivation, and emotional response is consistent with this view (Corr, 2004, 2008; Gray, 1994; Hoerger & Quirk, 2010; Quirk, Subramanian, & Hoerger, 2007). As well, personality could simultaneously explain variance in predicted and actual reactions through two other distinct channels, one involving "prospection", the capacity to imagine one's future (see Figure 1C), and another involving "experiential awareness" related to contemplating one's subjective experience (see Figure 1D). For example, some theorising has emphasised the ways in which these two processes fundamentally differ (Dunn, Forrin, & Ashton-James, 2009; McConnell, Dunn, Austin, & Rawn, 2011; Robinson & Clore, 2002), suggesting that different elements of personality might be involved in prospection versus emotional awareness.

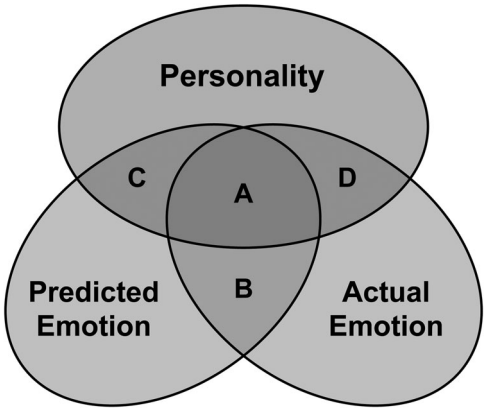

Figure 1. Personality and realistic affective forecasting. Personality could account for realistic affective forecasting in terms of the relative ordering of positive to negative predicted and actual reactions across individuals. Namely, personality could explain common variance in both predicted and actual emotions (Section A), and simultaneously explain unique variance in predicted emotions (Section C) and actual emotions (Section D).

Prior research has provided robust evidence for the relationship between emotions and particular personality traits, especially neuroticism and extraversion. In particular, higher extraversion and lower neuroticism are associated with more pleasant *actual* emotional reactions to stimuli and life events (Canli et al., 2001; Costa & McCrae, 1980; Gross et al., 1998; Mroczek & Almeida, 2004; Nettle, 2006; Tellegen, 1985; Zelenski & Larsen, 2001). Although those studies have documented the overlap between personality and actual emotions using experimental (Canli et al., 2001; Gross et al., 1998; Zelenski & Larsen, 2001) or longitudinal (Costa & McCrae, 1980; Mroczek & Almeida, 2004; Tellegen, 1985) designs, none examined predicted emotional reactions to upcoming events or stimuli.

To our knowledge, only three studies have directly examined the relationship between personality traits and both predicted and actual reactions. In one study (Hoerger & Quirk, 2010), US undergraduate participants completed an International Personality Item Pool (IPIP) measure (Goldberg, 1999) of the Big 5

personality traits—neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness—and reported predicted and actual emotional reactions to Valentine's Day. Higher extraversion and lower neuroticism were associated with more pleasant predicted and actual emotional reactions, though that study did not partition variance in order to determine whether personality contributed to realistic forecasts via a general "dispositional emotionality" (see Figure 1A), separate processes involving "prospection" (see Figure 1C) and "experiential awareness" (see Figure 1D), or all three. In a second study (Zelenski et al., 2013), US undergraduates completed a brief adjective-based measure of extraversion (Saucier, 1994) and reported predicted and actual reactions to small-group activities in the lab, such as engaging in small talk or completing puzzles. As in Hoerger and Quirk (2010), they found that extraversion was associated with more pleasant predicted reactions. Surprisingly, personality was not related to actual reactions to their lab tasks, contrary to much of the personality–emotion literature (Canli et al., 2001; Zelenski & Larsen, 2001). In a third study (Quoidbach & Dunn, 2010), Belgian adults completed a neuroticism scale from the Big Five Inventory (John & Srivastava, 1999) and an optimism measure (Scheier, Carver, & Bridges, 1994), and then reported predicted and actual reactions to President Obama's electoral victory. No relationship between personality and predicted reactions was found, though it was unclear whether the context—Belgian's reactions to US politics—was evocative and representative. Nonetheless, personality was related to actual emotional reactions, reflecting its role in contemplating and reporting on subjective experience (see Figure 1D). In summary, some research suggests that higher extraversion and lower neuroticism may be related to more pleasant predicted and actual emotional reactions, though prior findings have been mixed, potentially affected by methodological limitations, and have not distinguished dispositional emotionality from prospection and experiential awareness (see Figure 1).

Present investigation

In the present investigation, we examined the role of personality in affective forecasting across a range of emotionally evocative stimuli and events. This included primary analyses of new and existing data on affective forecasting for football games, an election, Valentine's Day, birthdays, happy and sad film clips, and an intrusive interview. Our primary aim was to examine whether personality was associated with both predicted and actual emotional reactions. Consistent with prior research (Canli et al., 2001; Mellers & McGraw, 2001; Nettle, 2006; Smits & Boeck, 2006; Zelenski & Larsen, 2001), we hypothesised that higher extraversion and lower neuroticism would be associated with more pleasant predicted and actual emotional reactions to these stimuli and events. Heterogeneity analyses examined whether effect sizes varied for neuroticism versus extraversion. As well, prior research has found, albeit inconsistently, that findings can vary across the item content of personality surveys as well as for positive versus negative affect ratings (Corr, 2004; Grucza & Goldberg, 2007). Thus, we also dichotomised personality items as more or less relevant for affective forecasting (described in the section "Methods") to explore the influence of item content, and we conducted another set of heterogeneity analyses to explore whether forecasts of negative affect and positive affect are equally influenced by personality. Our secondary aim was to examine whether personality accounted for shared variance in predicted and actual emotional reactions (see Figure 1A), unique variance in predicted emotions and unique variance in actual emotions (see Figure 1C and 1D), or some combination of each.

Methods

The investigation involved five samples of participants ($N = 713$). The studies included four real-world emotional events (Samples 1–4) and three emotionally evocative stimuli (Sample 5). The events and stimuli were intended to be relevant to the participants in these studies and vary in affective valence. Some studies focused on immediate emotional reactions, while others focused on the potentially more challenging task (Finkenauer, Gallucci, van Dijk, & Pollmann, 2007; Wilson et al., 2000) of predicting how one would feel days or weeks after a target event occurred. The studies also varied along a number of contextual dimensions (e.g., personal versus societal relevance, field versus lab setting), allowing us to examine the effects of personality across scenarios. The former three samples involved primary analyses of existing data (Hoerger, Quirk, Chapman, & Duberstein, 2012; Hoerger et al., 2009, 2010), and the latter two involved new data collection. The studies included measures of extraversion (Sample 3), neuroticism (Sample 5), or both (Samples 1, 2, and 4).

Sample 1: Football game

Participants and procedures. Sample 1 (Hoerger et al., 2009) involved 180 students (67% women; mean age = 19.6 years, SD = 2.7 years) at Michigan State University (MSU). Participants completed a personality measure at baseline and then provided predicted happiness ratings for one of nine home team college football games. At follow-up, they provided actual happiness ratings for the corresponding game. Half of participants happened to experience a winning game, and half a loss. All football games were held on Saturdays.

Emotion ratings. Three days prior to the game, participants predicted how happy they would feel the following Monday both in the event of a win and a loss (predicted ratings for the game outcome that did not occur were discarded). Then, on the following Monday, they reported their actual current happiness. Predicted and actual emotion ratings were made on a 9-point happiness scale used in prior forecasting studies (Gilbert et al., 1998).

Personality. Participants completed 10-item IPIP (Goldberg, 1999) measures of neuroticism ($\alpha = .87$, e.g., "I often feel blue") and extraversion ($\alpha = .84$, e.g., "I look at the bright side of life"). The IPIP scales have shown evidence for reliability and convergent validity with other personality measures (Goldberg, 1999).

Sample 2: Election

Participants and procedures. Sample 2 (Hoerger et al., 2010) involved 57 MSU students (68% women; mean age = 19.5 years, SD = 1.3 years). At baseline, they completed a personality measure and provided predicted happiness ratings for the 2004 US Presidential election; 65% of participants supported John Kerry and 35% supported George W. Bush. At follow-up after the election, participants reported their actual happiness.

Emotion ratings. In the two months leading up to the election, participants predicted how happy they would feel two weeks after the election, both in the event Bush won and Kerry won (predicted ratings for a Kerry win were discarded). Two weeks after the election, they reported on their actual current level of happiness. Emotion ratings were made using the same 9-point happiness scale as in Sample 1.

Personality. Neuroticism ($\alpha = .86$) and extraversion ($\alpha = .85$) were assessed using the same scales as in Sample 1.

Sample 3: Valentine's Day

Participants and procedures. Sample 3 (Hoerger, Quirk, et al., 2012) included 325 students (80% women; mean age = 19.8 years, SD = 2.1 years) at Central Michigan University (CMU) studied in 2007. Methods were similar to the 2006 Valentine's Day study noted previously (Hoerger & Quirk, 2010). In January, participants completed a personality measure and predicted their reactions to Valentine's Day and each of two subsequent days (2/14, 2/15, and 2/16). In February they provided actual ratings of current emotions on each of those three days.

Emotion ratings. Using 9-point rating scales, predicted and actual emotional reactions were rated along six dimensions: happiness, pleasure, joy, sadness, gloom, and misery. Negative affects were reverse coded, and ratings were averaged across emotions and days (2/14, 2/15, and 2/16) to yield composite indicators of predicted and actual reactions (average $\alpha = .91$).

Personality. As a proxy measure of extraversion, we analysed data from the 18-item Temporal Experience of Pleasure Scale (TEPS) ($\alpha = .85$, Gard, Gard, Kring, & John, 2006), which assesses trait differences in positive emotionality (e.g., "When something exciting is coming up in my life, I really look forward to it"). The TEPS is a valid proxy as it has been shown in diverse samples to be associated with several de facto indicators of extraversion, such as positive affectivity, interpersonal involvement, activation, and approach motivation (Buck & Lysaker, 2013; Ho, Cooper, Hall, & Smillie, 2015; Liu, Wang, Zhu, Li, & Chan, 2012). No measure of neuroticism was included in the study.

Sample 4: Birthdays

Participants and procedures. Participants ($n = 55$) were CMU students (76% female; mean age = 20.5 years, SD = 3.3), who were selected to have birthdays between late October and early December. At the start of the fall semester, participants predicted how they would feel the day after their birthday. Then, the day after their birthday, they reported their current emotional state and completed the personality measure. We focused on the day after birthdays, rather than birthdays themselves, to increase the challenge of the task as well as avoid potential pitfalls, such as some participants reporting actual reactions before their birthday had fully unfolded.

Emotion ratings. Using 5-point rating scales, predicted and actual emotional reactions were rated along four dimensions: happiness, satisfaction,

sadness, and disappointment. Negative affects were reverse coded and ratings averaged to yield composite indicators of predicted and actual reactions (average $\alpha = .80$).

Personality. Extraversion was assessed using the 6-item sociability subscale ($\alpha = .69$, e.g., "I can deal effectively with people") from the TEIQue-SF (Petrides & Furnham, 2006), and neuroticism was assessed using the 6-item emotional well-being scale ($\alpha = .88$, e.g., "On the whole, I have a gloomy perspective on most things") from the same instrument. The scales have been found to correlate with other measures of extraversion and neuroticism in large, diverse samples (Petrides et al., 2010; Siegling, Saklofske, Vesely, & Nordstokke, 2012).

Sample 5: Emotional stimuli

Overview. In contrast to the prior studies involving real-world emotional events, participants in this sample were exposed to emotionally evocative stimuli designed to trigger three broad domains of emotion: happiness, sadness, and anxiety. Brief film clips are commonly used to evoke happiness and sadness (Gruber, Oveis, Keltner, & Johnson, 2008; Morrone-Strupinsky & Depue, 2004). Anxiety is often triggered through interpersonal encounters; for example, several studies have used an intrusive interview of highly personal questions to evoke anxiety (see Shean & Wais, 2000). In each of those studies, personality was associated with emotional reactivity, making the stimuli appropriate for the current investigation.

Participants and procedures. Participants were 96 CMU students (67% women; mean age = 18.6 years, SD = 1.5 years). They provided predicted and actual reactions to emotionally evocative laboratory stimuli, which included two film clips and an intrusive interview. At baseline, participants completed a web-based survey. This involved predicting their emotional reactions to each film clip based on descriptive narratives (119–153 words), predicting their reactions to an intrusive interview based on the interview questions, and completing personality measures. Approximately two months later, they attended a lab session where they experienced each of the stimuli and reported their actual emotional reactions.

Stimuli. The film clips, five minutes each, included college antics in *Old School* (happy film clip) and a funeral scene from *Garden State* (sad film clip). These specific film clips were chosen based on pilot testing demonstrating that they triggered the intended emotional response. The intrusive interview consisted of eight highly personal questions (e.g., "How do you react to criticism and praise by others and what are you criticised and praised for?"), which were designed to evoke temporary feelings of anxiety (for a review of this interview protocol, see Shean & Wais, 2000). Actual emotional reactions were reported immediately after each of these three stimuli. The film clips were presented in a counterbalanced order on a 15-in. PC monitor, followed by the interview. As a series of emotionally evocative stimuli were used, we followed existing recommendations (Rottenberg, Ray, & Gross, 2007) to include neutral stimuli—specifically, five-minute film clips depicting nature scenes—immediately prior to the latter two emotionally evocative stimuli. This reduces the risk that contrast effects could bias ratings.

Emotion ratings. Predicted and actual emotional reactions were assessed using three self-report methods common for triangulating emotional response (Larsen & Prizmic-Larsen, 2006): subjective emotion ratings (like those used in Samples 1–4), behavioural tendency ratings that indicate actions or urges relevant to emotion, and open-ended responses quantitatively coded by raters. In terms of open-ended responses, participants described predicted and actual reactions to each stimulus, for example, "I would feel very sad and upset" ($M = 16.2$, SD = 11.4 words per response). Six psychology graduate students coded these responses using a 9-point emotion rating scale. Interrater reliability was excellent across 3456 ratings (96 participants × 6 ratings × 6 raters), with an average measures intraclass correlation coefficient of .97. Participants also rated predicted and actual reactions via four context-specific ratings of behavioural tendencies indicative of emotion (e.g., "wanting to cry", "wanting to throw something out of frustration"); the specific item wording was customised for each stimulus, based on prior pilot testing, and participants responded using a 9-point rating scale. Finally, participants reported predicted and actual reactions for each stimulus by rating four subjective emotions (e.g., happiness, sadness), using a 9-point rating scale; the specific emotion words were customised by stimulus based on prior pilot testing. The behavioural tendency and subjective rating scales both demonstrated good internal consistency (average $\alpha = .81$). The three types of emotion ratings demonstrated excellent convergent validity with an average intercorrelation of $r = .58$. Accordingly, they were averaged to yield composite indicators of predicted reactions and actual

reactions for each of the three stimuli (average α = .78); higher scores were coded to reflect more pleasant (or less unpleasant) reactions.

Personality. Participants also completed 28 items assessing several indicators of neuroticism (α = .93). The measure included the same 10-item IPIP measure from Studies 1 and 2 (Goldberg, 1999), as well as several related indicators, including a 9-item measure of trait social anxiety (e.g., "I sometimes avoid going to places where there will be many people because I will get anxious"; Raine, 1991), a 5-item measure of negative affect intensity (e.g., "I get upset easily"; Larsen & Diener, 1987), and a 4-item measure of positive-affect shame (e.g., "Expressing enjoyment about a fun activity you're engaged in makes you a bad person"; Kaufman, 2004). These scales have shown evidence for reliability and validity in prior studies examining their relationships with other measures of neuroticism (Goldberg, 1999; Völter et al., 2012; Williams, 1989). No measure of extraversion was included in the study.

Statistical analyses

Descriptive statistics were used to summarise the extent to which affective forecasts were realistic or error-prone at the event level in each sample. Following prior procedures (Mathieu & Gosling, 2012), the zero-order correlation (r) between predicted and actual emotion ratings was used to gauge whether participants were realistic in terms of the relative order of who had the most positive to most negative reactions. The average absolute deviation ($|M_{predicted} - M_{actual}|/SD_{actual}$) between predicted and actual reactions was used as an omnibus indicator of overall error (Dunn, Brackett, Ashton-James, Schneiderman, & Salovey, 2007; Hoerger, Chapman, Epstein, & Duberstein, 2012), which represents the average number of standard deviations that predicted emotion ratings erred from actual emotion ratings. Effects were averaged within the sample (for Sample 5) and then averaged across samples, weighted by sample size.

Our primary aim was evaluated by examining the extent that personality correlated with predicted and actual emotional reactions. All correlations were in the expected direction (positive for extraversion, negative for neuroticism), so in conducting meta-analyses, R-values were used to reflect the magnitude of the effect. In Samples 1, 2, and 4, the multiple R was used to account for the fact that both neuroticism and extraversion were measured in each sample. Weighted averages were computed, first averaging within Sample 5 and then averaging across studies. Steiger's Z-test for dependent correlations was used to examine whether personality correlated differentially with predicted versus actual emotional reactions, and given the large sample size (N = 713), the study was powered to detect correlations that differed by as little as .07 in the overall meta-analysis. In the event of a significant Q statistic, we planned to conduct three sets of heterogeneity analyses. These included examining the magnitude of findings across positive versus negative affect ratings (only Samples 3–5 including both), neuroticism versus extraversion, and variation in findings across specific personality items. Personality items were classified as more conceptually relevant to affective forecasting (i.e., those mentioning feeling words or the future, 43 items, such as "I get upset easily" and "I get anxious when meeting people for the first time") or less conceptually relevant to affective forecasting (25 items, such as "I believe I'm full of personal strengths" and "I would describe myself as a good negotiator") by two raters (93% agreement, κ = .85), with disagreements resolved by consensus.

Our secondary aim was evaluated using a series of hierarchical regression analyses (see, e.g., Seibold & McPhee, 1979; Zientek & Thompson, 2006). Within each sample, we computed five variance estimates: the total variance in predicted emotions explained by personality (Figure 1, Sections A + C), the total variance in actual emotions explained by personality (Sections A + D), the total incremental variance in predicted emotions explained by personality over and above that accounted for by actual emotions (Section C), the total incremental variance in actual emotions explained by personality over and above that accounted for by predicted emotions (Section D), and the total common variance (Section A), computed by subtracting the fourth variance estimate (Section D) from the second estimate (Sections A + D). F-tests were used to evaluate statistical significance, and findings were summarised with weighted averages.

Results

Descriptive overview

The descriptive analyses provide evidence for the ways in which affective forecasting is realistic across

Table 2. Personality, predicted emotional reactions, and actual emotional reactions.

			Concordance between predicted and actual emotions			Personality correlates of predicted and actual emotions	
Study	Emotional stimulus/event	*N*	D_m	*r*	Personality trait(s)	Predicted r	Actual r
1	Football game	180	1.22***	.31***	Extraversion	.37***	.20**
					Neuroticism	−.11	−.23**
2	Election	57	1.02***	.33**	Extraversion	.31*	.16
					Neuroticism	−.21	−.09
3	Valentine's Day	325	0.75***	.65***	Extraversion	.30***	.35***
4	Birthday	55	0.78**	.36**	Extraversion	.42**	.38**
					Neuroticism	−.49***	−.55***
5.1	Sad film	96[b]	0.69**	.64***	Neuroticism	−.38***	−.34***
5.2	Happy film	96	0.67**	.51***	Neuroticism	−.30**	−.40***
5.3	Intrusive interview	96	0.70***	.60***	Neuroticism	−.51***	−.48***
Composite[a]		713	0.88***	.52***		.36***	.35***

Notes: D_m = the average absolute deviation ($|M_{predicted} - M_{actual}|/SD_{actual}$), or the average number of standard deviations that predicted emotion ratings erred from actual emotion ratings. *r* = the zero-order correlation between predicted emotion ratings and actual emotion ratings, reflecting the extent forecasts are realistic in terms of relative ordering across individuals. In all cases, higher values for predicted and actual emotion ratings reflect more pleasant emotions.

[a]The composite is a weighted average. Effects were averaged within sample for Studies 5.1–5.3 and then averaged across Studies 1–5, weighted by sample size. For the composite values in the latter two columns, *R*-values were used in order to make all values positive (each effect was in the hypothesised direction), and in Studies 1, 2, and 4, multiple *R* was used to account for the combined effects of neuroticism and extraversion.

[b]The same sample of participants completed Studies 5.1–5.3.

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

individuals and error-prone at the event level. On average, predicted emotional reactions deviated from actual emotional reactions by 0.88 SD units, $p < .001$ (see Table 2), ranging from 0.67 to 1.22 SD units. At the same time, predicted and actual emotional reactions correlated $r = .52$, $p < .001$, ranging from $r = .31$ to .65, and suggesting some relative consistency across individuals. Both the correlations and estimates of error were statistically significant across all samples and stimuli. In summary, predicted and actual emotional reactions differ from perfect concordance, but are also significantly correlated.

Aim 1: Personality correlates of predicted and actual emotions

Personality was hypothesised and found to correlate with both predicted and actual emotional reactions (see Table 2). Overall, personality correlated $R = .36$, $p < .001$, with predicted emotional reactions. As expected, extraversion was associated with more pleasant predicted emotional reactions, and neuroticism was associated with more unpleasant predicted emotional reactions. The magnitude of the effect varied from $|r| = .11$ to .51. Overall, personality correlated comparably with actual emotional reactions, $R = .35$, $p < .001$. Again, extraversion was associated with more pleasant actual reactions, and neuroticism with more unpleasant reactions. The magnitude of this effect ranged from $|r| = .09$ to .55. As well, the correlations between personality and predicted emotions ($|r| = .33$–.40) and actual emotions ($|r| = .29$–.41) were comparable across the varying methodologies employed in Sample 5.

For the composite estimate, personality was similarly associated with predicted and actual emotional reactions, Steiger's $Z = .30$, $p = .77$. Although Steiger's *Z* was also non-significant in each sample, there was significant variability in the magnitude of the difference between correlations for predicted versus actual reactions ($Q = 32.46$, $p < .001$). However, the planned heterogeneity analyses did not account for this cross-study variability. Specifically, personality-affect correlations were comparable for extraversion (predicted $|r| = .33$, actual $|r| = .31$, $Z = .54$, $p = .59$) and neuroticism (predicted $|r| = .25$, actual $|r| = .28$, $Z = .63$, $p = .53$). Consistent with that finding, individual personality items correlated similarly with predicted and actual emotional reactions regardless of whether the items were defined a priori as more relevant to affective forecasting (predicted $|r| = .18$, actual $|r| = .19$, $Z = -.28$, $p = .78$) or less relevant (predicted $|r| = .18$, actual $|r| = .18$, $Z = .14$, $p = .89$). Moreover, personality scale scores correlated comparably with predicted and actual ratings for both positive (predicted $|r| = .32$, actual $|r| = .35$, $Z = -.72$, $p = .47$) and negative (predicted $|r| = .29$, actual $|r| = .32$, $Z = -.79$, $p = .43$) affects.

Table 3. Personality is associated with total, unique, and shared variance in predicted and actual emotional reactions.

			Venn diagram section[c]				
			A + C	A + D	C	D	A
Study	Emotional stimulus/event.	N	Total variance in predicted emotions explained by personality	Total variance in actual emotions explained by personality	Unique variance in predicted emotions explained by personality	Unique variance in actual emotions explained by personality	Shared variance in predicted and actual emotions explained by personality
1	Football game	180	.15***	.06**	.11***	.04*	.02
2	Election	57	.10*	.03	.07*	.00	.03
3	Valentine's Day	325	.09***	.12***	.00	.03**	.09***
4	Birthday	55	.25***	.30***	.12*	.17**	.13**
5.1	Sad film	96[b]	.14**	.19***	.00	.05*	.14**
5.2	Happy film	96	.09***	.16***	.01	.08**	.08**
5.3	Intrusive interview	96	.26***	.23***	.07**	.04*	.19***
Composite[a]		713	.13***	.12***	.05***	.04***	.08***

[a]The composite is a weighted average. Effects were averaged within sample for Studies 5.1–5.3 and then averaged across Studies 1–5, weighted by sample size.
[b]The same sample of participants completed Studies 5.1–5.3.
[c]See Figure 1 for a visual representation of each column.
*$p < .05$, **$p < .01$, ***$p < .001$.

Aim 2: Hierarchical analyses of total, unique, and shared variance

Hierarchical analyses showed that personality accounted for shared and unique variance in predicted and actual emotional reactions (see Table 3). In particular, neuroticism and extraversion explained 8% of the overlapping variance shared by predicted and actual emotional reactions (equivalent to Figure 1, Section A), an additional 5% of unique variance in predicted emotional reactions (equivalent to Figure 1, Section C), and an additional 4% of unique variance in actual emotional reactions (equivalent to Figure 1, Section D). This means that some personality processes directly account for the predicted–actual reaction link, whereas other aspects of personality had small independent effects on predicted or actual reactions. Each of these variance estimates differed across samples and stimuli, including within-subject in Sample 5 (see Table 3). Given the average correlation between predicted and actual emotions ($r = .52$ or $R^2 = .27$), neuroticism and extraversion can be estimated to explain 30% of the direct correspondence, or relative consistency across individuals, between predicted and actual emotions (.08/.27 = 30%).

Discussion

Personality was hypothesised and found to explain both predicted and actual emotional reactions to seven emotionally evocative stimuli and events, consistent with prior research (Canli et al., 2001; Mellers & McGraw, 2001; Smits & Boeck, 2006; Zelenski & Larsen, 2001) and theory (Corr, 2008; Funder, 1995; Gray, 1994; Robinson & Clore, 2002). In particular, individuals who were more introverted and neurotic were realistic in predicting that they would experience more unpleasant emotional reactions than their peers in response to these stimuli and events. Individuals who were more extraverted and less neurotic were realistic in predicting that they would experience more pleasant emotional reactions, relative to their peers. Personality accounted for realistic affective forecasting by explaining shared variance in predicted and actual emotional reactions (see Figure 1A), and by simultaneously accounting for unique variance in both predicted and actual emotions (see Figure 1C and 1D). These data have potential implications for theory and future research on realistic affective forecasting.

The present investigation highlights the importance of individual-differences research aimed at understanding realistic affective forecasting. Many forecasting studies have focused on describing errors at the general event level (see Wilson & Gilbert, 2013), and studies aimed at identifying mechanisms have often focused on contextual factors accounting for error, such as situational features affecting attentional focus (Lench et al., 2011; Wilson et al., 2000), social processes that facilitate rationalisation (Gilbert et al., 1998), or culture (Lam, Buehler, McFarland, Ross, & Cheung, 2005). The few

individual-difference studies have also mainly focused on explaining errors (Dunn et al., 2007; Hoerger, 2012; Hoerger, Chapman, et al., 2012; Quoidbach & Dunn, 2010; Zelenski et al., 2013). In building on prior empirical findings (Canli et al., 2001; Zelenski & Larsen, 2001), our results make a theoretical contribution by showing that the traits extraversion and neuroticism are intricately related not just to the experience of emotion, but also to the relative concordance between experienced and anticipated emotion. Consistent with prior theorising, a single underlying personality process could account for shared variance in motivation, predicted emotions, and actual emotions, facilitating realistic affective forecasting and decision-making (Corr, 2004, 2008; Hoerger & Quirk, 2010; Quirk et al., 2007). In our investigation, neuroticism and extraversion explained about 30% of the direct link between predicted and actual reactions (see Figure 1A), suggestive of a single underlying process. What is this single process? It may reflect a very general dispositional emotionality, simultaneously related to actual emotions, predicted emotions, and perhaps other types of emotional reports (i.e., recollected, hypothetical). Yet, that single putative process only tells a partial story.

Two auxiliary processes contributing to realistic forecasting can be inferred from our data. In particular, we found that personality accounted for unique variance in predicted reactions (5%; see Figure 1C) and in actual reactions (4%; see Figure 1D). These findings lead us to speculate that two other personality processes, one related to prospection (projecting into the future) and one related to experiential awareness, are comparable in magnitude and may act in concert to facilitate realistic affective forecasts, in terms of the relative ordering of positive to negative reactions across individuals. This speculation is consistent with theories emphasising that these two processes fundamentally differ (Dunn et al., 2009; McConnell et al., 2011; Robinson & Clore, 2002). In summary, our findings suggest that personality generally contributes to realistic affective forecasting in terms of who predicts and experiences more positive or negative emotional reactions, and our analyses lead us to hypothesise three personality processes underlying congruence: dispositional emotionality, prospection, and experiential awareness.

The ideas presented here suggest new avenues for research on affective forecasting drawing from the realistic paradigm. Namely, the present findings suggest the need to identify factors that simultaneously influence predicted and actual emotional reactions. As neuroticism and extraversion explained about 30% of the correspondence between predicted and actual reactions, there is room for future research to examine other individual-difference constructs that may account for additional variance in affective forecasting congruence. As our heterogeneity analyses were unable to account for variability in observed effects, future studies could build on our findings by attempting to elucidate the personality-related psychological processes that may account for shared or unique variance in predicted and actual emotions.

The present research was balanced by several strengths and weaknesses. To the best of our knowledge, this is the first study to replicate a finding on individual differences in affective forecasting across such a wide array of emotional evocative stimuli and events. Other strengths included the relatively large sample size, the diversity of the study procedures, and the potential theoretical contribution of this research. However, the study samples were homogenous, consisting of young adult college students. Future studies aimed at understanding emotional processes and their role in decision-making in samples more representative of the US population could make an important contribution (Croyle, 2015).

Moreover, our findings are based on the aggregate of five specific studies. Point estimates for the personality–emotion link varied across studies (see Table 2), with stronger relationships observed for birthdays and the intrusive interview than for the election. The overall findings also differed from two prior reports, which found that personality was only related to predicted reactions (Zelenski et al., 2013) or only related to actual reactions (Quoidbach & Dunn, 2010). These differences could be due to the different types of stimuli (e.g., events that vary in valence or personal relevance, laboratory stimuli), differences in measurement (e.g., personality scales, emotion scales), or differences in the time span between predictions and the emotional event. Thus, more research is needed to account for cross-study variation in affective forecasting research.

Finally, future research seeking to demonstrate that affective forecasting research can improve decision-making would be particularly timely. A number of studies have shown that affective forecasting is correlated with decision-making (see Hoerger, Chapman, et al., 2012), and shown that experimental manipulations of affective forecasting can augment decisions

made by research participants in structured laboratory settings (see Gilbert, Killingsworth, Eyre, & Wilson, 2009). Research on health decision-making is a growing national priority in the USA (PCORI, 2012), but few studies have examined whether affective forecasting interventions can improve decisions of broad societal significance, such as engagement in exercise (Ruby, Dunn, Perrino, Gillis, & Viel, 2011) and participation in cancer screenings (Dillard et al., 2010). Thus, more research is needed from both the realistic paradigm and error paradigm examining whether findings on affective forecasting can ultimately benefit significant real-world decisions.

In conclusion, we found that neuroticism and extraversion accounted for much of the relationship between predicted and actual emotional reactions. This investigation highlights the importance of individual-differences research in this domain and makes a theoretical contribution to emotion research by suggesting that traits contribute to realistic affective forecasting, namely the relative ordering of predicted and actual emotional reactions across individuals, through three putative processes: dispositional emotionality, prospection, and experiential awareness.

Disclosure statement

No potential conflict of interest was reported by the authors.

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