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The truth about predictions and emotions: Two meta-analyses of their relationship

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ABSTRACT

Two lines of research converge on the topic of predicting emotions, namely the response expectancy theory and the affective forecasting paradigm. We propose a revised response expectancy model, in which affective forecasts are a subgroup of response expectancies, referring to emotional outcomes. We conducted two meta-analyses in order to assess the effect size of the relationship between predictions and emotions. 106 studies comprising 301 effect sizes were analyzed. Our results showed a medium effect size regarding the association ($r = .46$, $p < .001$), and a small effect size regarding the difference ($d = .42$, $p < .001$) between predictions and emotions. Valence of emotion, valence of event, and type of design moderated the difference between predictions and emotions. Individuals are both accurate in the relative sense, as indicated by the response expectancy theory, and inaccurate in the absolute sense, as suggested by the affective forecasting paradigm. Thus, our results support the integration of the two paradigms.

1. Introduction

Two main lines of research have studied the relationship between predictions of future emotions and actual experienced emotions. These are, respectively, the response expectancy theory (Kirsch, 1985) and the affective forecasting paradigm (Gilbert et al., 1998). The research underlining these two paradigms may provide answers to important personal questions such as: Should I undergo this medical procedure if a considerable amount of pain is involved? Is it worth it to pursue this job opportunity if going to the interview fosters high evaluation anxiety? Should I continue dating this person if a future break-up will result in an extended period of sadness?

Response expectancies are defined as expectancies regarding nonvolitional outcomes (e.g. pain, relaxation, distress, emotional responses), and are deemed to determine comparative subjective and physiological responses (Kirsch, 1985). This line of research stems from investigations regarding hypnosis and placebo effect mechanisms and has been studied mainly in settings evaluating effectiveness of medication and psychotherapy on outcomes such as pain analgesia (Sullivan et al., 2001), side effects of cancer treatment (Montgomery & Bovbjerg, 2001; Montgomery & Bovbjerg, 2004), but also in non-clinical settings such as exam-related distress (Montgomery et al., 2007). The theory regarding response expectancies proposes that there is a causal connection between expectancies at t_0 and nonvolitional outcomes at t_1, and therefore by changing expectancies one can produce a change in nonvolitional outcome (Kirsch, 1990). Research methods in existing studies quantify the association between expectancies and outcomes in terms of correlation and provide evidence for the mediating role of expectancies between various predictor variables and nonvolitional outcomes (Montgomery, Schnur, et al., 2010b; Sullivan et al., 2001). Consistently, predictions about future outcomes have been considered accurate in this paradigm, research showing positive and medium (Montgomery et al., 2007; Sohl, Schnur & Montgomery, 2009; Sullivan et al., 2011) or medium to large (Sullivan et al., 2001) associations between predictor and outcome. A recent meta-analysis concerning the relationship between response expectancies and side effects of cancer treatment showed that a possible moderator of this relationship may result from previous experience with the treatment, with higher familiarity leading to higher associations between expectancies and responses (Sohl et al., 2009). As such, we draw the conclusion that familiarity with the event in question might moderate the strength of the association between expectancies and nonvolitional outcomes in general.

Affective forecasts, also referred to as emotional predictions, represent predictions individuals make regarding their future emotions (Gilbert et al., 1998; Gilbert & Wilson, 2009). These predictions have been studied with regard to various life events such as medical decisions (Sieff, Dawes & Loewenstein, 1999), performance at intelligence tests or

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exam results (Buehler & McFarland, 2001; Dunn, Brackett, et al., 2007b; Greitemeyer, 2009), accommodation (Dunn, Wilson & Gilbert, 2003), romantic relationships (Hoerger, 2012; Hoerger & Quirk, 2010; Gilbert et al., 1998), sporting events (van DijK, Finkenauer & Pollman, 2008;), or general elections (Gilbert et al., 1998; Levine, Lench, Kaplan & Safer, 2012). The main focus in this line of research has been on the differences between emotional forecasts at t_0 and experienced emotions at t_1 or later times, proving that people generally mispredict their future emotional states by overestimating intensity and duration of future emotions, especially negative emotions (Gilbert & Wilson, 2007; Loewenstein, 2007; Wilson & Gilbert, 2013). There is no purported causal link between forecasts and emotions in the affective forecasting paradigm and predictions are consistently labeled inaccurate. The implication is that individuals may choose less beneficial courses of action in light of these inaccurate predictions, and thus may benefit from improving the accuracy of their predictions. The methodology in this paradigm always involves computing differences between means of affective forecasts at t_0 and experienced emotions at t_1, and sometimes correlations are also reported. There have been two recent meta-analyses concentrating on affective forecasts and their overestimation of experienced emotions, which contain similar results. Both Mathieu and Gosling (2012) and Levine et al. (2012) found that, as pertains to differences between prediction and emotion, the effect size is significant and medium, showing that individuals indeed overpredict their future emotions.

As discussed above, these two lines of research converge on the topic of predicting emotions, albeit they do not always use the same methodology and do not maintain the same theoretical assertions. Differences include inference of causality in the response expectancy theory (while no such claim is maintained regarding affective forecasts) and conceptualization of accuracy. Response expectancies are considered accurate in predicting nonvolitional outcomes in that they correlate highly with these outcomes, while affective forecasts are considered inaccurate as they usually overpredict (differ in means from) emotional outcomes. Some clarifications have been made regarding this puzzling account of accuracy vs. inaccuracy, namely Mathieu and Gosling (2012) proposed a differentiation between relative and absolute accuracy. Relative accuracy refers to accuracy in the direction of the prediction (people who predict more intense emotions will tend to feel more intense emotions and vice-versa), while absolute accuracy refers to identity between prediction and emotion (people will feel emotions as intense as they predicted). Their meta-analysis showed that relative accuracy tends to be high and absolute accuracy tends to be low in which regards emotional predictions, which is to say that while most people overpredict their future emotional states, the ones who predict more intense emotions will tend to feel more intensely and vice-versa (Mathieu & Gosling, 2012). Mathieu and Gosling looked only at affective forecasting studies having a within-subjects design, found heterogeneity in their data, no significant moderators in which regards relative accuracy, and several significant moderators in which regards absolute inaccuracy. One of these was valence of the event, with negative valence events having greater inaccuracy than positive events.

This conceptualization goes to support the integration of the two research paradigms, as discrepancies regarding accuracy are given by different definitions and use of the term and not by substantial differences underlying the phenomenon. Research on response expectancies may further benefit from taking into consideration the recurrent finding that expected emotions are not as intense or enduring as they might appear. Conversely, research regarding affective forecasting may benefit from factoring in the consistent conclusion that emotions do tend to follow the general direction of the forecasts, being in the same direction and associated with these forecasts even if distinct. Furthermore, both paradigms support the idea that by adjusting predictions one may improve future emotional or behavioral outcomes. Therefore, we propose an integrative model of response expectancy, in which affective forecasts are considered a subcategory of these expectancies, referring only to emotional outcomes. As such, we argue for the need to join the independent results obtained in the literature in a quantitative approach targeting the relationship between response expectancies/affective forecasts targeting future emotional outcomes (henceforth named predictions) and nonvolitional emotional outcomes (subsequently named emotions). We aim to investigate this new model and study the relationship between predictions and emotions by conducting two distinct meta-analyses: one regarding the association, and the other targeting the difference between the two, regardless of line of research the results come from. Response expectancy theory proposes that predictions will associate positively with emotions (i.e. will be accurate in the relative sense). Affective forecasting paradigm suggests that predictions will differ from emotions by overestimating them (i.e. will be inaccurate in the absolute sense). Should hypotheses generated by both paradigms be sustained, we could conclude that there is no need to investigate affective forecasts/response expectancies regarding future affect independently, but rather join them in one overarching model.

Existing research provides possible moderating effects for the relationship between predictions and emotions. Affective forecasting research thus suggests valence of the emotion (Gilbert et al., 1998; Wilson & Gilbert, 2003) and valence of the event (Mathieu & Gosling, 2012) as possible moderators of this relationship. Familiarity with the event the prediction is made for can be derived as moderator from studies investigating response expectancies (Montgomery & Bovbjerg, 2003; Sohl et al., 2009. Moreover, as Kirsch (1990) initially suggested, expectancies might also be more accurate if they refer to more specific emotions (such as affects) rather than more general emotions (such as moods) or general distress. Therefore, we also consider investigating specificity of the emotional response as a possible moderator. Kirsch (1990) also regarded distance in time between t_0 and t_1 as a possible factor influencing the accuracy of response expectancies, with expectancies measured more closely to t_1 being more accurate. However, time between t_0 and t_1 is seldom reported in a way in which it can be qualified as a moderator category in studies concerning predictions upon future emotions. Many studies do not report exact time between the moment the prediction is made and the moment the emotion is recorded, or report a mean time for all participants, which does not account for high variability. Moreover, a continuous moderator would be more appropriate in order to test for the assumption held by the response expectancy theory, and this would require continuous data which is simply not reported in the literature.

Fatigue is a particular outcome which has been studied in the response expectancy literature as a physiological nonvolitional outcome (Sohl et al., 2009). However, it can also be argued that it constitutes a complex emotion (Gibson et al., 2003), or a general measure of distress; we therefore decided to also take fatigue into consideration as an emotional outcome.

1.1. General objective of the present investigation

The present research aimed to investigate the relationship between predictions and emotions through a meta-analytical process. We tried to integrate the two lines of research concerning predictions about emotional outcomes and we investigated the role of several literature-derived moderators regarding the strength of their relationship with actual emotions. Additionally, we broadened the category of emotions included in previous research (i.e. by including fatigue). We addressed the association between predictions and emotions, on the one hand, and the difference between the two constructs, on the other, separately, as they are two distinct methods for researching the relationship between predictions and emotions. However, as the distinction resides only at the methodological level, we conducted a single literature search and selection process, and subsequently we assigned each article to one or both of the following meta-analyses. The methodology for the two studies is similar; differences are pointed out where they appear.