



Components of Emotional Meaning: A sourcebook

Johnny J. R. Fontaine (ed.) et al.

<https://doi.org/10.1093/acprof:oso/9780199592746.001.0001>

Published: 15 August 2013

Online ISBN: 9780191762765

Print ISBN: 9780199592746

Search in this book

CHAPTER

12 Driving the emotion process: The Appraisal component

Klaus R. Scherer, Johnny J. R. Fontaine

<https://doi.org/10.1093/acprof:oso/9780199592746.003.0013> Pages 186–209

Published: 15 August 2013

Abstract

The theoretical framework underlying the GRID approach (Component Process Model) suggests that the results of subjective event appraisal drive the changes in all other components in the emotion episode. Thus one would expect to find a high degree of differentiation in the structure of this component. This is confirmed once the powerful influence of a valence superfactor is partialled out of the features. In addition to the VALENCE APPRAISAL factor, six additional factors are identified: NOVELTY/ CHANCE CAUSE, COPING ABILITY, EXPECTED/ FAMILIAR, GOAL RELEVANCE, NORM VIOLATION, and SELF VS OTHER CAUSE. These factors contribute substantially to the overall emotion dimension with the exception of the POWER dimension. The claim that appraisal is at the basis of emotion differentiation, including meaning, is supported by the result that the seven appraisal factors allow correct classification of 57% of the cases in a discriminant analysis.

Keywords: appraisal, valence, coping potential, novelty, goal relevance, causal attribution, expectation, norm violation

Subject: Developmental Psychology, Social Psychology

Collection: Oxford Scholarship Online

Having reported the data analyses concerning the Feeling, Bodily reaction, Expression, and Action tendency components of emotion, we now address the component that has been considered the central defining element of emotion by philosophers across the centuries and that is increasingly seen as the key to understanding emotion by most theorists in this domain—the Appraisal component. A detailed description of this cognitive emotion component, responsible for the evaluation of events that trigger emotion, and in particular of the nature of the major appraisal checks and their function in the emotion process, has been provided in Chapter 1. In consequence, here we focus on the selection of the items to represent this component in the GRID instrument and on the presentation and interpretation of the results.

12.1 Operationalization of the Appraisal component

As for the other components, we first describe how the Appraisal component has been operationalized in the GRID instrument, more precisely, how the features have been chosen and how the concrete items were formulated. An effort was made to represent the major streams in the literature.

Component Process Model. As explained in Chapter 1, Scherer's Component Process Model (CPM; 1984b, 2001, 2009c) was chosen as the theoretical framework for the selection of the features representing the different appraisal checks in the GRID instrument and the formulation of the specific items. These features represent the suggestions of the major appraisal theorists concerning the central criteria or dimensions that determine the elicitation and differentiation of emotion episodes. Despite minor differences in terminology, there is a large degree of convergence among appraisal theorists and thus the choice of appraisal features can be considered as representative for a core group of appraisal theories (see Ellsworth & Scherer, 2003; Scherer, 1999a).

p. 187 Based on the CPM, we selected 13 appraisal features, organized in four superordinate classes of appraisal criteria: relevance, implications, coping potential, and normative significance of the situation for the person (see Chapter 1 for a detailed discussion; also Scherer, 2001, pp. 94–99 and Table 5.4 in that chapter, reproduced in Table SM 1²). The CPM postulates that the appraisal system sequentially and recursively processes these appraisal checks in order to achieve a comprehensive account of the situational antecedents and the potential consequences for the person, which drives ↴ the changes in the other emotion components. In other words, the dynamically evolving profile of appraisal results is expected to determine, in a sequential-cumulative fashion, the nature and quality of the emergent emotion episode. If this assumption is correct, we expect that the appraisal results will determine, to a large part, directly or mediated by the corresponding response patterns, the label an individual will chose to describe the nature of the emotional experience. In consequence, appraisal features should be a central constituent of the differentiated semantic profiles of emotion words.

The formulation of the appraisal items in the GRID instrument was largely informed by the questions in a computer-based expert system predicting emotion labels on the basis of user input of appraisal profiles (Scherer, 1993; Scherer & Meuleman, 2013) and the Geneva Appraisal Questionnaire (GAQ, http://www.affective-sciences.org/system/files/page/2636/GAQ_English.PDF; see also the preliminary formulation of the pertinent items in Table 3 of Scherer, 2005a). Table 12.1 shows the final formulation of the appraisal features in relation to the individual appraisal criteria or stimulus evaluation checks postulated by the CPM (indicated by an X in the respective column). In general, only a single item was chosen to represent a specific appraisal check, given the need to constrain the total number of features in the instrument. However, in a few cases (novelty, intrinsic un/pleasantness, causal attribution, and goal conduciveness/obstructiveness), we formulated several items to represent different aspects or outcomes of the same check.

Table 12.1 List of appraisal features organized by class of appraisal criteria

Appraisal features	Relevance detection	NOVELTY	Intrinsic pleasantness	Goal relevance	Implication assessment	Causal attribution	Outcome probability check	Discrepancy from expectation	Goal/need conduciveness	Urgency
suddenly		X								
familiar		X								
unpredictable		X								
confirmed expectations								X		
inconsistent with expectations								X		
in itself pleasant for the person			X							
in itself pleasant for somebody else										
in itself unpleasant for the person			X							

consequences predictable	X	
consequences positive for person		X
consequences positive for somebody else		
consequences negative for person		X
consequences negative for somebody else		
required an immediate response		X
consequences avoidable or modifiable		
enough resources to avoid or modify consequences		

consequences
able to live
with

incongruent
with own
standards and
ideals

violated laws
or socially
accepted
norms

center of
attention

treated
unjustly

in danger

irrevocable
loss

In addition to the features covering the 13 standard appraisal criteria, we added some features to acknowledge specific elements of appraisal highlighted in alternative theoretical approaches to emotion. These items are identified in the last two columns of Table 12.1. Social appraisal. One set of additional items concerns the social aspects of appraisal. While the CPM focuses on the consequences of an event for the *self*, cross-cultural psychologists and anthropologists have emphasized that cultures differ in the relative focus on the individual or on the group

p. 188

(e.g., Markus & Kitayama, 1991). In order to take into account this major dimension of cross-cultural variability, for two of the valence features—pleasantness and goal conduciveness, we added two items capturing the valence of an event for *another person* (referring to both a person's own goals and appraisal items that referred to the goals of other persons). In addition, the items "center of attention" and "treated unjustly" were included to represent two different aspects of social appraisal. We felt that these additional features might facilitate the use of the GRID instrument in cross-cultural research by providing a more comprehensive coverage of the relevant appraisal criteria.

p. 189

Core relational themes. Furthermore, two additional items were added to represent Lazarus' appraisal theory postulating that appraisals establish an integrative meaning of the eliciting situation defined as *core relational themes* (Lazarus, 1991a; Smith & Lazarus, 1993). To evaluate the role of such integrated meanings, the core relational themes of two major negative emotions of fear (danger theme), and sadness (loss theme) were added to the list of appraisal features. A total of 31 features were finally chosen to represent the Appraisal component (see Table 12.1).

12.2 Theoretical expectations

Predictions about internal structure. Most of the appraisal features are represented by a single item (or by qualitatively different alternative results of a check). Therefore we do not attempt to examine the overlap or redundancy of items to identify, in a psychometric fashion, sets of items that measure the same underlying dimension or factor (as in scale construction). Rather, each appraisal item is expected to represent an independent feature that, in specific configurations with other features, characterizes a specific emotion (see Chapter 1). As for the other components, we used factor analysis to identify potential superordinate structures. As shown in the introduction to this volume (specifically in Chapter 1), there is reason to assume that each appraisal check is valenced, representing different *types of valence*, such as valence as predictability, as pleasure, as satisfaction, as power/dominance, as self-worthiness, or as moral worthiness (see Chapter 1, Table 1.1). Given the pervasiveness of valence in appraisal, one would expect the emergence of a general factor, broad factor, or superfactor of valence (similar to "g" in intelligence, Sternberg & Grigorenko, 2002; or extraversion and neuroticism in personality, Strelau & Zawadzki, 1997).

Predictions about relationships with the four overall factors. Based on the appraisal literature (Ellsworth & Scherer, 2003; Scherer, 2001; see Chapter 1), we developed a number of hypotheses concerning which Appraisal component factors should correlate with each of the four overall factors. Specifically, as mentioned above, we expected a valence superfactor that should correlate highly with the overall VALENCE factor. We also expected a strong correlation between the novelty appraisal checks with the overall NOVELTY factor, given their strong impact on the emergence of novelty in the overall structure (see Fontaine et al., 2007). The items expected to measure coping potential, presumably loading on an Appraisal component coping factor, were expected to correlate to some extent with the overall POWER factor, even though the broad coping potential concept also includes other facets, not related to power, such as the ability to adjust to or live with a changed situation. No detailed predictions were made for the AROUSAL factor, as we expected this dimension to primarily qualify responses in the sense of greater intensity or activation, rather than differentiate categories of emotion. However, judging from past work on two-dimensional mapping of emotion words (see the literature reviewed in Chapter 2), it is likely that some emotion words imply a higher degree of intensity or activation within one emotion family. The choice of these words may well be determined by certain configurations of appraisal results (e.g., goals being seriously threatened, having little power, or urgent need for action might all require a high degree of arousal).

p. 190 **Predictions about discrimination.** Given the fundamental claim of most appraisal theories, and particularly the CPM, that appraisal causes emotional responses and drives the changes in the other emotion components, we hypothesize that individual appraisal features and Appraisal component factors will permit highly accurate classification of the 24 terms in multiple discriminant analyses (MDA). However, as appraisal theorists expect the results for different appraisal criteria to interact, in the case of the CPM even in a cumulative sequential fashion, configurational and nonlinear effects can be expected (Scherer, 2000b, 2009a). It should be noted that such effects cannot be easily identified with standard linear statistical methods (e.g., MDA) and thus only a few illustrations for the existence of such effects will be provided below.

12.3 Results

The analyses on the Appraisal component have been executed on data from 34 samples representing 30 countries and 25 languages (see Chapter 6, for a detailed account of the samples). For a description of the design, the instrument, and the data-analytic methods, the reader is referred to Chapter 5. Moreover, the same steps are taken as with the analyses of the overall structure (see Chapter 7). We first report on the factor structure of the Appraisal component. We then present the relationships between the appraisal factors and the overall factors that have been identified across the remaining emotion components. We end by investigating how well the Appraisal component allows the differentiation of the 24 emotion terms from one another across languages, countries, and samples.

The internal structure of the Appraisal component

Standard internal structure analysis. The scree plot (see Figure SM 1) pointed to two to four factors. The investigation of the stability of the factor structure across four language groups showed that only the first two factors are stable across groups (see Table SM 2). The two factors account for 60.7% of the overall variance.

The VARIMAX rotated factor structure for this solution is reproduced in Table 12.2. It shows that Factor 1 is constituted of many items that in one form or another represent a general *valence* factor. We will refer to this factor as GENERAL VALENCE APPRAISAL below. Factor 2 shows high loadings for items related to the suddenness and unpredictability of events. This factor will be called NOVELTY APPRAISAL.

Table 12.2 Loadings of the appraisal features in a two-factorial VARIMAX rotated structure

Appraisal features	GENERAL VALENCE APPRAISAL	NOVELTY APPRAISAL
consequences positive for person	0.97	0.04
in itself pleasant for the person	0.96	0.07
consequences positive for somebody else	0.93	0.07
important and relevant for person's goals	0.88	0.09
in itself pleasant for somebody else	0.88	0.11
important and relevant for goals of somebody else	0.84	0.07
confirmed expectations	0.81	-0.26
consequences able to live with	0.79	-0.11
center of attention	0.73	0.12
familiar	0.70	-0.28
consequences predictable	0.53	-0.48
caused by the person's own behavior	0.47	-0.36
inconsistent with expectations	-0.55	0.48
in itself unpleasant for somebody else	-0.72	-0.09
consequences negative for somebody else	-0.76	-0.12
in danger	-0.81	0.26
violated laws or socially accepted norms	-0.83	0.01
irrevocable loss	-0.86	0.05
incongruent with own standards and ideals	-0.91	0.02
treated unjustly	-0.92	0.05
in itself unpleasant for the person	-0.93	0.02
consequences negative for person	-0.94	0.01
unpredictable	-0.04	0.84
suddenly	0.15	0.76
caused by chance	0.42	0.64
required an immediate response	-0.07	0.56
caused by a supernatural power	0.44	0.49
caused by somebody else's behavior	-0.09	0.34
caused intentionally	0.19	-0.23
consequences avoidable or modifiable	-0.35	-0.37

In order to visualize the position of the 24 emotion words in the two-dimensional space constituted of the GENERAL VALENCE APPRAISAL by NOVELTY APPRAISAL factors, we plotted the means of the appraisal factor scores for the 24 emotion words (listed in Table SM 3) in Figure 12.1. Visual inspection of the plot confirms that the emotions chosen for the GRID study, with the exception of surprise and compassion, are highly valenced, occupying rather opposite regions on the GENERAL VALENCE APPRAISAL dimension, suggesting a clear divide between the positive and negative emotions in our set of 24 emotion words. As to the exceptions, surprise is a very brief reaction in response to a suddenness/unpredictability appraisal of an event that can turn out to have either positive or negative consequences (determined by the ensuing relevance checks). As to compassion, one can empathize with either a positive or a negative emotion experienced by another person.

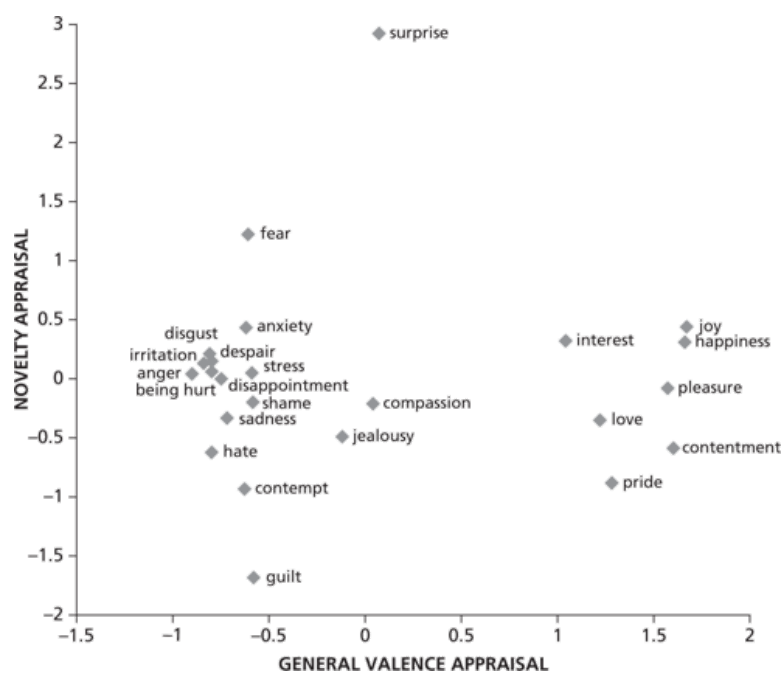


Figure 12.1 Plot of the average factor scores for the 24 emotion words on GENERAL VALENCE APPRAISAL and NOVELTY APPRAISAL.

As far as the NOVELTY APPRAISAL dimension in the plot is concerned, it is dominated by surprise, which, as expected, clearly marks this dimension. However, the spread-out positions of the other emotion words demonstrate that there is also an important amount of variation on the NOVELTY APPRAISAL dimension, suggesting that this dimension contributes significantly to the overall differentiation between the emotion words.

p. 191 Overall, the GENERAL VALENCE APPRAISAL dimension, due to the convergence of different types of valence, explains the bulk of the variance. This confirms the overwhelming importance of the generic valence dimension in any kind of dimensional analysis of emotion words (i.e., in similarity research, see also Chapter 14, as well as the results shown in Chapter 7 reporting the overall analysis).

p. 192 As mentioned in the theoretical predictions above, it could be expected that specific appraisal factors might be facets of a general superfactor of valence, similar to the superfactor “g” in intelligence research, a general factor underlying various types of competencies. Indeed, the central role of valence in the current data, represented by the first factor on which most of the different appraisal features loaded, strongly suggests the presence of a superfactor “valence.” To further examine the structural information in the Appraisal component that is not accounted for by this valence superfactor, we took recourse to alternative exploratory analytic strategies, namely a) separate factor analyses for positive and negative emotion terms, and b) factor analysis on appraisal features after partialling out intrinsic pleasantness and goal conduciveness.

Separate analysis of positive and negative emotion terms. The strong effect of valence in our data set is largely due to the predominance of the clear division between words denoting positive and negative emotions in the set of 24 words studies, as only surprise and compassion can be considered as more neutral. If one looks at the mean ratings on the appraisal features separately for positive and negative emotions (see Table 12.3) it becomes apparent that there are very systematic differences between the two emotion sets with negative emotions having less predictable outcomes, lower coping potential, and lower moral and self-standard compatibility. Most of the differences shown in the table are all very highly significant in a multivariate ANOVA. This confirms the claim that most appraisal checks are valenced and suggests that, in general, the different types of valences tend to go into the same direction for positive and negative emotions. The ↵

p. 193

p. 194 ↵
amount of variance accounted for by this valence superfactor, exacerbated by the fact that we have several items for intrinsic pleasantness and goal conduciveness, can account for the fact that remaining differences between the appraisals was drowned out and only novelty emerges as the second factor in the overall factor analysis.

Table 12.3 Mean appraisal ratings of positive and negative emotion words

Appraisal features	Negative emotion words	Positive emotion words
suddenly	0.62	0.84
familiar	−0.44	1.21
unpredictable	0.57	0.50
confirmed expectations	−0.63	1.47
inconsistent with expectations	0.76	−0.24
in itself pleasant for the person	−2.61	2.76
in itself pleasant for somebody else	−1.30	1.42
in itself unpleasant for the person	1.57	−1.96
in itself unpleasant for somebody else	0.47	−1.11
important and relevant for person's goals	−0.89	2.27
important and relevant for goals of somebody else	−0.89	1.09
caused by chance	−0.12	0.83
caused by the person's own behavior	0.29	1.31
caused by somebody else's behavior	1.05	0.86
caused by a supernatural power	−1.15	0.15
caused intentionally	0.30	0.70
consequences predictable	−0.33	0.81
consequences positive for person	−2.56	2.82
consequences positive for somebody else	−1.55	1.48
consequences negative for person	1.62	−2.06
consequences negative for somebody else	0.45	−1.28
required an immediate response	0.25	0.14
consequences avoidable or modifiable	0.33	−0.32
enough resources to avoid or modify consequences	0.10	0.11
consequences able to live with	−0.83	1.09
incongruent with own standards and ideals	1.24	−1.61
violated laws or socially accepted norms	0.93	−1.57
center of attention	−0.28	1.79
treated unjustly	1.59	−2.37
in danger	0.91	−2.32

We therefore computed separate factor analyses for the positive and negative emotion words. As we are interested in examining the extent to which the internal structure of the appraisal ratings reflects the theoretical predictions of the CPM (see Chapter 1) and to obtain Appraisal component factors that represent this theoretical structure, we decided to exclude the features that were added on the basis of alternative theories (the items marked in the last two columns of Table 12.1) from this factor analysis. In other words, only the values for the appraisal features that are explicitly postulated by the CPM were included in the factor analysis (we did include the item concerning “relevance for another person’s goals” as a second item for the goal relevance check to capture an aspect that is important for altruistic emotions, such as compassion). The resulting VARIMAX rotated structures are shown in Tables 12.4 and 12.5. For the negative emotion terms a seven factorial structure accounting for 68.09% of the total variance could be well interpreted. In the case of the positive emotion terms the best interpretation was provided by the five-factorial structure, which accounted for 67.12% of the total variance. The pattern of factor loadings is well interpretable in the light of the CPM predictions described in Chapter 1. Thus, for the negative emotion terms the factors can be interpreted as F1 valence, F2 coping potential, F3 novelty, F4 expectedness, F5 relevance, F6 incongruity with standards, and F7 causality (see Table 12.4). The factor structure for the positive emotions is comparable except that the incongruity with standards and the causality features load on other factors (see Table 12.5). Thus, the analysis of the superordinate structure, after the valence superfactor was neutralized through separating positive and negative emotions, provides a solution that is highly compatible with theoretical expectations about the internal structure of the appraisal criteria.

Table 12.4 Loadings of the theoretically predicted appraisal features in a seven-factorial VARIMAX rotated structure for the negative emotion terms

Appraisal features	F1	F2	F3	F4	F5	F6	F7
in itself unpleasant for the person	0.78	0.05	0.07	0.02	0.11	0.24	-0.03
consequences negative for person	0.74	0.20	0.24	0.00	-0.02	0.10	-0.03
inconsistent with expectations	0.69	-0.03	0.30	-0.03	0.00	0.06	0.12
consequences positive for person	-0.66	0.12	-0.01	0.12	0.35	0.05	0.14
in itself pleasant for the person	-0.65	0.08	0.08	0.31	0.02	0.02	0.35
enough resources to avoid or modify consequences	0.10	0.83	-0.12	-0.06	-0.12	0.06	0.19
consequences avoidable or modifiable	0.00	0.82	-0.04	0.07	-0.03	0.27	0.12
consequences able to live with	-0.06	0.64	0.03	0.27	0.28	-0.04	-0.06
consequences predictable	0.06	0.54	-0.17	0.44	-0.12	-0.19	0.14
suddenly	0.12	-0.07	0.85	0.01	-0.04	-0.10	-0.05
unpredictable	0.28	-0.19	0.75	-0.14	-0.05	0.01	-0.09
caused by chance	0.08	-0.02	0.67	0.02	0.13	0.06	0.09
required an immediate response	-0.12	0.32	0.56	-0.43	0.08	0.10	-0.36
familiar	-0.06	0.11	0.01	0.76	0.15	-0.12	0.03
confirmed expectations	-0.26	0.09	-0.08	0.72	0.19	0.02	-0.11
caused intentionally	0.13	0.17	-0.11	0.50	-0.34	0.31	-0.21
important and relevant for person's goals	-0.02	-0.02	0.13	-0.03	0.85	-0.03	0.01
important and relevant for goals of somebody else	-0.01	0.01	-0.07	0.23	0.78	-0.12	-0.10
violated laws or socially accepted norms	0.07	0.07	0.05	-0.11	-0.17	0.87	0.11
incongruent with own standards and ideals	0.53	0.15	-0.07	0.04	0.03	0.71	-0.05
caused by the person's own behavior	0.00	0.32	-0.04	0.03	-0.02	0.13	0.79
caused by somebody else's behavior	0.43	-0.03	0.05	0.30	0.09	0.05	-0.66

Table 12.5 Loadings of the theoretically predicted appraisal features in a five-factorial VARIMAX rotated structure for the positive emotion terms

Appraisal features	F1	F2	F3	F4	F5
consequences negative for person	0.83	-0.12	-0.20	-0.08	0.11
incongruent with own standards and ideals	0.78	-0.02	-0.24	-0.18	0.17
in itself unpleasant for the person	0.77	-0.06	-0.19	0.08	0.02
violated laws or socially accepted norms	0.75	0.11	0.14	-0.01	0.03
in itself pleasant for the person	-0.62	0.23	0.52	0.15	0.13
required an immediate response	0.50	0.50	0.09	0.12	0.23
unpredictable	-0.05	0.85	0.07	0.00	-0.11
suddenly	-0.05	0.78	0.18	0.20	0.03
caused by chance	-0.13	0.72	0.36	0.03	-0.03
caused by somebody else's behavior	-0.05	0.65	0.06	0.19	0.05
inconsistent with expectations	0.11	0.64	-0.33	-0.16	0.16
important and relevant for goals of somebody else	-0.04	0.18	0.81	-0.01	0.04
important and relevant for person's goals	-0.14	0.12	0.73	0.22	0.00
consequences positive for person	-0.55	0.12	0.61	0.24	0.16
confirmed expectations	-0.15	-0.11	0.59	0.58	-0.07
caused by the person's own behavior	-0.05	0.11	0.07	0.85	0.04
caused intentionally	0.07	0.32	0.15	0.69	0.13
consequences predictable	-0.01	-0.01	0.40	0.68	0.29
familiar	-0.41	0.04	-0.14	0.53	0.27
enough resources to avoid or modify consequences	0.15	0.02	-0.19	0.20	0.82
consequences able to live with	-0.20	0.01	0.30	0.04	0.77
consequences avoidable or modifiable	0.37	0.08	0.05	0.16	0.71

This solution to controlling the dominant effect of the valence superfactor has the disadvantage that two different sets of factor scores would be required for the two types of emotion for further analyses, which is not compatible with many of the methods used in this study. We therefore chose yet another approach.

Internal structure analysis on residuals. To obtain a single factor structure that represents the differentiation beyond the valence factor, we partialled valence out of the original feature scores (see Chapter 5). For both conceptual and empirical reasons (size of the loadings on Factor 1 in Table 12.2) the meaning of valence in the Appraisal component can be defined by the four central appraisal features “in itself pleasant,” “in itself unpleasant,” “positive consequences,” and “negative consequences.” These features have in common that they reflect the hedonic significance of the situation created by the eliciting event—the generally positive or negative outcome engendered by the event. A factor analysis on only these four features yielded a single factor accounting for 95% of the total variance. We further refer to this factor as VALENCE APPRAISAL. This valence factor was then partialled out of the 18 remaining appraisal features that are explicitly postulated by the CPM using linear regression.

These 18 residual features were then submitted to a factor analysis. Figure SM 2 shows the scree plot. The scree criterion suggests a cut-off at five or six factors. The replicability of the residual structure for the six factor solution, which provided the clearest interpretation, was investigated. While not all congruence coefficients reached the cut-off value of 0.85, probably because unreliability had comparatively more effect in the residual structure, all items had the highest loadings on their respective factor after orthogonal Procrustes rotation in each of the four language groups, except for three cases (one feature in the German and two features in the East-Asian language groups loaded on a different factor). In consequence, the resulting six-factor configuration can be interpreted in the same way across language groups. The six factors accounted for 69% of the overall variance in the selected set of residual appraisal variables.

Table 12.6 shows the rotated factor loadings for the six-factor solution. Overall, we find a very similar structure to the separate factor analyses for positive and negative emotions (except for the absence of the valence factor), which demonstrates the stability of this solution given the different analysis approaches. The first factor represents the suddenness and unpredictability aspects of the theoretically postulated novelty check in the early relevance detection phase. However, in contrast to the two-factor solution discussed above, where only the suddenness and unpredictability items of this early check loaded on the NOVELTY APPRAISAL factor, we now also find a strong loading for “inconsistent with expectations,” which is part of the theoretically postulated discrepancy from expectation check (see Table 12.1). Most likely, this is due to ecological correlations as described above—if events are unpredictable they are likely to be inconsistent with expectations. Ecological correlations may also be responsible for the loadings of two additional items that were expected to represent separate checks on this factor: “caused by chance” (causation subcheck) and “required an immediate response” (urgency subcheck). Unexpected and unpredictable events often occur by chance and require an urgent reaction. As it would be difficult to clearly separate conceptually postulated and ecological correlations and as we used the factor analysis as an empirical discovery method, we decided to include all five items in the definition of this factor that will be referred to as NOVELTY/CHANCE CAUSE.

Table 12.6 Loadings of the theoretically predicted appraisal features after partialling out VALENCE appraisal in a six-factorial VARIMAX rotated structure

Appraisal features	NOVELTY/CHANCE CAUSE	COPING ABILITY	EXPECTED/FAMILIAR	GOAL RELEVANCE	NORM VIOLATION	SELF VS OTHER CAUSE
suddenly	0.87	−0.10	0.02	0.01	−0.04	0.02
unpredictable	0.85	−0.17	−0.12	−0.01	0.02	0.13
caused by chance	0.75	−0.08	−0.05	0.15	0.08	0.03
inconsistent with expectations	0.64	0.07	−0.11	−0.10	0.11	0.32
required an immediate response	0.63	0.19	−0.25	0.16	0.09	−0.11
enough resources to avoid or modify consequences	−0.05	0.85	0.12	−0.12	0.06	−0.16
consequences avoidable or modifiable	−0.05	0.79	0.17	−0.02	0.25	−0.16
consequences able to live with	−0.01	0.71	0.14	0.31	−0.09	0.20
caused intentionally	0.05	0.14	0.73	−0.19	0.22	0.13
confirmed expectations	−0.28	0.00	0.67	0.38	−0.05	−0.15
familiar	−0.17	0.15	0.63	0.16	−0.26	0.04
consequences predictable	−0.23	0.38	0.62	0.11	−0.09	−0.20
important and relevant for person's goals	0.15	0.00	0.06	0.83	−0.04	−0.14
important and relevant for goals of somebody else	0.04	0.07	0.09	0.81	−0.01	0.25
violated laws or socially accepted norms	0.09	0.01	−0.01	−0.10	0.85	−0.24
incongruent with own standards and ideals	0.07	0.17	−0.06	0.05	0.81	0.24
caused by somebody else's behavior	0.33	−0.02	0.33	0.15	0.05	0.69
caused by the persons own behavior	−0.02	0.26	0.39	0.02	0.09	−0.67

The second factor represents the three appraisal checks that make up the theoretically postulated coping potential assessment phase—control, power, and adjustment (enough resources to avoid or modify consequences, consequences avoidable or modifiable, consequences able to live with). We call this factor **COPING ABILITY**. It should be noted that the third feature (consequences able to live with) originally loaded very highly on the valence superfactor (with almost zero correlations with the two other items) and joined the **COPING ABILITY** group only after valence was partialled out.

p. 197 The third factor represents a blend of elements from three different theoretically postulated checks in the CPM: 1) the “event is familiar” feature of the novelty check, 2) the “consequences predictable” feature of the outcome probability check, and 3) the “confirmed expectations” part of the discrepancy from expectation check (the extent to which the personal expectations for this point in time are matched) all load on the third factor. In addition, an item originally considered to be part of the causal attribution check, “caused intentionally,” also loads highly on this factor. The latter might reflect the fact that expectations are more likely to be met if intentional causation, rather than chance occurrence, is involved and may also be due to ecological correlations. As before, irrespective of the theoretical definitions, we combined these items, which represent a highly plausible appraisal constellation, under the label of EXPECTED/FAMILIAR for this factor.

Factor 4 represents the theoretically postulated goal relevance checks with high loadings on “important and relevant for person’s goals” and “important and relevant for goals of somebody else” (the items added to represent relevance in the case of altruistic emotions such as compassion). We call this factor GOAL RELEVANCE.

p. 198 Factor 5 represents the norm and self compatibility evaluation phase postulated by the CPM with high loadings of “violated laws or socially accepted norms” and “incongruent with own standards and ideals.” The factor will be referred to NORM VIOLATION.

Finally, Factor 6 covers the personal causation part of the causal attribution check represented by high opposite loadings of “caused by the person’s own behavior” and “caused by somebody else’s behavior.” Appropriately, the factor will be called SELF VS OTHER CAUSE.

The factor analysis reported above was computed on the basis of standardized residuals of the appraisal ratings. In consequence, the resulting factors will be referred to as “residual factors” below, highlighting the fact that they represent only residual variance after the VALENCE APPRAISAL factor had been partialled out.

p. 199 Table 12.7 shows the factor score profiles for the individual emotion categories on these six residual factors as well as, in the first column, the scores for the VALENCE APPRAISAL factor that was separately computed on the four appropriate items.

Table 12.7 Average factor scores per emotion word for valence appraisal and the six residual appraisal factors

Emotion words	VALENCE APPRAISAL	NOVELTY/CHANCE CAUSE	COPING ABILITY	EXPECTED/FAMILIAR	GOAL RELEVANCE	NORM VIOLATION	SELF VS OTHER CAUSE
anger	-0.85	0.41	0.07	0.56	-0.37	0.29	-0.02
anxiety	-0.61	0.19	0.03	-0.87	0.60	-0.23	-0.69
being hurt	-0.84	0.07	-0.14	0.47	-0.18	-0.11	0.77
compassion	0.15	-0.39	0.47	-0.03	0.45	-0.53	0.95
contempt	-0.53	-1.18	-0.10	0.61	-0.40	1.36	0.89
contentment	1.49	-0.33	0.31	0.78	0.35	-0.08	-0.33
despair	-0.80	-0.04	-0.48	-0.42	0.10	-0.68	-0.58
disappointment	-0.82	0.15	0.47	0.12	0.57	0.27	0.58
disgust	-0.79	0.07	-0.46	0.24	-0.27	0.58	0.47
fear	-0.64	0.89	-0.77	-0.56	-0.15	-0.93	-0.59
guilt	-0.46	-0.94	0.82	-0.25	-0.51	0.79	-2.07
happiness	1.63	0.35	-0.09	0.19	-0.12	-0.25	0.11
hate	-0.73	-0.99	-0.54	0.44	-0.30	0.59	0.67
interest	1.09	0.40	0.63	-0.16	0.80	0.79	-0.15

irritation	-0.88	0.48	0.47	0.31	-0.25	0.13	0.15
jealousy	-0.43	-0.82	-0.61	0.14	0.04	-1.46	0.82
joy	1.57	0.78	-0.03	0.63	-0.01	-0.39	0.03
love	1.38	-1.15	-0.29	-1.15	-0.42	-0.52	0.64
pleasure	1.56	0.14	-0.11	0.67	-0.21	0.26	-0.09
pride	1.25	-0.78	-0.11	0.13	0.29	-0.18	-0.91
sadness	-0.86	-0.09	0.18	0.82	0.36	-0.80	0.11
shame	-0.65	0.29	0.15	-0.33	-0.47	0.64	-1.14
stress	-0.63	0.12	0.49	-0.74	0.45	-0.50	-0.72

Even a cursory perusal of the profiles for the individual emotions confirms the high degree of plausibility of the differentiation afforded by the VALENCE APPRAISAL factor and the six residual factors. The scores for VALENCE APPRAISAL clearly separate the emotions into a positive and a negative group, with the exception of surprise and compassion which are in a somewhat neutral zone. Surprise and fear are high on the NOVELTY/CHANCE CAUSE factor whereas contempt and hate are low (indicating that these two emotion words may refer to more enduring affective dispositions toward a particular person than a spontaneous emotion episode). The factor COPING ABILITY, somewhat unexpectedly, does not show a very large degree of variation between emotions which might be due to the fact that the items are worded in a fairly technical way, closely approaching psychology terminology. It is also possible that people normally do not analyze their coping potential in a very conscious and precise fashion. However, despite their small size, the differences are meaningful. Thus, low coping potential characterizes fear and despair (and interestingly jealousy), whereas in irritation, interest, and particularly guilt, there is more of a feeling of being able to master the consequences of the eliciting event or behavior. In the case of guilt, this might be due to the possibility of repairing the wrongs one has caused. On the EXPECTED/FAMILIAR factor, contentment and sadness are high (probably because the eliciting event happened at some temporal distance), whereas surprise is, not surprisingly, low. Interestingly, love also has a low score on EXPECTED/FAMILIAR, suggesting that it may be related to somewhat rare and unexpected events (especially if one thinks of “falling in love” as an event rather than love in the sense of an enduring relationship).

The GOAL RELEVANCE factor does not seem to be very useful for differentiating the 24 emotions, as only interest has a somewhat higher than average factor score here. One possibility for the lack of differentiation could be the fact that all 24 emotions designated by the words chosen for this study imply personally relevant goals. Another possible explanation is that, as for the coping potential features, the notion of “goal relevance,” which, while being a central psychological concept, might be somewhat opaque to the layperson. In any case, in popular parlance the meaning of the word goal seems very constrained in the sense of an immediate conscious intention (like pursuing a specific interest) and not normally generalized to fundamental, unconscious needs and desires (see Scherer, 1993). NORM VIOLATION, in contrast, is very important, both for someone else’s behavior, as for contempt and hate (but not being hurt), and one’s own behavior, having violated one’s own internal standards, for guilt and shame. Other negative emotions such as sadness and fear are very low on this factor, presumably because they have low values on personal causation, and moral evaluation is thus not very pertinent. The sixth factor, bipolar SELF VS OTHER CAUSE mainly separates self-reflective emotions such as shame and guilt, due to one’s own behavior, from those elicited by the behavior of others or chance.

Mapping the appraisal structure onto the overall structure

Regression analysis with two general appraisal factors. Table 12.8 shows the results of the regression of the appraisal two-factor solution on the four overall factors computed *with the appraisal features excluded*. As expected, the GENERAL VALENCE APPRAISAL factor in the two-factor solution explains a very high proportion of the variance of the overall VALENCE factor. As argued above, the predominance of a general valence dimension, here demonstrated by a convergence of different types of valence, is probably at the basis of the extraordinary importance of the valence dimension in any kind of dimensional analysis of feelings, and affective words, explaining the bulk of the variance (see Chapter 1 as well as the results shown in Chapter 7).

Table 12.8 Standardized regression weights and R^2 of the two VARIMAX rotated appraisal factors regressed on the four overall factors

Overall factors	β GENERAL VALENCE APPRAISAL	β NOVELTY APPRAISAL	R^2
VALENCE	0.93***	0.06***	0.87
POWER	0.20***	-0.03	0.04
AROUSAL	-0.06	0.37***	0.14
NOVELTY	0.04	0.40***	0.16

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The appraisal features were removed from the four overall factors.

p. 200 The presence of the novelty items in the appraisal feature list may have been a major reason for the emergence of a stable fourth factor representing novelty in the overall PCA of emotion words across cultures and languages (see Chapter 7). This would explain why this fourth factor has not emerged in earlier dimensional analyses of the emotion domain which were based solely on self-report of feeling or motor expression. Given that the second factor in the initial two-factor solution for the Appraisal component could be reasonably defined as a novelty factor, one would assume that it predicts the fourth NOVELTY factor in the overall structure rather well. This expectation is indeed borne out by the data in Table 12.8. However, the relationship is not quite as strong as one might have thought. This probably means that the overall NOVELTY factor is to a large extent defined by appraisals of novelty. In Chapter 7, it was observed that the NOVELTY factor was weakened by removing appraisal features from the global structure.

Regression analysis with residual appraisal factors. Table 12.9 shows the same kind of analysis for the two-phase factor PCA solution (first identifying a superfactor and then partialling it out of the remaining variables) with the VALENCE APPRAISAL factor and the six “residual factors” based on the appraisal features after partialling out VALENCE APPRAISAL. As in the two-factor solution, the VALENCE APPRAISAL factor provides an almost perfect prediction of the overall VALENCE factor. The NOVELTY/CHANCE CAUSE factor predicts the overall NOVELTY factor, although less strongly. In addition, we find a reasonably strong prediction of the overall AROUSAL factor by the two residual appraisal factors NOVELTY/CHANCE CAUSE (positive direction) and EXPECTED/FAMILIAR (negative direction), suggesting that sudden, unexpected events are very likely to generate arousal especially when an urgent response is required. As mentioned above, this is very plausible from an evolutionary point of view, suggesting that unexpected events should generate attention and activation to allow a rapid adaptive response. The remaining beta coefficients in Table 12.9, while often significant, are of less importance—in and of themselves, they are unlikely to explain much of the variance in the overall factors. As shown by the rather low R^2 , none of the local Appraisal component factors contributes substantially to predict the overall POWER factor.

Table 12.9 Standardized regression weights and R^2 of VALENCE APPRAISAL and the residual appraisal factors regressed on the four overall factors

Overall factors	β VALENCE APPRAISAL	β NOVELTY/CHANCE CAUSE	β COPING ABILITY	β EXPECTED/FAMILIAR	β GOAL RELEVANCE	β NORM VIOLATION	β SELF VS OTHER CAUSE	R^2
VALENCE	0.94***	0.06***	0.07***	-0.03*	0.08***	-0.07***	-0.03**	0.91
POWER	0.20***	-0.02	0.00	0.20***	-0.02	0.19***	0.20***	0.16
AROUSAL	-0.04	0.34***	-0.08**	-0.32***	-0.08*	-0.11***	-0.13***	0.26
NOVELTY	0.08**	0.40***	-0.27***	0.14***	-0.28***	0.09**	0.13***	0.36

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The appraisal features were removed from the four overall factors.

Exploring the prediction of the POWER and the AROUSAL factor. While the regression analyses confirmed the expectation for the overall VALENCE, and to an important extent for the NOVELTY factor, they did not confirm the expectation for the overall POWER and the overall AROUSAL factor. If the appraisal process is driving the emotion process, one might expect that variation in power and arousal can also be well predicted on the basis of the Appraisal component. Therefore, we systematically investigated possible explanations for the fairly modest prediction of the AROUSAL and particularly the POWER factor by the appraisal features. We could identify four possible explanations, namely problems of operationalization, the importance of individual appraisal checks, statistical suppression effects, and interaction effects.

p. 201

↳

p. 202 First, the items formulated to represent the coping ability features (especially “consequences avoidable or modifiable” and “enough resources to avoid or modify consequences”) may not have captured the essence of the personal power and control aspects that are part of the theoretical coping potential construct (as postulated by the CPM, see Scherer, 2009c). The *item formulation* may have been too indirect or too close to the adjustment check so that the meaning may not have been sufficiently clear to the participants. The fact that the coping features showed much less variance across the 24 emotion words than the other appraisal check features, points in the direction of a problem with the wording of the items.

Second, there is the possibility that important information is lost by *working with factors* rather than with the individual appraisal checks. According to the CPM, each of the appraisal checks, independently and consecutively, contributes to the unfolding of an emotion episode. Thus power, control, and adjustment checks are considered as separate checks, here operationalized by a single feature each, even though they are conceptually subsumed under the term “coping potential.” In order to estimate how much information may be lost by working with appraisal factors rather than individual appraisal features, we investigated this possibility by testing an a priori theoretical prediction with the data of this study. Scherer (2001) predicted that the arousal dimension would be based on the need to urgently undertake action in the situation. This appraisal check was operationalized by one feature, namely “required an immediate response.” In the factor analyses described above, that feature loaded on the NOVELTY factor. According to the theoretical expectation, it is not so much the novelty of the event that causes the arousal, but more specifically the need to intervene. To investigate this possibility we compared the regression model for AROUSAL with all seven appraisal factors (see Table 12.9) with a regression model where the individual feature “required an immediate response” was added as a predictor. The simple addition of this single predictor lead to an increase in the variance accounted (R^2) for from 26% to 35%. Moreover, if the feature “required an immediate response” was included as the only predictor, it accounted on its own for 22% of the total variance, which is almost as much as the seven appraisal factors (the VALENCE APPRAISAL factor plus six residual appraisal factors) together.

Third, combined with the second account, there is a possible problem of *suppression effects* in the prediction of the POWER and AROUSAL factors. Statistically, a suppression effect means that the predictive value of a predictor increases when another predictor is included (or that its predictive value is suppressed in the absence of that other variable; see the review in MacKinnon, Krull, & Lockwood, 2000). As we found that many of these appraisal checks share a strong valence component, it is possible that their contribution to the prediction of variance gets suppressed. In the data we observed a clear suppression effect for the following two appraisal features, namely the features “treated unjustly” and “irrevocable loss,” on the POWER factor. When they were each entered separately as predictors they accounted for less than 1% and 11% respectively of the variance in POWER. However, when they were entered together as predictors they jointly accounted for 26% of the variance. Only when entered jointly with “irrevocable loss” “treated unjustly” predicts the POWER factor positively (beta increasing from -0.045 to 0.652). Another suppression effect could be observed for the appraisal checks “familiar” and “consequences negative for somebody else.” When each of these appraisal checks were entered separately as predictors of the AROUSAL dimension, they each explained about 3% of the variance respectively. However, when they were jointly entered as predictors, they accounted for 10% of the variance. This means that their joint effect was about three times as large as their individual effects. For instance when “familiar” was entered as single predictor its beta weight was -0.186 , however, together with “consequences negative for somebody else,” it increased to -0.304 .

p. 203 The fourth possible account is that the regression analyses have only looked at *linear relationships* between the emotion components and the overall factors. However, the CPM, as described in Chapter 1, is a sequential and cumulative model which predicts different emotions by specific configurations of appraisal results over time, yielding *nonlinear* effects. This is to say that while each check will have an effect of its own, it is the cumulative results of a specific configuration of the different checks that produce the essential impact of appraisal on the other components (often in a nonlinear fashion; see Scherer, 2000b, 2009a). In technical terms, this means that the appraisal checks do not determine the emotion process in a linear (additive) way, but that it is the specific *interaction* (configuration) between them that accounts for the final result.

In what follows, we provide a few exemplary illustrations for such effects. We find clear and theoretically interpretable evidence for such interaction effects with just three appraisal checks, namely “caused by the person’s own behavior,” “caused by somebody else’s behavior,” and “with consequences that were positive for the person.” A linear model with just these three appraisal check predictors accounted for 13% of the variance in the POWER factor. A regression model with just two interaction effects included (namely between self-cause and positive consequences, and between other cause and positive consequences), accounted for an additional 10% of the variance. Thus, the predictive value was almost doubled. In situations where you yourself are responsible for positive consequences, power goes up. However, in situations where someone else is responsible for positive consequences for you, power goes down. With only three appraisal features and two interaction effects more variance is accounted for in POWER than with the linear effects of the seven appraisal factors.

These examples demonstrate that the simple linear regression model with appraisal factors as predictors is indeed insufficient to represent how the Appraisal component allows for the prediction of POWER and AROUSAL. We found clear evidence for the need to work with individual appraisal features, to be aware of suppression effects and to look at interaction effects. However, here we can do little more than illustrate the relevance of these issues for understanding the Appraisal–other component links. A comprehensive investigation of a model that would fully represent these links would be necessarily complex (including individual appraisal checks and multiple theoretical interaction effects). The development and appropriate testing of such a complex model is beyond the scope of the current chapter.

Differentiating emotion terms on the basis of the Appraisal component features

Ultimately, the ability to correctly classify emotion words on the basis of feature profiles, as measured through multiple discriminant analyses (MDA; see Chapter 5) provides evidence for our claim that appraisal features constitute a central element of the component feature profile, allowing the differentiation of the semantic fields of the emotion words chosen for the GRID study.

MDA based on the two general appraisal factors. First, we computed an MDA based on factor scores resulting from the two-factor solution (shown in column A of Table 12.10). In this case, only 33% of cross-validated grouped cases were correctly classified, showing the enormous loss of discriminative power entailed by a reduction of the information to only the two higher order factors accounting for most of the variance.

Table 12.10 Classification accuracy (in percent) for the 24 emotion words in discriminant analyses based on different sets of appraisal factors, CPM predicted features, and all appraisal features

Emotion words	A	B	C	D	
	Classification based on two factors	Classification based on two-phase 1 + 6 factors	Classification based on CPM predicted features	Classification based on all appraisal features	
	Accuracy	Accuracy	Accuracy	Accuracy	Confusion > 15% with
being hurt	0.0	38.2	47.1	61.8	
sadness	8.8	55.9	64.7	79.4	
shame	8.8	73.5	88.2	91.2	
guilt	76.5	88.2	85.3	88.2	
compassion	20.6	41.2	58.8	85.3	
disappointment	5.9	35.3	55.9	67.6	
love	26.5	82.4	94.1	91.2	
contentment	38.2	55.9	52.9	52.9	pleasure
happiness	17.6	38.2	44.1	47.1	joy
pride	52.9	67.6	82.4	94.1	
pleasure	29.4	38.2	55.9	52.9	joy
joy	44.1	58.8	50.0	47.1	happiness
interest	73.5	85.3	79.4	88.2	
surprise	94.1	94.1	97.1	94.1	
despair	2.9	44.1	55.9	79.4	
stress	14.7	41.2	50	73.5	anxiety
anxiety	32.4	35.3	35.3	50.0	stress
fear	76.5	76.5	82.4	85.3	
jealousy	52.9	79.4	76.5	88.2	
hate	38.2	64.7	64.7	70.6	
irritation	0.0	32.4	32.4	38.2	anger
anger	29.4	20.6	26.5	32.4	irritation
disgust	14.7	35.3	58.8	67.6	
contempt	29.4	67.6	67.6	70.6	
Total	32.8	56.3	62.7	70.7	

MDA based on the residual appraisal factors. We then computed an MDA on the basis of the VALENCE APPRAISAL factor scores together with the factor scores for the six residual factors (resulting from the factor analysis in which the VALENCE APPRAISAL factor was partialled out; see section on the internal structure of the appraisal component above). The first five of the seven discriminant functions were clearly identifiable due to strong and unique correlations between the predictor factors and the respective discriminant functions. A stepwise analysis was used and the first five predictors entered in the following order (with the percentage of the variance accounted for in parentheses): VALENCE APPRAISAL (73), NOVELTY/CHANCE CAUSE (11), SELF-OTHER CAUSE (8), NORM VIOLATION (5), EXPECTED/FAMILIAR (2). The last two discriminant functions were multiply determined (1.2 and 0.3). In this case 56% of cross-validated grouped cases were correctly classified. These results are shown in column B of Table 12.10.

MDA based on the a priori CPM appraisal features. Next we computed an MDA based on the appraisal features that had been predicted a priori by the CPM (i.e., excluding the features that were added based on socio-cultural and core relation theme approaches; marked in the last two columns in Table 12.1), entering all features at the same time. The results (see column C in Table 12.10) show an overall hit rate of 63% (cross-validated). The profile of hit rates for the individual emotions are slightly higher than those in column B for the MDA based on seven factors, but the pattern is highly comparable, suggesting that the factors represent the information in the theoretically predicted features rather well.

MDA based on all appraisal features. Finally, we computed an MDA using all individual appraisal feature items (column D in Table 12.10). Results show that now 71% of cross-validated grouped cases were correctly classified. Again, the profile of hit rates for the individual emotions, while slightly higher than those in columns B and C, show the same pattern across most emotions. The emotions of sadness and despair constitute an exception, as their hit rates greatly increase in this condition. A detailed analysis suggests that this might be due to the core relational theme “irrevocable loss” which Lazarus (1991a) proposed for sadness and despair. A similar increase is seen for compassion. Upon analysis it can be surmised that this might be due to events with positive or negative consequences happening to *other* people (appraisal features added to represent socio-cultural approaches), which is of course central to the meaning of the word “compassion”.

It is instructive to consider the major confusions, allowing the determination of the emotion words that seem to have somewhat similar appraisal profiles. Particularly frequent confusions occur between: a) happiness and joy, contentment and pleasure, and joy and pleasure; b) stress and anxiety; and c) anger, and irritation. It comes as no surprise that these are the emotion groups that are generally considered as parts of larger emotion families. This can be demonstrated by using the profile of hit rates for the individual emotion words for the best MDA solution, based on all appraisals (column D in Table 12.10), to categorize the emotions with respect to how well they can be classified on the basis of the appraisal feature profiles (in ascending order of accuracy):

Below 50% accuracy: anger, irritation, happiness, joy

Between 50–75% accuracy: anxiety, contentment, pleasure, being hurt, disappointment, disgust, hate, contempt, stress

Above 75% accuracy: sadness, despair, compassion, fear, guilt, interest, jealousy, shame, love, pride, surprise.

Clearly, the emotion words classified with less than 50% accuracy are members of two emotion families, the anger and the happiness family. In fact, the latter could also include contentment and pleasure, from the next group, as there are many confusions between the four words. If we run the MDA with these terms combined into families, both the family accuracies and the overall accuracy increase substantially.

If one compares the accuracy coefficients for the individual emotions across the different MDAs described above, on the basis of the compilation of the respective percentages shown in Table 12.10, one sees in general a gradual increase without major jumps except in the case of moving from the two-factor solution scores (column A) to the seven factor MDA in column B, where there is a very sharp increase. Once the composite scores based on the VALENCE APPRAISAL factor and the six residual factors obtained after partialling out VALENCE APPRAISAL is used, accuracy improves dramatically. This suggests that while valence is a very important factor for affect, in and of itself, it does not allow taking account of the high degree of differentiation in the meaning of a major set of emotion labels. Only surprise is classified accurately, given that the second factor represents $\hookrightarrow$ novelty. Interestingly, fear, guilt, and interest have relatively high accuracy scores, possibly because of a special combination of valence and novelty scores.

In general the discrimination results based on only the appraisal items show a rather impressive accuracy of classification. This underlines the claim made in Chapter 1 that it is subjective appraisal that elicits and differentiates emotions, in part through driving the changes in all other emotion components. The comparison in Table 12.10 shows that the VALENCE APPRAISAL factor and the six residual factors capture much of the variance in the theoretically predicted features. However, five emotions reach a satisfactory classification accuracy only when all features are used in the MDA: being hurt, compassion, pride, stress, and fear. This suggests that for some emotions, very specific, configurational appraisal profiles seem to be required to correctly reflect the meaning of the respective label.

Looking at the individual profiles. We reviewed the results of Table 12.7 by column, that is, by appraisal dimension. However, it can also be read by row, looking at the specific appraisal configuration for each emotion. These configurations can be compared with the detailed predictions for 13 of the 24 emotions studied here (see Table 5.4 in Scherer (2001) and Table SM 1). These predictions attempt to specify the appraisal profiles that will lead a person to categorize and label an emotion episode with a specific word. While at this stage, the comparison is limited to eyeballing and approximation, especially as the factors reported here often combine items from different appraisal checks that are treated as independent in the theory, the degree of fit is encouraging. There is only one emotion—anger—in which there are major discrepancies between prediction and factor score configurations. Anger was theoretically predicted to be generally elicited by events that are sudden and unpredictable, discrepant from expectations, often involving violation of norms and standards but in situations in which the individual judges to have relatively high coping potential. The data reported here (see row 1 in Table 12.7) do not bear this out. Instead, the word anger has a rather flat profile across the six appraisal factors. One possible explanation is that the anger family consists of a rather large number of members with very different characteristics, ranging from mild irritation to violent rage, and that in consequence the meaning of the category name *anger* must cover many different alternatives, resulting in a somewhat diffuse semantic profile.

One important function of the current data set is to help fill the many cells in the prediction table (Table 5.4 in Scherer, 2001; reproduced in Table SM 1) that were designated as “open,” in the sense that, at the time, no prediction was ventured. We believe that the current data set on the semantic profiles of emotion words defined by appraisal feature profiles is sufficiently robust to serve as the basis for specific hypothesis as to the likelihood that certain appraisal check profiles will engender the use of certain emotion terms.

12.4 General discussion and conclusion

Internal structure

The impact of valence. One can argue that the appraisal process in and of itself is fundamentally valenced—it is essential to know what is happening in relationships to my needs/goals and whether something is primarily good or primarily bad for me. Our analysis of the internal structure of the appraisal process shows, as expected, that valence clearly dominates. The fact that only two factors were stable across the four language families and that the first and by far the strongest of these gathers virtually all items, except the novelty-related ones, confirms the earlier suggestion that the outcomes of most of the major appraisal checks are indeed *valenced*, that is, are considered as positive or negative in and of themselves (see Table 1.1; see also Sacharin, Sander, & Scherer, in press). Supporting this theoretical claim, we find high loadings (both positive and negative) for valence (the first factor) as pleasure (in itself un/pleasant for self and someone else), valence as satisfaction (consequences positive/negative for self and someone else), valence as self-un/worthiness (incongruent with own standards and ideals), valence as moral un/worthiness (violated norm/laws, unjust treatment). There is only limited confirmation for valence as power or coping ability in the sense that only coping through adjustment (predictable consequences and able to live with consequences) loads highly on the first factor. The items intended to tap the power or control aspect (enough resources to modify consequences, consequences avoidable or modifiable) did not load on this valence superfactor. This may be due to the fact that the respective items do not reflect a type of power or dominance which is highly context independent (and it is this type of power that is likely to be positively valenced), but rather a type of control power that is afforded by the situational contexts. For example, if an event has positive consequences, the issue of coping with the consequences is not relevant. It remains an issue for further research to determine under which circumstances positive valence based on power or dominance is generated in appraisal. Specifically, items will need to be generated that reflect this type of positive power, guaranteeing access to resources, and protection from harm.

Given the impact of the valence superfactor across separate appraisal checks, we decided to remove the effect due to this dominating, superordinate factor by partialling out its contribution to the variance. This allows the identification of the additional contribution of other (underlying) factors on a lower level of this valence generality. As shown above, the six factorial solution is eminently interpretable. It is important to stress the point made in the earlier description of the factors, namely that the factor analysis does not distinguish between conceptual similarity between different features (i.e., measuring similar content as in test items) and ecological correlations (i.e., high common loadings on a factor due to co-occurrences of certain conditions in the real world, such as expected outcomes being more probable for intentional behavior than chance occurrence). Therefore, the factor analysis results cannot be used to confirm the justification of theoretical distinctions. However, the detailed interpretation of the factors computed on the residual variables allows the formulation of hypotheses for further research.

The case of the novelty and expectation checks is particularly interesting. The novelty subchecks of familiarity and predictability (familiar, consequences predictable), as well as the item “confirmed expectations” are very positively evaluated as suggested by high loadings on the GENERAL VALENCE APPRAISAL factor. In contrast, the suddenness and unpredictability subchecks are apparently not positively or negatively valenced. Rather, they constitute the second, orthogonal factor in the PCA solution, together with the item “caused by chance.” This pattern suggests that the appraisal criteria might be organized according to a hierarchical structure with two orthogonal “superfactors”—GENERAL VALENCE APPRAISAL and NOVELTY APPRAISAL. The existence of an appraisal subprocess that specifically processes sudden and unpredictable events, which can be either positive or negative, is plausible from an evolutionary point of view as it alerts the organism to potentially relevant consequences. The resulting state, surprise, is not even considered as an emotion by many theorists because it generally constitutes only a first reaction to something sudden and completely unexpected. However, even though this emotional reaction is generally very brief, it may have quite a strong impact on other components, such as inducing search for additional information, a momentary surge of arousal, and specific forms of expression.

Congruence with overall factors

p. 208 As expected the VALENCE APPRAISAL factor predicted the overall VALENCE factor almost perfectly. The relationship between the NOVELTY/CHANCE CAUSE factor and the overall NOVELTY factor was somewhat less strong than expected but still rather sizable. However, the NOVELTY/CHANCE CAUSE factor (as well as the EXPECTED/FAMILIAR factor) did substantially contribute to the prediction of the AROUSAL factor.

The overall POWER factor was least well predicted by the appraisal factors. We had expected that one or more appraisal factors, especially the COPING POTENTIAL factor (which should represent control and power features according to the CPM), would at least partly predict the overall POWER factor but this was not the case. This is probably largely due to the fact that the two coping potential features may not have been worded in an appropriate manner. As mentioned above, we had formulated the items “consequences avoidable or modifiable” and “enough resources to avoid or modify consequences” in a somewhat indirect way to avoid mentioning the concepts of control and power. Both the ratings on these items for the different emotion words, the correlations and factor analyses showed that this strategy did not work. Consequently, we will formulate more explicit items to operationalize the control and power appraisals for the future use of the GRID instrument (see Chapter 44). Apart from this methodological issue, the current results also plead for an independent role of the appraisal checks of power, control, and adjustment. Conceptually, they can all be seen as contributing to “coping potential” in a very broad sense. However, the current data suggest that a combination of these three checks, as in the coping potential factor described below, might not have been useful—either for the prediction of the overall factors or emotion discrimination. One of the reasons might be that the situational context may be a much more important determinant of one’s ability to live with an outcome than one’s personal potential to adjust to it.

Discrimination and classification

The central claim of our approach is that the meaning of major emotion words can be defined, largely by the appraisal process underlying the respective emotion episodes. How well do the results of the discriminative structure of the appraisal process support this claim? In sum, we have shown that the 24 emotion words in the GRID study can be differentiated with approximately 70% accuracy by the 31 appraisal features alone. This suggests that the differential meaning of different emotion terms is largely carried by the specific appraisal configurations that are predicted to determine the respective emotion episodes. The predictors in the total appraisal set include 10 features that were added to represent appraisal dimensions that have been suggested by sociocultural approaches and the notion of core relational themes. Even if these 10 items are excluded and the prediction is exclusively based on the appraisal checks explicitly postulated in the CPM, the accuracy drops only by about 7% to 63%. This means that the bulk of the variance is explained in the appraisal checks that are part of the architecture of the CPM. The loss of 7% is partly explained by the appraisal that “other persons” experience a positive or negative outcome (important to classify compassion) and relational themes like “loss” (important to classify sadness and despair) are not part of the CPM. However, as has been shown in several places in this chapter, at least some of the information content of these appraisal criteria can be captured by using appropriate interactions or configurational variables based on the individual checks postulated by the CPM. For example, the theme “danger” is represented by a configuration of an expected obstructive event with negative consequences, high goal relevance, insufficient power, control, and adjustment, and possibly the need for an urgent response.

p. 209

Some limitations should be noted. The CPM postulates appraisal mechanisms that intervene in a recursive (sequential and cumulative) *process* of appraisal whereas the raters in the GRID study evaluated which appraisals can be jointly considered to be responsible for the elicitation of a state that is normally labeled with one of the emotion words provided. Clearly, the latter can only provide a very rough assessment of the underlying processes, all the more so as laymen generally are not conscious of these appraisal processes and we had to formulate the respective features in an easily understandable, nontechnical fashion. Clearly, the rating procedure as well as the type of linear statistical techniques used in our analyses cannot capture the complexity of the appraisal criteria and the dynamic nature of the appraisal process, particularly the complex interactions between appraisal checks in the cumulative sequence of their checking. This is particularly true for the factor analysis approach which focuses on identifying a minimal number of factors explaining a maximum of variance. Despite these shortcomings, the discrimination of the emotion terms on the basis of the VALENCE APPRAISAL factor and the six residual factors obtained after partialling out VALENCE APPRAISAL still allow a classification with 56% accuracy, more than 13 times higher than chance.

Future development

Theoretical efforts and the associated research activity need to focus on the reliable measure of the individual appraisal checks and their role in the elicitation of specific emotions—or the semantic differentiation of the respective emotion terms. Of central importance is attention to the hitherto neglected issue of the multiple interactions between appraisal criteria. We have shown that most of the variance in the meaning of emotion terms can, in principle, be captured by modeling the multiple interactions of the appraisal criteria as postulated by the CPM and similar appraisal theories. In consequence, the priority in theoretical and methodological development, as well as empirical investigation, should be given to identifying the specific appraisal criteria interactions that are likely to represent constitutive elements of the meaning of major emotion terms.

Notes

- 1 Corresponding author: Klaus R. Scherer. Swiss Center for Affective Sciences—University of Geneva. 7, Rue des Batoirs, CH-1205 Geneva, Switzerland. Klaus.Scherer@unige.ch
- 2 All supplementary materials (SM) are available at the GRID website: <http://www.affective-sciences.org>/GRID. See Appendix 1 (“Availability”) for further details.