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# Evidence for the Existence of Emotion Dispositions and the Effects of Appraisal Bias

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The concept of *emotion disposition* is proposed as an important dimension of individual differences. It refers to a stable tendency to experience certain emotions more or less frequently or intensely for similar classes of situations or events in daily experience than the majority of other people. In contrast to classic "trait affect" traditions, the theoretical framework described here proposes a specific mechanism based on the notion of *appraisal bias*, that is, the evaluation of events or situations in biased, often unrealistic, fashion. The bias toward internal versus external causal attribution is a classic example. It is suggested that such biases can affect virtually all appraisal criteria (e.g., novelty/expectedness, (un)pleasantness, goal conduciveness/obstruction, causation, control, power, and norm compliance), creating a disposition to experience specific emotions more frequently. In some cases, this process may lead to the development of affective disorders. Two studies are herein reported: (a) administering an emotion disposition assessment instrument to several thousand adults in personnel assessment contexts ($N$ = 3,012), demonstrating the existence and intensity of emotion dispositions and identifying potential individual difference correlates; and (b) using an updated version of the instrument in a representative survey panel study ($N$ = 190), assessing both emotion dispositions and appraisal biases, allowing analysis of their relationships (in addition to examining the effect of correlates). The results confirm the viability of the underlying theoretical assumptions as well as of the scenario method used for the assessment and provide leads for further research, particularly in the areas of emotional competence and affective disorders.

*Keywords:* affective disorders, affective traits, appraisal bias, emotion disposition, emotional competence

*Supplemental materials:* http://dx.doi.org/10.1037/emo0000861.supp



Ancient temperament theory (Hippocrates, Galen), assuming that emotions were caused by an excess or lack of certain body fluids, is an early precursor of the concept of *emotion dispositions*. Since then, there have been several attempts at developing systematic typologies of *trait affect* or *trait emotion*. In clinical and educational psychology, it has been proposed to distinguish between state and trait measures of anxiety to be measured with self-report assessment scales (Cattell & Scheier, 1961; Pekrun, 2006; Spielberger & Reheiser, 2004). In personality and social psychology, the notion of *dispositional affect*, defined as a personality trait or as an overall tendency to respond to situations in a generally more positive or more negative way, has been proposed (Epstein, 1979, 1980; Watson & Tellegen, 1985; Watson & Walker, 1996).

This type of inquiry into the existence of general emotional response dispositions or styles seems highly relevant for psychological health, well-being, and the general domain of emotional competence (Scherer, 2007). Here are some examples of potential consequences of emotion dispositions: anger–irritability or hostility, sadness–tendency toward depressed mood, fear or worry–habitual apprehensiveness, shame and/or guilt–excessive internal attribution of responsibility. Habitual emotional response tendencies across very different events and situations may constitute potential risk factors for developing affective dysfunctions such as depression or anxiety disorders. On the other hand, a proclivity to experience enjoyment and happiness might have positive consequences for social interaction and life satisfaction.

The issue of emotion dispositions should be addressed from within the specific theoretical framework of *emotion psychology*, generally focusing on "normal" emotional functioning, providing a convenient framework for postulating hypotheses concerning the etiology of emotion dysfunctions and identifying risk factors (Scherer & Mehu, 2015). In this respect it seems promising to focus on stable individual differences in the fundamental process

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of event evaluation or appraisal that elicits emotions and drives changes in the emotion components (see review in van Reekum & Scherer, 1997).

A first attempt at providing a theoretical framework for the psychological mechanisms underlying stable emotion dispositions (apart from potential genetic factors) was made by Scherer (1987, 1989) for dysfunctional emotional reactions, constituting risk factors for affective disorders. Based on the Component Process Model of emotion (CPM; Scherer, 1984a, 1984b, 2009), dysfunctional emotional reactions are conceptualized as the result of unrealistic or inappropriate appraisals of events or situations. One way to define inappropriateness is to determine the deviation of appraisals from commonly shared social-normative judgment (in general or in a specific culture) concerning the nature of the situation (Scherer & Brosch, 2009). Thus, one would diagnose dysfunctional affect in the form of neurotic anxiety if most other people considered the object of fear to be neutral or benevolent rather than frightening (see also d'Arms & Jacobson, 2000). This allows to identify of a number of specific *appraisal biases.* Examples are anhedonia (excessively negative pleasantness evaluation), hopelessness/helplessness/depression (excessive concern with and underestimation of control and power over consequences), and anxiety disorders (excessive concern about adequacy of power and coping potential; see also Kaiser & Scherer, 1998; Mehu & Scherer, 2015; Roseman & Kaiser, 2001; Scherer, 1987, 1989).

Supporting evidence comes from a representative survey of emotion experiences in the Swiss population (Scherer, Wranik, Sangsue, Tran, & Scherer, 2004), which corroborates the notion that an emotion disposition may act as a risk factor for experiencing certain emotions more frequently. Using an event sampling technique, the investigators asked respondents to report an event that had elicited an emotion on the previous day, to describe their appraisal of the event and their reaction pattern, and to verbally label the emotion. For the assessment of emotion dispositions, respondents rated the relative frequency of their experience of each of 14 emotions. The results indicate that the higher respondents are on trait emotionality (i.e., the more frequently they habitually experience a particular emotion), the more likely they will have experienced the corresponding emotion *yesterday*. For example, based on an odds ratio, respondents high on trait anxiety are almost three times more likely to have experienced an episode of anxiety yesterday compared with those who are low on this trait. For trait sadness, the likelihood is about two times higher and for trait anger, 1.5 times higher. Although these findings primarily demonstrate the convergent validity of two types of self-report (disposition oriented and situation oriented), it is striking that the effect of a trait emotion disposition is relatively strong even for specific points in time, such as "yesterday," given the large number of factors that might account for the occurrence of specific emotions (see Epstein, 1979, 1980).

Despite the intrinsic plausibility of the existence of emotion dispositions and a reasonable amount of supporting evidence for some variants (e.g., work on trait and state test anxiety in personality, clinical, and educational psychology), surprisingly little empirical research has been devoted to this topic in emotion psychology (but see, e.g., Gasper & Clore, 1998, on anxiety; Tangney, Youman, & Stuewig, 2009, on proneness to shame; and Schriber, Chung, Sorensen, & Robins, 2017, on dispositional contempt). The theoretical framework proposed here differs from earlier approaches on trait affect (which often focus on generally positive vs. negative emotionality) by covering a larger number of different emotions. Most importantly, this approach proposes, based on largely validated predictions of appraisal theory, a hypothetical causal mechanism, arguing that specific appraisal biases, that is, systematically evaluating events or situations in an unrealistic, biased fashion, are the bases for emotion dispositions. From this approach concrete predictions about the development of risk factors for specific types of emotional disorders can be derived (see Scherer & Brosch, 2009).

In the following, four major issues in relation to the theoretical framework outlined above are empirically examined: (a) evaluating the plausibility of the assumption that there are stable individual differences in the form of emotion dispositions across different eliciting situations by using a large, representative sample of participants; (b) developing an appropriate ecologically valid assessment instrument by producing directly comparable measures across participants for a number of standard situations (avoiding simple self-report of perceived tendencies, as suggested by the work of Epstein, 1980); (c) testing a number of concrete published predictions on the importance of different types of appraisal bias for different types of emotion disposition; and (d) exploring the role of different personality and biographical background factors that might be responsible for the development of appraisal bias and ultimately stable emotion dispositions.

In pursuit of these aims, different emotion dispositions were directly measured in two empirical studies. Participants were asked to imagine experiencing several typical emotion situations and reporting the intensity of the different emotions they would be likely to experience. In Study 1, we assessed the frequency and intensity with which specific emotions were reported by a large sample of professionals. The validated assessment instrument was used in Study 2, asking participants in a representative panel sample to rate their likely emotional reactions to a set of scenarios, and, in addition, report their putative appraisals if faced with the respective situations, to obtain an estimate of potential appraisal biases.

## Study 1: Emotion Dispositions

The purpose of this study was to investigate individual differences in the type, frequency, and intensity of emotional reactions that participants would expect to experience in response to a number of different emotion-inducing scenarios. In particular, it was of interest to examine whether some individuals expect to react, for several scenarios, with specific emotions at a higher frequency and intensity than the majority of the respondents in the sample. The existence of such stable individual differences could be interpreted as further evidence for the importance of emotion dispositions as outlined in the introduction.

### Method

**Participants.** A total of 3,052 adults from many different cultural and linguistic backgrounds were studied (2,921 of whom provided biographical data: 23.3% female; 44.3% between 20 and 40 years, 55.4% between 40 and 60 years, 80.8% with higher levels of education, 86.2% from Western cultures). All participants

were tested in the context of professional middle- and upper-level personnel assessment sessions in the course of a career development program (which explains the lower percentage of women) by using the proprietary, commercially available assessment instrument Computer Assessment of Human Potential (CAPP), which consists of a battery of different tests that assess a comprehensive set of dimensions, including personality, coping style, human values, work values, behavioral tendencies, and emotion recognition ability (see Scherer, 2007; Scherer & Scherer, 2011). Sample size was determined by the availability of this large-scale data set.

**Instrument.** Measuring emotional responses by presenting participants with concrete scenarios of emotion events and obtaining judgments of how they would respond in these situations has a long history in emotion research, for example, to study self-conscious emotions (Robins, Noftle, & Tracy, 2007; Tangney, 1990) or to assess differential emotions (Harmon-Jones, Bastian, & Harmon-Jones, 2016). This work has established the reliability and validity of the approach, aiming specifically at using emotion-specific scenarios to provide more complete emotion descriptions than what is afforded by simple adjectives. In our case, we developed the Emotion Index (as part of the CAPP assessment package), to measure the emotional response dispositions of the professionals participating in the program. The instrument consists of nine scenarios, descriptions of situations in which reactions with many different emotions are appropriate: (a) criticized by a colleague, (b) late for work, (c) lost job, (d) troubled relationship, (e) overheard being badmouthed by friends, (f) forgot important appointment, (g) unfaithful partner, (h) inadvertently offending a friend, and (h) discovering a major flaw in one's work (the detailed scenarios are reproduced in Table S1 of the online supplementary materials). The scenarios were developed from real emotion experiences recorded by the participants in an actuarial survey of recently experienced emotions in different European countries (see Scherer, Wallbott, & Summerfield, 1986). Following an example for each of the nine scenarios, participants had to indicate the extent to which they would feel each of eight emotions. Interpretation was based on determining which emotions were indicated as being experienced more frequently and intensively than others across the nine scenarios and could be compared with the distribution of answers in the chosen comparison group. Although the concept of emotion disposition is considered valid for both positive and negative emotions, in this study, only relatively negative scenarios were chosen because adverse events are generally more frequent and tend to produce more differentiated reaction patterns (due to more complex appraisal configurations) than do genuinely pleasant and goal conducive events (see also Scherer et al., 2004, for pertinent evidence). Therefore, to maximize variance and to limit the number of scenarios (and thus the duration of the test), it was decided to limit this first investigation to adverse situations that potentially give rise to diverse types of negative emotions. The following labels for seven major negative emotions were provided to characterize a respondent's reaction to the given scenarios, all of which entail adverse consequences: *sadness*, *contempt*, *anger*, *fear*, *worry*, *shame*, and *guilt*. Positive emotion terms were considered inappropriate for the chosen scenarios. However, the expression "in Good Humor" was provided as a non-negative alternative in order to capture a tendency toward indifference or taking the consequences more lightly (possibly related to a coping style).

For each of these eight emotions, respondents had to indicate, using a slider scale from 0 to 100, the intensity with which they would themselves feel this emotion if they were experiencing the respective event or situation. The selected emotion terms were sufficiently comparable in relative frequency and intensity connotations to assume equal metrics and item difficulty.

To examine the construct validity of the instrument, potential correlates of emotion dispositions in terms of personality, values, and coping strategies were measured with extensively empirically validated instruments that constitute the regular CAPP assessment platform (see Scherer, 2007, pp. 109–111). Data from the following instruments are used here: Personality-Index (behaviorally anchored fuzzy-set items to assess Autonomy, Extraversion, Anxiety, Impulsivity, Self-Assurance, Aggressiveness, External Control, Warmth, Dominance, Irritability, Conscientiousness, Excitement Seeking, Pessimism, Altruism, and Emotional Stability), Coping-Index (behaviorally anchored fuzzy-set items to assess Problem solving, Problem acceptance, Problem redefinition, Rumination, Wishful thinking, Problem repression, Emotion catharsis, Affective resignation, Seeking gratification, Relaxation, Emotion substitution, Emotion repression, Self concept modification, Internal attribution, Self concept bolstering, External attribution, Seeking social support, Seeking empathy, Seeking esteem, Repression confirmation), and Human Values Index (pairwise comparison preference test, yielding transitive hierarchies of the following human concerns –Success/Status, Power/Influence, Knowledge/Understanding, Solidarity/Loyalty, Tradition/Order, Peace/Harmony, Love/Affection, Morality/Ethical conduct, Honor/Integrity, Justice/Equality).

**Procedure.** The Emotion Index was administered in the context of a computer assessment battery of different tests of personal potential (including personality, values, and coping potential, as described earlier, and other human resource domains). These assessments were mandated by companies and organized by human resource consultants, generally in the interest of allowing respondents to target their personal development. Respondents completed the tests on their own computer in the office or at home during periods in which they were not disturbed by other people or noise. Sessions lasted between 1 and 2.5 hr, depending on the number of instruments chosen by the consultants who were administering the assessment (as directed by the interest of the respective client) and the speed of responding. The data were automatically analyzed in an anonymous fashion, information on identity being available only to the consultant who provided direct feedback to the respondent. This work was conducted in accordance with the professional code of ethics for personnel assessment.

## Results

First, for the participants who provided biographical data ($N$ = 2,921), a repeated measure analysis of variance (ANOVA) was computed on the raw rating data to determine the effects of differences between the nine scenarios and the eight emotions, as well as the interaction effect. The latter is crucial to examine the hypothesis that participants would react with different emotion configurations to the different scenarios. The tests of within-subjects effects yielded the following coefficients (sphericity assumed): for scenario, $F(8, 24{,}400) = 549.3$, $p < .0001$, $\eta_p^2 = 0.15$; for emotion, $F(7, 21{,}350) = 2292.1$, $p < .0001$, $\eta_p^2 = 0.43$; and for

the Scenario × Emotion interaction, $F(56, 170800) = 1745.2$, $p < .0001$, $\eta_p^2 = 0.36$. These results show that the ratings are clearly differentiated by scenarios and types of emotion and, most important, that there is a sizable interaction effect, showing that participants responded with different emotion profiles to the nine scenarios.

To control for the effects of extreme response styles of individual participants (e.g., frequent use of more extreme ranges of the scale), which are particularly problematic in large groups of participants with heterogeneous backgrounds (see the meta-analysis by Batchelor & Miao, 2016), we computed within-person z-scores (which corresponds to the person-mean-*SD* standardization approach recommended by Wang, Zhang, Maxwell, & Bergeman, 2019) to be used in further analyses. Concretely, for each participant, we deducted the overall mean of all of his or her emotion ratings across all situations from the individual ratings and divided by the overall standard deviation. Table 1 shows the mean *z* scores for the emotion ratings over the nine scenarios, illustrating the observed interaction effect between scenarios and emotions. The mean of the emotion ratings show that contempt and fear are relatively rarely reported in response to the scenarios.

**Evidence for stable emotion dispositions.** The assumption underlying the current research is that much of the overall variance between participants is attributable to stable dispositions to react more readily with certain emotions. How can we estimate the amount of variance due to such dispositions rather than to a multitude of other potential factors and error? Ideally, one would want to use a longitudinal design that allows examination of the stability of emotion dispositions over time (and the use of cross-lagged analyses of predictor relationships). This was not possible in the present case, as the data were obtained in one-time professional assessment sessions. Therefore, a more indirect method was needed to estimate the proportion of variance in between-participants judgments that was likely attributable to dispositional factors.

To demonstrate the existence of emotion dispositions as stable trait variables, we can examine the extent to which participants reliably differ from each other in their tendency to respond with specific emotion profiles across all scenarios. The disposition hypothesis predicts that individuals who have a strong tendency to react with a certain type of emotion will systematically report higher intensities for this emotion across *all* or most scenarios (as compared to selectively choosing the most appropriate emotion for each scenario).

In standard psychometric tests, the proportion of variance unexplained by the latent construct to be measured is considered error. In contrast, the different scenarios in the Emotion Index are *expected* to generate different emotion disposition profiles. It is thus essential to estimate the proportion of variance attributable to differences between the scenarios and compare these with the variance accounted for by stable differences between participants. The purpose is not to show that the latter are larger than the former but rather to examine the extent to which the variance not explained by scenario differences can be attributed to individual dispositions rather than to random error.

In the repeated measures literature, the use of linear modeling (LM) is often proposed to estimate the proportion of variance that is accounted for by (a) the differences between the repeated measurements as compared with (b) the variance attributable to the differences between participants. Here we used the LMER module in R to compute the respective percentage of variance accounted for by stable participant differences as compared with the percentage of variance accounted for by scenario differences (according to the formula "random intercept variance/random intercept variance + residual variance"). The results of applying this method to the emotion ratings (z-scores) are shown in columns 1 and 2 of Table 2. For some emotions, the proportions for scenario-based variance are relatively low, suggesting that more of the variance is due to factors other than scenario differences (including participant differences, as suggested by the relatively higher percentage for participant-based variance). In the two cases in which the percentage accounted for by the scenarios is somewhat higher, exceeding 0.4 (sadness and guilt), this is probably because some situations make the choice of a particular emotion more likely, for example, personal loss for sadness, or personal responsibility for guilt. In contrast, for anger, fear, and particularly good humor, the variance accounted for by participant differences relative to scenario differences is relatively higher (>.05), and the scenario-based variance relatively lower, than those for guilt and sadness. This suggests that the former emotions may be less situation specific. This is most obviously the case of "taking the event in good humor," a response that fits all circumstances.

Thus, the data in Table 2 show that both sources of variance—differences between scenarios and between respondents—are present and may mutually influence each other, as suggested by the ANOVA results reported at the beginning of the Results section. Some scenarios may make certain emotions more obvious and unavoidable, limiting the degree of possible variation due to emo-

Table 1
*Study 1: Means of Emotion Ratings by Scenarios (z Scores)*

| Emotion scenario | Anger | Contempt | Fear | Good humor | Guilt | Sadness | Shame | Worry |
|---|---|---|---|---|---|---|---|---|
| Criticized by colleague | 1.27 | −0.11 | −0.61 | 0.12 | −0.59 | −0.38 | −0.63 | 0.00 |
| Late for work | −0.37 | −0.64 | −0.19 | −0.10 | 0.78 | −0.51 | 0.46 | 0.64 |
| Lost job | 0.58 | −0.46 | −0.14 | −0.28 | −0.57 | 1.04 | −0.51 | 1.35 |
| Troubled relationship | −0.46 | −0.63 | −0.32 | −0.31 | 0.32 | 1.58 | −0.47 | 0.56 |
| Badmouthed by friends | 1.00 | 0.24 | −0.65 | −0.11 | −0.59 | 0.79 | −0.53 | −0.49 |
| Forgot appointment | 1.10 | −0.61 | −0.51 | −0.36 | 0.94 | −0.39 | 0.62 | 0.06 |
| Unfaithful partner | 1.19 | 0.05 | −0.45 | −0.40 | −0.35 | 1.53 | −0.48 | 0.20 |
| Offending a friend | −0.44 | −0.61 | −0.60 | −0.32 | 1.06 | 0.14 | 0.43 | 0.04 |
| Discovering flaw in work | 0.77 | −0.62 | −0.56 | −0.01 | 0.24 | −0.42 | −0.35 | 0.19 |
| *M* | 0.51 | −0.38 | −0.45 | −0.20 | 0.14 | 0.38 | −0.16 | 0.29 |

Table 2
*Study 1: Estimates of the Proportions of Variance Attributable to Participant and Scenario Differences (Multilevel Modeling Analysis)*

| Emotion | *z* scores %V part | *z* scores %V scen |
|---|---|---|
| Anger | 0.08 | 0.37 |
| Contempt | 0.06 | 0.25 |
| Fear | 0.11 | 0.23 |
| Worry | 0.07 | 0.25 |
| Sadness | 0.04 | 0.52 |
| Guilt | 0.05 | 0.42 |
| Shame | 0.04 | 0.33 |
| Good humor | 0.28 | 0.04 |

*Note*. %V part = percentage variance accounted for by stable participant differences; %V scen = percentage variance accounted for by scenario differences.

tion dispositions. Similarly, some emotions may seem very unlikely to occur in certain situations, again limiting the effect of dispositions. Overall, however, the current data provide first evidence for the existence of stable individual differences in the disposition to experience certain emotions more frequently and more intensely than others do. In consequence, we averaged the within person *z* scores over all nine situations to obtain emotion disposition scores for each of the eight emotions.

**Relations to personality/value dispositions and coping strategies.** The large sample of participants tested in the context of professional assessment sessions in Study 1 was useful to find first empirical evidence for the existence of emotion disposition predictors. In this context, it was not possible to measure appraisal bias, which, as outlined in the introduction, is hypothesized to be a major cause of emotion dispositions (this issue is investigated in Study 2). However, it is possible to relate the emotion disposition variables to the set of personality/value variables furnished by the assessment instruments in the CAPP battery described in the Method section. Such stable individual differences may provide valuable cues for potential mechanisms underlying the development of emotion dispositions. If significant correlations are found, this can be interpreted in the sense of personal predispositions for emotional response tendencies. As summarized in the introduction, links between standard personality traits and emotion dispositions or trait affect, such as relationships between neuroticism and anxiety, sadness, or shame, are frequently referred to in the literature. Similarly, dominance is often linked to a readiness to react with anger to adverse events.

Given that 45 different personality/coping/value traits were assessed, a matrix of Pearson *r* correlations with the mean within *z* scores of the different emotions reported by the participants (averaged over all nine scenarios), would be difficult to interpret (especially as due to the large *N* there are many significant correlations and since many of the personality/value variables are highly intercorrelated). Therefore, a linear regression procedure with the stepwise entry criterion was chosen to provide a more interpretable summary of the major relationships. Given the large N, the criterion for entry was set to $< .001$ and for removal to .01. The results of these analyses are shown in Table 3. As is to be expected because of the large overall variance due to the *N* of approx. 3000, the adjusted $R^2$ values are generally low. However, the overall ANOVAs for the regressions as well as the beta coefficients for the predictor variables entered based on the stepwise criterion are all significant with $p < .001$.

## Discussion

The data for the large and diverse group studied here suggest that there are stable individual differences in the type and intensity of emotions judged as realistic responses to nine representative scenarios that each person imagined happening to her/himself. In a multivariate analysis of variance (MANOVA), the effect size for differences between emotions is about three times larger than that for differences between scenarios. The large effect size for the Emotion × Scenario interaction effect is particularly noteworthy, indicating the presence of different emotion profiles for different scenarios. A multilevel modeling estimation of the proportion of variance accounted for by scenario differences versus participant differences justifies the assumption that there are stable individual differences due to stable tendencies to preferentially react more intensively with certain types of emotions than with others. These differences are not attributable to a general elevation of the profiles over all emotions, but only for those that could be reasonably expected in a situation (e.g., based on the evaluation of probable factors of causation).

Potential links of emotion dispositions with other individual difference variables were examined by computing linear regressions of a large number of personality/coping/value variables on

Table 3
*Study 1: Stepwise Linear Regressions of Personality/Coping/Value Variables on Emotion Ratings (z Scores)*

| Emotion | Adj $R^2$ | Predictors and beta coefficients |
|---|---|---|
| Anger | .12 | Emotion repression −.15, Altruism −.10, Impulsivity .09, Success/Status .11, Autonomy .08, Love/Affection .11, Relaxation −.09, Wishful thinking −.08, Justice/Equality .08 |
| Contempt | .06 | Seeking social support −.12, Self concept modification −.11, Altruism −.10, Problem solving −.08, Autonomy .06 |
| Fear | .04 | Anxiety .13, Problem repression −.09, Wishful thinking .08, Dominance −.07 |
| Worry | .03 | Rumination .09, Autonomy −.08, Peace/Harmony .08, Seeking social support .07 |
| Sadness | .06 | Altruism .14, Success/Status −.10, Knowledge/Understanding −.08, Problem redefinition −.08, Solidarity/Loyalty −.07, Problem solving −.06 |
| Shame | .02 | Impulsivity −.07, Honor/Integrity .07, Dominance −.07, Obtaining gratification −.07 |
| Guilt | .02 | Internal attribution .15, Problem repression .07 |
| Good humor | .11 | Self-Assurance .142, Seeking esteem −.120, Rumination −.087, Internal attribution −.052, Relaxation .099, Self concept bolstering .079, Solidarity/Loyalty .082, Knowledge/Understanding .071, Emotion repression .072. |

*Note*. All ANOVAs reach $p < .001$, and all beta coefficients reach $p \leq .001$. Predictors are listed in order of stepwise entry.

the emotion ratings. The results show that there are indeed significant associations between these trait measures and the tendency to respond more strongly with specific emotions to ambivalent situations. The pattern of results is highly plausible: Impulsive individuals characterized by a strong need for autonomy and highly valuing success and status tend to experience anger in situations in which adverse events obstruct their goals. In contrast, prosocial, altruistic individuals experience sadness if things do not go according to their aims and beliefs whereas those who describe themselves as anxious and low in dominance are prime candidates for experiencing fear in such situations. Worry is a more likely emotional reaction to such situations for individuals valuing social support and harmony and engaging in frequent rumination. As is to be expected, individuals given to internal attribution of responsibility are likely to experience more guilt, whereas those who put honor/integrity very high on their list of values tend toward feeling shame. Individuals characterized by high self-assurance and defensive coping strategies have a tendency to downplay the negative consequences of undesirable events and assume that they can easily live with them, taking things in good humor. These links seem highly plausible and correspond to many of the predictions described in the introduction.

Given the nature of the assessment sessions, it was not possible to identify the precise mechanisms responsible for these individual differences. Many different mechanisms could play a role, including psychobiological factors such as genetic predispositions for temperament, mood, and personality (e.g., impulsivity), as well as social-psychological factors such as self-fulfilling prophecies. However, as outlined in the introduction, one important mechanism, probably subserved by some of these factors, consists of dispositional biases in the appraisal of emotion-antecedent events. As discussed in the introduction, individual and cultural differences in values, motivation, and cognitive biases may lead to systematic appraisal tendencies or biases that can account for differential dispositions for experiencing certain emotions more often than other emotions and more frequently than other individuals (see review in van Reekum & Scherer, 1997). Study 2 is devoted to a first empirical examination of the relationships between appraisal biases and emotion dispositions.

## Study 2: Appraisal Bias and Emotion Disposition

Solid evidence in the literature suggests stable differences in causal attribution tendencies (external-internal control: Rotter, 1966; attribution style: Seligman, Abramson, Semmel, & von Baeyer, 1979; Weiner, 1990), over- or underestimation of personal coping potential, and differences in perceived self-efficacy (Bandura, 1977; Epstein, 1993, 2003; Kuppens & Van Mechelen, 2007). All of these differences are likely to lead to systematic biases in the evaluation of relevant events and thus to a differential likelihood of experiencing certain emotions (see Scherer & Brosch, 2009).

So far, direct empirical tests of this hypothetical mechanism are rare. Silvia (2008) examined whether individual differences in the emotion of interest, known as trait curiosity, can be explained by specific patterns of appraisal. After completing several measures of trait curiosity, participants read complex poems (Experiment 1) or viewed simple and complex pictures (Experiment 2) and rated their interest and appraisal components associated with this emotion. The results showed that the effect of trait curiosity on interest was fully mediated by appraisals. Multilevel analyses suggested that curious participants differed in the strength of appraisal rather than in the kinds of appraisals relevant to their interests. The author concluded that appraisal theories can offer a process-oriented explanation of emotion traits that bridges state and trait emotional experience.

Here we propose to test a specific set of predictions concerning the origin of stable dispositions in responding with certain emotions to typical emotion-inducing situations. These predictions have been developed in the context of appraisal theories of emotion (see Ellsworth & Scherer, 2003), in particular the CPM (Scherer, 1984a, 1984b, 2001, 2009). The central assumption of the CPM is that emotions are brief episodic processes during which several organismic subsystems temporarily work together in synchrony, driven by the appraisal of events that are highly relevant for an individual, given their potential consequences and the resulting need to urgently react to the situation. The outcomes of these recursive appraisals (which can occur at multiple levels of cognitive processing, from automatic template matching to complex analytic reasoning) generate motivational effects (action tendencies) accompanied by changes in motor expression and in somatic and autonomic physiology. The outcome of the appraisal processes and the peripheral responses generated are assumed to be centrally integrated in the form of "feelings." The appraisal criteria are suggested to be evaluated one after another (sequence of appraisal checks) such that each subsequent check builds on the outcome of the preceding check and further differentiates and elaborates on the meaning and significance of the event for the organism and the potential response options: Is the event novel (sudden, unpredictable, unexpected) or familiar? Is it intrinsically pleasant or unpleasant? Does it help or hinder the attainment of relevant goals? Does the organism have sufficient coping potential (e.g., physical or social power) to deal with the consequences? To what extent is it fair, socially or morally acceptable (which has important implications for social responses)? The cumulative outcome of this sequential appraisal process determines the specific nature of the resulting emotional episode.

Under normal circumstances, the appraisals will realistically represent the nature of the events and their consequences, as well as their impact on the individual and her/his potential to cope with them. However, as described in the introduction, this process may be affected by an individual's disposition to privilege certain evaluative interpretations over others, resulting in a less realistic assessment of the situation. For economy of space, here we do not review in detail the hypotheses proposed in the literature. Table 4 (adapted from Scherer & Brosch, 2009) lists the specific hypotheses regarding which types of appraisal biases could be expected to produce specific emotion dispositions (and possibly emotional disorders). Study 2 represents the first attempt to test some of these hypotheses concerning emotion dispositions, using a web-based panel investigation.

It was predicted that stable emotion dispositions would be found (as in Study 1) and that these could be predicted by dispositional appraisal biases. In particular, the following published predictions (Scherer & Brosch, 2009; see Table 4) were to be tested:

- Low relevance bias > indifference (good humor)
- Obstructiveness (negative valence) bias > dissatisfaction (generally negative emotions)

Table 4
*Predicted Links Between Dysfunctional Appraisal Biases, Frequency of Emotion Experiences, and Specific Clinical Syndromes*

| Appraisal dimension | Type of malfunction (appraisal bias) | Emotion disposition | Potential emotional disorder |
|---|---|---|---|
| Relevance detection | | | |
| Goal relevance | Inability to judge importance of events regarding goals, low intensity of motivational striving | Indifference | Apathy |
| Implication assessment | | | |
| Causal attribution | (a) External attribution bias | (a) Anger, contempt | (a) Paranoia, excessive hostility |
| | (b) Internal attribution bias | (b) Shame, guilt | (b) Shame, guilt proneness |
| Goal/need conduciveness | (a) Obstructiveness bias | (a) Dissatisfaction | (a) Chronic dissatisfaction/ frustration |
| | (b) Conduciveness bias | (b) Satisfaction, joy | (b) Euphoria |
| Coping potential determination | | | |
| Control | | | |
| Power | (a) Underestimation bias | (a) Pessimism, sadness, worry | (a) Helplessness, depression, excessive anxiety |
| | (b) Overestimation bias | (b) Triumph | (b) Mania |
| Normative significance evaluation | | | |
| (a) External standards | Tendency to (a) overestimate or (b) underestimate discrepancy between own behavior and social norms | Guilt | (a) Guilt neurosis<br>(b) Antisocial behavior |
| (b) Internal standards | Tendency to (a) overestimate or (b) underestimate discrepancy between own behavior and ego ideals | Shame | (a) Shame neurosis<br>(b) Shamelessness |

*Note*. From "Culture-specific appraisal biases contribute to emotion dispositions," by K. R. Scherer and T. Brosch, 2009, *European Journal of Personality*, 23, pp. 265–288. Copyright 2009 by John Wiley & Sons, Ltd., Hoboken, New Jersey. Adapted with permission.

- External attribution bias > anger, contempt
- Internal attribution bias > guilt/shame
- Control/power underestimation (coping potential) bias > sadness, worry
- High norm compliance bias (applied to internal causal attribution) > guilt/shame.

An additional aim of the study was to evaluate potential mediating factors for the effects of appraisal bias on emotion dispositions, such as personal background, personality traits, belief and attitudes, and emotion knowledge/understanding.

## Method

**Participants.** A total of 196 participants were recruited through the survey division of Qualtrics (Copyright 2013 Qualtrics, Provo, UT) as part of a larger web-based panel study conducted in the United States. Participants received gift vouchers worth about $6–8 for completing each study part. Dropout rates were within the normal range of studies conducted through the Qualtrics survey division (personal communication by the survey manager). Sample size was determined by the requirements of an even distribution over gender and age groups. Power analyses were not performed, because there were no specific hypotheses with expected effect sizes. The data of six participants were excluded because of very low scores or unrealistically fast response times, suggesting that they did not complete the tasks as instructed. The data for the remaining 190 participants (age range 18 to 65 years; $M = 45.5$, $SD = 12.2$; 49.2% female; 65% Caucasian) are used in this study.

**Procedure.** The study consisted of three sessions (about 45–60 min each) with three to four instruments to be completed via web administration on three consecutive days. This study was conducted in accordance with the relevant guidelines for ethical research and approval of the ethics committee of the Psychology Department at the University of Geneva.

**Measures.**

***Emotion disposition index (EMODI).*** To reduce the duration of the online test, participants were presented with only six of the nine scenarios used in Study 1: (a) late for work, (b) lost job, (c) troubled relationship, (d) overheard being badmouthed by friends, (e) forgot important appointment, (f) unfaithful partner (see starred items in Table S1 of the online supplementary materials for the scenario descriptions). For each scenario, they were asked to imagine finding themselves in the respective situations and to respond to the following questions (using bipolar slider scales from −100 to + 100 or unipolar scales from 0 to 100):

1. The extent to which they would appraise the event or situation on the following criteria: Expectedness (unexpected/anticipated), Urgency (happening very slowly, very quickly), Valence (negative/positive for me), Causal attribution (caused mainly by myself/by others); Coping ability (difficult/easy for me to deal with), Relevance (not relevant/important/to me), and Norm compliance (socially and/or morally questionable/acceptable);

2. The relative intensity with which they would experience each of eight emotions (the same as in Study 1): Sadness, Contempt, Anger, Good Humor, Fear, Worry, Shame, and Guilt.

There were three additional questions on the issues of intensity, duration, and regulation which will not be addressed in this report.

***Additional instruments.*** Demographic background questions assessed gender, age, highest level of education, father's and mother's highest level of education, professional domain, current personal situation (single, married, divorced), number of people in the household, and degree of religiosity. Owing to time limitations in the web-based panel study, only a few brief personality inventories or subscales could be used. We administered the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), the Drive subscale of the Behavioral Activation Scale (Carver & White, 1994), assessing the strength of approach responses, and a new Sense of control Scale (SoC; Ryser, Hosoya, & Scherer, 2016, unpublished report; measuring sense of control, power, and self efficacy; see also online supplementary materials, Section C, Appendix). Because one session of the three-part panel study was devoted to validating a series of tests for different aspects of emotional competence (see Schlegel & Scherer, 2018), we obtained data on five different tests measuring emotion knowledge and emotion recognition ability (further details on the different instruments are provided in Table S2 of the online supplementary materials).

## Results

Appraisal and emotion ratings. As in Study 1, all raw scores were transformed into within-participant $z$ scores to correct for individual response tendencies (Brinker, 2002). The means for both appraisal and emotion ratings are shown in Table 5. Repeated measures ANOVAs were computed to determine the effects of differences between the six scenarios and, separately, the seven appraisal scales and the eight emotions, as well as the interaction effects. The tests of within-subjects effects yielded the following coefficients (Greenhouse-Geisser corrected) for the appraisal ratings: scenario, $F(4.4, 845.3) = 41.7$, $p < .0001$, $\eta_p^2 = 0.18$; appraisal criteria, $F(3.6, 675.23) = 273.1$, $p < .0001$, $\eta_p^2 = 0.59$; and Scenario × Appraisal interaction, $F(30.0, 3651.1) = 78.2$, $p < .0001$, $\eta_p^2 = 0.29$. The corresponding results for the emotion ratings are as follows: scenario, $F(4.6, 865.5) = 24.5$, $p < .0001$, $\eta_p^2 = 0.12$; type of emotion, $F(4.99, 14{,}580.3) = 156.1$, $p < .0001$, $\eta_p^2 = 0.45$; and Scenario × Emotion interaction, $F(15.9, 3002.8) = 72.3$, $p < .0001$, $\eta_p^2 = 0.28$. The results show that ratings are clearly differentiated by scenarios and by profiles of appraisals and emotions, and, most important, sizable interaction effects show that for both appraisals and emotions, participants responded to the six scenarios with different profiles. Again, the profiles shown illustrate the important interaction between scenarios on the one hand and emotions as well as appraisal on the other.

**Evidence for consistent individual dispositions.** As in Study 1, the relative amount of variance accounted for by individual response dispositions on the one hand and scenario differences on the other was computed, in this case for both the emotion and appraisal bias dispositions.

As in Study 1, we used the LMER module in R to compute the respective percentage of variance accounted for by stable participant differences as compared with the percentage of the variance accounted for by scenario differences for both emotions and appraisal (the results are shown in columns 1 and 2 of Table 6). For the emotions, both the size and the patterns of the percentages of variance accounted for are similar to those found in Study 1.

In the case of appraisal bias, there are strong differences between the different appraisal criteria. Although there is high internal consistency for valence, relevance, and coping, suggesting that strong appraisal biases are to be expected, the percentages of variance accounted for by participants are much lower for the remaining dimensions. This is understandable in the case of the expectedness and perceived urgency of action because a large amount of variation across different situations and context factors is to be expected. However, in the case of causal attribution, one would have expected more pronounced personal appraisal tendencies, given the large literature on externalization or internalization referred to in the introduction. Interestingly, the variance between scenarios is particularly high for this appraisal dimension, indicating that participants clearly distinguished between the likelihood of external or internal causation in different situations. This corresponds to the suggestion made in discussing the results of Study 1, namely, that emotion dispositions are somewhat restricted in manifesting themselves in certain situations in which relatively

Table 5
*Study 2: Means of Emotion and Appraisal Ratings by Scenarios (z Scores)*

| Scenario | Late to work | Lost job | Relationship problems | False friends | Forgot appointment | Partner unfaithful | *M* |
|---|---|---|---|---|---|---|---|
| Emotions | | | | | | | |
| Anger | −0.64 | 0.35 | −0.77 | 0.31 | −0.18 | 0.68 | −0.04 |
| Contempt | −0.78 | −0.03 | −0.78 | −0.04 | −0.79 | 0.11 | −0.38 |
| Fear | 0.29 | 0.23 | −0.43 | −0.99 | −0.26 | −0.51 | −0.28 |
| Worry | 0.55 | 0.64 | 0.08 | −0.69 | 0.24 | 0.03 | 0.14 |
| Sadness | −0.20 | 0.69 | 0.74 | 0.25 | −0.01 | 0.66 | 0.35 |
| Shame | 0.17 | −0.74 | −0.45 | −0.88 | 0.07 | −0.77 | −0.43 |
| Guilt | 0.29 | −0.87 | −0.20 | −1.04 | 0.19 | −0.86 | −0.41 |
| Good humor | −1.11 | −1.03 | −1.09 | −1.14 | −1.19 | −1.22 | −1.13 |
| Appraisals | | | | | | | |
| Valence | −1.14 | −1.13 | −0.76 | −1.07 | −1.04 | −1.15 | 1.05 |
| Urgency | 0.25 | −0.32 | −0.54 | 0.48 | 0.38 | −0.04 | −0.04 |
| Coping | −0.24 | −0.62 | −0.36 | −0.36 | −0.46 | −0.62 | −0.44 |
| Expectedness | 0.72 | 0.23 | 0.19 | −0.67 | −0.53 | −0.16 | −0.04 |
| Relevance | 0.63 | 0.71 | 0.59 | 0.49 | 0.67 | 0.73 | −0.64 |
| Norm compliance | 0.07 | −0.11 | 0.39 | −0.34 | 0.09 | −0.62 | −0.09 |
| Other cause | −0.76 | 0.79 | 0.18 | 0.88 | −0.68 | 0.91 | 0.22 |

Table 6
*Study 2 Estimates of the Proportions of Variance Attributable to Participant and Scenario Differences for Appraisal and Emotion Variables (Multilevel Modeling Analysis)*

| Variable | %V part | %V scen |
|---|---|---|
| Appraisal | | |
| Urgency | 0.08 | 0.18 |
| Expectancy | 0.01 | 0.30 |
| Valence | 0.54 | 0.03 |
| Relevance | 0.25 | 0.01 |
| Other cause | 0.00 | 0.54 |
| Coping | 0.21 | 0.05 |
| Norm compliance | 0.04 | 0.18 |
| Emotion | | |
| Anger | 0.13 | 0.29 |
| Contempt | 0.13 | 0.19 |
| Fear | 0.10 | 0.23 |
| Worry | 0.13 | 0.22 |
| Guilt | 0.03 | 0.31 |
| Shame | 0.05 | 0.21 |
| Sadness | 0.17 | 0.17 |
| Good humor | 0.51 | 0.00 |

*Note*. %V part = percentage variance accounted for by stable participant differences; %V scen = percentage variance accounted for by scenario differences.

clear-cut causal attributions impose themselves. Compared with this special case, the variances attributable to scenario differences are relatively lower for the remaining appraisals. In the case of relevance, valence, and coping, the percentages of participant variance are even higher than the scenario variance, suggesting that these appraisal dimensions are particularly likely to show appraisal biases.

This matches the fundamental assumption of appraisal theories of emotion that appraisals are highly subjective, depending on factors such as personality, values, or cognitive processing specific to each individual. The responses for "in good humor" in both studies reinforce this point: As there are no objective situational characteristics (virtually 0% of the variance for this alternative is due to scenario differences in both studies), it is entirely determined by individual dispositions if one responds with good humor to a negative situation (reliabilities of about .7 in Study 1 and .9 in Study 2).

Overall, the evidence for the relatively high level of respondent variability for several appraisals and several emotions provides further evidence for the existence of the hypothesized stable dispositions to appraise events in a certain way and, correspondingly, to experience certain emotions more intensely or frequently.

Table 7 shows the correlations between appraisal ratings. The pattern found is highly consistent with expectations based on appraisal theory. Thus, negative situations, which are often unexpected, are highly relevant and difficult to cope with. Events seen as caused by others are seen as more relevant and somewhat more negative, as well as somewhat dubious with respect to norm compliance. One would expect that appraisal biases often have such a componential structure.

Because the interest here was to examine general dispositions to appraise situations in a somewhat biased way and to exhibit specific emotion reaction tendencies, there was less interest in the differential responses to the different situations than there was in the overall intensity of the ratings for certain appraisals and emotions. Therefore, we again averaged the appraisal and emotion ratings across all six scenarios to obtain an overall index of emotion disposition. This procedure is also justified by the low contribution to the variance explained by scenario differences reported above.

**Effects of background and personality predispositions on appraisal.** The case for the existence of appraisal biases will be further strengthened if it can be demonstrated that the participants who show such event evaluation tendencies also have other traits and dispositions that might predispose them to such judgment biases. To examine these relationships, as in Study 1 linear regression analyses with a stepwise entry criterion were used, regressing the demographic background variables and measures of personality and emotional competence on the appraisal ratings. To reduce the number of potential predictors, correlation analyses were used to identify high overlap between groups of variables in the different domains. For the big five personality traits measured by the TIPI, a highly significant correlation, $r = .40$, $p < .001$, was found between conscientiousness and agreeableness, reflecting a personality structure of being diligent and considerate, taking obligations to others seriously, and being willing to compromise. These two scales also had almost exactly the same correlations with the other three traits. In consequence, for the sake of economy and stability (given the small number of items in the TIPI), the means of both scores were combined to a composite variable *conscientious/agreeable*. The three subscales of the Sense of Control scale (SoC), low control, power, and self efficacy, and the Drive subscale of the BAS, also intercorrelate with $r > .40$ ($p < .001$), and were thus combined to a composite variable labeled *control/power*. Similarly, all five tests designed to measure the knowledge and

Table 7
*Study 2: Pearson Correlation Coefficients (r) Between Appraisal Biases*

| Variable | Urgency | Expectation | Valence | Relevance | Cause | Coping |
|---|---|---|---|---|---|---|
| Expectation | −0.26** | | | | | |
| Valence | −0.11 | 0.31** | | | | |
| Relevance | 0.28** | 0.01 | −0.51** | | | |
| Cause | 0.09 | −0.31** | −0.17* | 0.27** | | |
| Coping | −0.31** | 0.03 | 0.63** | −0.20** | −0.11 | |
| Moral | −0.38** | 0.16* | 0.38** | −0.05 | −0.25** | 0.12 |

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

recognition facets of Emotional Competence (EC) correlate very highly (with $r > .4$, $p < .001$; see also similar results in Schlegel & Scherer, 2018), consequently, the mean of the five test scores is used as a composite variable in the current study, labeled *EC knowledge*. As to other background factors, only age and gender were included as none of the other background factors correlated significantly with the ratings. The SWLS score was not included as life satisfaction is likely to be heavily influenced by the person's current situation and thus cannot be considered as a stable predisposition.

The results of these stepwise linear regression analyses are shown in Table 8, showing two major trends: Both Valence and Relevance (which highly correlate with $r = .51$, $p < .001$ – negative events are more relevant) are strongly predicted by EC Knowledge and Conscientious/Agreeable: Participants with high scores on these variables tend to consider all events as being more negative and more relevant to themselves. Participants with low scores on EC knowledge and high scores on sense of Control/Power rate their Coping potential as higher in all events. The results for the remaining appraisal criteria are too tenuous for further discussion, either no variables were entered into the regression equation or the adjusted $R^2$ is very low.

**Appraisal effects on emotion ratings.** Appraisal theories of emotion suggest that the appraisals are *major causal factors* that generate the emotion dispositions. The major aim of the current study was to investigate the relationships between the ratings of appraisals and of the resulting emotions in a number of imagined scenarios. Of course, this approach does not allow obtaining direct evidence for this causal process, because participants provide only subjective reports on both appraisals and emotions at the same time. However, given the difficulty of experimentally manipulating appraisals in a systematic fashion, the analysis of the relationships in these two sets of rating data can at least provide a plausibility check for the causal assumptions of the theory. A theory-based hierarchical regression analysis is the most appropriate technique for such an initial exploration. With emotions as dependent variables, three groups of independent variables were defined that were regressed on the dependent variables in a hierarchical fashion by using a stepwise selection of the most powerful predictors in each group: (a) the appraisal scales expected to have a direct effect; (b) personality traits and emotional competence abilities expected to affect individual differences in the use of appraisal criteria (but that may also have a direct effect on emotions, not mediated by appraisals); and (c) background factors such as gender and age (which may affect personality development and influence appraisal but may also have nonmediated, direct effects on emotions). The sequential steps in the regression analysis give theoretically motivated precedence to certain groups of predictors. Appraisals, considered to be the most proximate determinants, come first. Variance not explained by appraisals is then analyzed for direct effects by personality traits.[1] Any remaining variance not explained by the previous steps is analyzed for effects of age and gender. To further clarify the underlying rationale, the results of the procedure outlined above are illustrated in Figure 1, showing the path diagram for worry as an example.

Because the inclusion of such path diagrams for all the emotions studied would be too bulky, the results generated by these hierarchical linear regressions are shown in Table 9. The combination of the information provided in Tables 8 and 9 provides all the information required for the constitution of the respective path diagrams. The *direct* effects of background variables over and above the variance explained by the appraisals in Table 9 are indicated in italics.

The results suggest that several of the predictions in Table 4 are supported:

- Anger and contempt emotion dispositions are likely to be caused by an external attribution bias (Other cause);
- Sadness, worry (and fear) dispositions may be generated by an underestimation bias for control and power, and
- A tendency toward indifference (here glossed as good humor) may be linked to an inability to judge the importance of events.

There is no confirmation of the hypotheses concerning guilt and shame, in the sense neither of lacking norm compliance nor in terms of causal attribution biases. This is probably because these emotions were rarely mentioned as emotional reactions to the scenarios, as shown in Table 5, resulting in very low $R^2$ values (which do not allow interpreting the predictors).

Interestingly, there are a few *direct* prediction effects (not mediated by appraisal) from background (age, gender) and personality (openness) variables on emotion ratings. Older participants tend to report more worry. Female participants report less contempt but also less shame and guilt. The latter may be attributable to participants with a higher score on openness reporting less guilt ($r = -.20$, $p < .01$) and females scoring generally higher on openness, $r = .22$, $p < .01$.

## Discussion

The results concerning the relationships between appraisal and emotion ratings largely correspond to the predictions of the CPM and are highly plausible. They are also consistent with the appraisal bias hypothesis advanced earlier; for example, if a person is biased in the direction of underestimating the positive valence of an event and his or her ability to cope with the consequences, one would expect a higher frequency and intensity of the emotions of worry and sadness.

One reason for the lack of support for the internal causal attribution predictions for shame and guilt may well be that the six scenarios used here were not quite appropriate for self-conscious emotions and thus contained too few elements for the appropriate appraisals. The correlations found between the appraisal tendencies and dispositional factors, in particular personality traits, are consistent with the conceptualization of the different personality traits as described in the literature and correspond to theoretical expectations about the nature of specific appraisals. The findings for emotional competence seem counterintuitive: Participants who have better emotional knowledge skills are more likely to attribute causes for events externally (to others), to feel that the events are significantly more negative and relevant, and to see their coping potential as lower than others do. One potential interpretation of these findings is that emotionally competent persons may be more realistic in their appraisals (similar to the "depressive realism"

[1] It should be noted that the direct effects of personality traits on emotion ratings in this study cannot be directly compared with the respective results in Study 1 because the traits included and the measures used are not directly comparable.

Table 8
*Study 2: Stepwise Linear Regressions of Personality and Background Variables on Appraisal Ratings (z Scores)*

| Appraisal | Adj $R^2$ | Predictors and beta coefficients |
|---|---|---|
| Urgency | — | N/A |
| Expectation | .02 | Conscientious/Agreeable −.17 |
| Valence | .38 | EC Knowledge −.51, Conscientious/Agreeable −.24 |
| Relevance | .41 | EC Knowledge .51, Conscientious/Agreeable .27 |
| Other cause | .09 | EC Knowledge .26, Extraversion −.17 |
| Coping | .18 | EC Knowledge −.37, Control/Power .25 |
| Norm compliance | — | N/A |

*Note*. EC = emotional competence. All ANOVAs reach $p < .001$, and all beta coefficients reach $p <= .001$, except for expectation and other cause $p < .05$. N/A = No variables entered into the equation.



hypothesis; Alloy & Abramson, 1979; Moore & Fresco, 2012), whereas optimists, such as many extraverts, may overestimate their personal responsibility and overestimate their coping ability.

Combining these different classes of predictors in a series of hierarchical regression analyses allowed examination of the probability that appraisal biases mediate the effects of predisposing personality/value factors on specific emotion dispositions. Although further research is needed, the results shown in Table 9 encourage the theoretically based hypothesis suggesting that stable appraisal biases might be at the root of emotion dispositions that can eventually lead to emotional disturbances.

## General Discussion

### Limitations

Before discussing the major contributions of the two studies reported here, some limitations need to be acknowledged. One of these is that that the results are based only on participants imagining the experience of different emotional situations. In addition, the relationships between appraisal tendencies and emotion intensities are based on participants judging both of these simultaneously for the same imagined situation. This is, of course, a common limitation for studies on the link between cognitive appraisal processes and subjective emotional experience. Complex appraisal results are extremely difficult to measure objectively, except in highly controlled experimental studies by using recordings of brain activity following appraisal manipulation (e.g., Gentsch, Grandjean, & Scherer, 2015). Similarly, subjective emotional experience, feeling, or qualia are virtually impossible to measure objectively in scenario imagination designs without resorting to self-report by using emotion labels. However, the indirect assessment via imagined scenarios may be less affected by response tendencies than are direct queries concerning the frequency of certain experiences. One can hope that further technological advancement will allow less subjective measurement at some point. For the moment, one has to live with this limitation and take the results reported here with a grain of salt, acknowledging that some of the relationships reported may, at least to some degree, be affected by method factors.

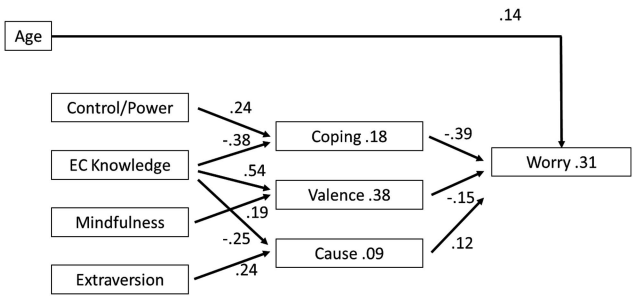


*Figure 1.* Study 2: Hierarchical regression model for worry. EC = emotional competence.

Another limitation is that only biases for negative emotions were addressed, although the concept of emotion dispositions, generated by appraisal biases, is expected to cover the whole gamut of different emotions. The reason is feasibility. There are limitations to the number of scenarios that one can ask respondents to imagine and limitations to the evaluation of their likely reactions on a fair number of dimensions. In the interest of minimizing dropout and obtaining valid responses, it was decided to start by examining negative emotions to allow a reasonable sampling of different types of situations. This is also justified by the fact that one can assume that appraisal biases that lead to negative emotions are more likely to contribute to the risk of developing emotional disturbances. Further insight into these processes is urgently required for theory-based efforts on prevention (e.g., of anxiety disorders or depression). However, it is highly desirable that future research addresses the issue of comparable dispositions for positive emotions, such as pride. If, as expected, these emotions are attributable to biases in appraising outcomes, for example, by overestimating self-agency and self-efficacy, they might also have dysfunctional consequences for social interaction and social relations. On the other hand, it is highly likely that some overestimation of coping ability and self-efficacy can be very functional and have positive effects. For example, in a major review paper, Carver and Scheier (2014) cite evidence showing that *dispositional optimism* predicts greater career success, better social relations, and better health, possibly reflecting greater engagement in pursuit of desired goals.

Although not constituting a real limitation, the respondents in both studies can be considered as highly "normal" individuals who work in mid- to upper-level positions in companies or organizations (Study 1) or who are members of commercial survey panels (Study 2). This may explain why some of the correlations between

Table 9
*Study 2: Hierarchical Stepwise Linear Regressions of Appraisal, Personality and Background Variables on Emotion Ratings (z Scores)*

| Appraisal | Adj $R^2$ | Predictors and beta coefficients |
|---|---|---|
| Contempt | .13 | Other Cause .35; Relevance −.16, *Gender −.18* |
| Anger | .21 | Coping −.31, Other cause .30 |
| Fear | .10 | Other Cause .22, Coping −.21 |
| Worry | .30 | Coping −.39, Valence −.18, *Age .13* |
| Sadness | .27 | Coping −.35, Valence −.25 |
| Guilt | .06 | Openness −.16, *Gender −.18* |
| Shame | .03 | *Gender −.17* |
| Good humor | .43 | Valence −.10, Coping .39, Relevance −.34, Norm compliance .26, Urgency −.19 |

*Note*. All ANOVAs reach $p < .001$, and all beta coefficients reach $p <= .01$, except for Guilt and Shame $p < .05$. Direct effects (i.e., variance accounted for after the variance because the appraisal variables have been removed) are marked in italics.

appraisal bias and emotion dispositions reported in this article seem relatively low with respect to effect size, despite being highly significant because of the large *N*. It is to be expected that these relationships will be much stronger in samples consisting of individuals at risk for certain emotional disorders. Apart from the probable absence of a high number of persons who have, or are at risk for, emotional disturbances, the samples in both studies reported here show a high level of diversity and inclusion. In Study 1, because of the professional status of the participants, there was a higher percentage of male participants and of participants with a higher level of education than average. However, given the large *N*, there was a high amount of variation in demographic factors, as the sample included participants from many different countries and cultures. In Study 2, all participants were members of a survey panel based in the United States. This allowed selection of a representative sample with respect to gender, age, profession, and ethnic origin, an ideal situation to achieve diversity and inclusion.

## Summary of Major Results

As outlined at the end of the introduction, this research program targeted four major aims. The overall results of the studies in this respect can be summarized as follows:

1. Examining the plausibility of the assumption that there are stable individual differences in the form of emotion dispositions across different eliciting situations: In both studies, sizable amounts of variance for stable individual differences in tendencies to respond more intensively with certain emotions to the standard scenarios were found, generally supporting the prediction.

2. Development of an appropriate ecologically valid assessment instrument: The results for both studies showed that the envisaged emotional responses of participants to a number of standard scenarios provide directly comparable reliable measures for emotion dispositions. In addition to finding similar emotional disposition patterns for six of the scenarios (see Tables 1 and 5), Study 2 demonstrated a similar degree of reliability for the envisaged appraisal responses. Thus, the final EMODI instrument can be recommended for further evaluation in this domain.

3. Testing a number of published predictions on the importance of different types of appraisal bias for different types of emotion disposition: Many of the predictions made in this domain (summarized in Scherer & Brosch, 2009; see Table 4) were supported by the data in Study 2. In particular, the following effects were significant: Low relevance bias > indifference (as evidenced in good humor), obstructiveness (negative valence) bias > dissatisfaction (e.g., anger, sadness, worry), control/power (coping potential) underestimation bias > sadness, worry, external attribution bias > anger. The reason for the lack of support for some hypotheses (particularly those involving shame and guilt) is most likely the absence of scenarios inviting self-cause appraisal bias.

4. Exploring the role of different personality and biographical background factors responsible for the development of appraisal bias and, therefore, stable emotion dispositions: The respective results in both studies suggest that such factors may indeed be involved in the development of these response tendencies, in particular traits such as agreeableness and conscientiousness, power, self-efficacy, control beliefs, and emotional knowledge and understanding ability.

## Outlook

The current approach does not allow defining and analyzing appraisal bias and emotion dispositions in a categorical fashion. Here, we have investigated the general mechanisms underlying the relationships between appraisals and emotion ratings by using multivariate correlation and regression analyses. However, in the introduction we proposed that there are individuals with stable appraisal biases that increase the probability of the emergence of specific emotions that may be dysfunctional. The quantitative definition of such a specific appraisal bias, for example, in the form of a threshold or cut-off level, is a rather thorny issue, given that bias is defined as a deviation from what "normal" people would consider a realistic appraisal of an event. At the present state of empirical data concerning such "normal" appraisals, it would be extremely hazardous to propose such a definition, which will require a more solid basis in theoretical analysis and empirical data.

Clearly, future research is needed to establish the stability and generalizability of the notion of appraisal biases and their effects on emotion dispositions. In particular, the single cross-sectional assessment should be complemented by a longitudinal approach in which the same participants can be tested at different points in time to establish the stability of the biases and dispositions. Another major task for the future is to elaborate a solid theoretical framework to account for predispositions and mediating variables. In the absence of such a framework in the literature, the current work was limited to a first exploratory survey of the kinds of personal background, personality, value, and ability factors that might be possibly involved. The results are promising and encourage further investment in developing an appropriate framework.

Overall, the results of the two studies reported here provide valuable cumulative support for the theoretical proposals put forth in the literature regarding trait emotion or affect and the important role of attribution and appraisal bias. In line with empirical results from earlier work (e.g., Scherer et al., 2004), the data presented in this article justify the claim that there are emotion dispositions in the sense that individuals may have the tendency to react with specific emotions to different events more frequently and with higher intensity. In the current research project, potential mechanisms were explored that may plausibly be involved in such individual differences in emotional responding. In particular, an effort was made to demonstrate the potential role of appraisal tendencies or biases that may lead a person to consistently evaluate events and situations in a specific manner, for example, by over- or underestimating, as the case may be, the positive or negative implications of an event for the person, his or her ability to cope with these consequences, and the degree of his or her responsibility for such consequences. The data reported here suggest that appraisal tendencies may indeed be a key element in emotion dispositions, particularly as some of them seem to be strongly related to different aspects of stable personality and emotional competence.

This initial work will need to be pursued and extended in an effort to obtain further empirical evidence for this phenomenon. Such work is all the more important, because there are key implications for diagnostic applications in clinical settings, for example, the possibility of using the existence of appraisal bias as an indicator for risk factors for affective disturbances such as depression and anxiety disorders (Abramson, Metalsky, & Alloy, 1989; Kaiser & Scherer, 1998; Mehu & Scherer, 2015; Patrick & Bernat, 2006; Riskind & Rector, 2018; Roseman & Kaiser, 2001; Scherer & Brosch, 2009). A central issue will consist of establishing markers for appraisal biases that can be considered dysfunctional and potentially lead to increased risk for affective disorders. Therefore, research that combines the approach to measuring appraisal tendencies, as advocated here, with the administration of instruments designed to detect risk for depression and anxiety disorders is urgently needed. In a preliminary study, using a precursor of the EMODI instrument, significant relationships with the Depression/Anxiety/Stress scale were found (see the conference poster by Gentsch et al. [2015] reproduced in Figure S1 of the online supplementary materials).

Many of the hypothesized relationships concern the overestimation of negative valence and the underestimation of coping potential. Some of the results reported here suggest that there may also be a danger for bias toward positive valence and high coping potential, possibly leading to an unrealistically optimistic evaluation (as shown in the results for good humor responses in the results reported earlier). On the other hand, there is a clear tendency of participants with high scores on five major tests of emotional knowledge to show an appraisal bias in the direction of underestimating their coping potential, with a resulting tendency to react with worry or sadness to negative events (which could potentially carry a risk for anxiety or depression disorder). Alternatively, perhaps individuals with high emotion knowledge are more realistic and react with the appropriate emotions to negative events that are difficult to cope with. It seems to be of high importance to clarify the underlying mechanisms, which will probably also require measuring the appropriateness or the realism of appraisals.

Another important task for future research is to study the relationship between manifest self-report of emotional experiences (e.g., emotions experienced yesterday, as in Scherer et al., 2004, or during recent weeks, as in many clinical inventories) and the innovative method of asking participants to imagine standard scenarios and indicate their probable emotional response. It is possible that manifest self-report of recent emotional experiences suffers, like most self-report instruments on personality, from specific response sets (e.g., general negativity). In contrast, the more indirect technique of asking respondents to imagine their appraisals and emotional reactions in imagined scenarios might provide more direct evidence for the importance of appraisal biases for emotional reactions (particularly because the responses to standard scenarios can be compared across participants, which is not the case for subjective self-report).

In conclusion, the two large-scale studies reported here have provided further evidence that supports the existence of emotion dispositions and the hypothesis that these are produced, at least in part, by stable appraisal biases that affect the evaluation of events and their potential consequences. Of course, both studies are based on self-report and multivariate correlational analyses, which does not allow firm causal inference. In fact, critics could claim that it is equally possible that appraisal biases are produced by emotion dispositions. Although possible, this does not seem very plausible. Abductive reasoning, logical inference starting with a set of observations, requires to find the simplest and most likely explanation for the observations. The notion that emotional experiences are largely determined by appraisal processes has been supported by extensive research in which appraisals have been experimentally manipulated, generally finding support for the predicted emotional reactions (Moors, Ellsworth, Scherer, & Frijda, 2013; Scherer & Moors, 2019). It seems plausible that this may also be true for emotion dispositions. However, there is of course the possibility of a recursive process, in other words emotion dispositions created by appraisal biases serving to stabilize and further develop such cognitive biases. Future research, in preference of a longitudinal nature, is needed to examine the underlying processes.

Appraisal biases and the resulting emotion dispositions are not necessarily negative or detrimental for well-being. For example, the disposition to react more positively to life events and experience emotions that are more positive may foster optimism and thus lead to a reasonable amount of successful risk-taking. In this work, we have focused on the negative consequences, because in some cases appraisal biases may lead to cognitive vulnerability that constitutes a serious risk factor for depression, anxiety disorders, and other dysfunctional emotional responses (Mehu & Scherer,

2015). In view of the steadily increasing incidence of these emotion disorders, especially in young people, empirical investigation of the underlying mechanisms and the development of appropriate prevention programs seems urgently required. Apart from preventing potential risk factors and attempting to diagnose appraisal bias and dysfunctional emotion dispositions, a better understanding of the underlying mechanisms and the development of appropriate training procedures could also serve to increase the level of emotional competence (see Scherer, 2007). Given the central role of concepts and mechanisms related to many different domains of psychological science, future research should be directed toward a much closer collaboration between the relevant areas of expertise, in particular, personality, clinical, social, and emotion psychology as well as assessment methodology.

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