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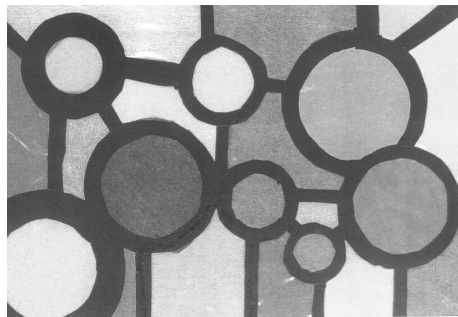
Dimensions of Openness to Emotions (DOE)

A Model of Affect Processing

Manual

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2007



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Dimensions of Openness to Emotion (DOE) - A Model of Affect Processing

Including the Questionnaires in French
"Dimensions de l'Ouverture Emotionnelle" DOE

Scientific Report No. 168

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Cover graphic by Leon Reicherts

DOE test versions in other languages and reference values are available on:

www.unifr.ch/psycho/clinique/DOE

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Abstract

Emotional Openness” (EO) is a multidimensional model of affect processing, as represented by the individual. It refers to both actual emotion theory (e.g. Davidson, Scherer & Goldsmith, 2003) and experiential and emotion-focused therapy (e.g. Greenberg & Paivio, 1997; Elliott & Greenberg, 2002). The model proposes five factorial and evidence based dimensions of affect processing: Cognitive-Conceptual Representation (REPCOG), Perception of Internal (PERINT) and External (PEREXT) Bodily Indicators, Communication of Emotion (COMEMO) and Regulation of Emotion (REGEMO). A supplementary dimension, called Normative Restrictions of Emotion (RESNOR), refers to social restrictions of affectivity.

Using a theory based, psychometric and factorial construction rationale, different instruments have been developed: the “*Dimensions of Openness to Emotion*” (DOE) instrument (“*Dimensions de l’Ouverture Emotionnelle*” in the original French version), a trait-oriented 36 items questionnaire (DOE-36), and a 20 items short version (DOE-20), both with good reliability and factorial model properties. In order to describe actual processes/states of affect processing we developed the DOE-state (15 items) and recently the DOE-self-monitoring (6 items), a short form to be integrated into daily life affect monitoring using the “ambulatory assessment” methodology. (e.g. Reicherts, Salamin, Maggiori & Pauls, 2007). Adapted language versions of the DOE instruments are available in French, Italian, German, Spanish and English.

The manual presents a large number of validity studies which show plausible associations of the DOE dimensions with other emotion processing instruments (TAS-20; TMMS), and with personality factors and other trait-like personality characteristics (e.g. social competencies, empathy). However, the model of Emotional Openness proposes a particular psychological space of the person’s representation of emotion processing and provides trait, state and self-monitoring measures. The model and the DOE instrument have been tested against a variety of clinical disorders and problems, such as Dependence and Personality Disorders, including dual diagnosis, eating disorders and problems, somatoform disorders, phobic and gambling behaviors (using experimental studies), and burnout, and important effect sizes have been attained. Clinical treatment studies revealed plausible changes in affect processing and the treatment sensitivity of the DOE instrument. Based on the EO model, specific intervention modules are developed to improve affect processing.

Introduction

In the original French model, called “Ouverture Émotionnelle” or “Ouverture à l’expérience émotionnelle”, the term “*openness*” has four meanings, depicting different facets of the original approach:

- (1) To “be open” or to “open oneself” to the various components or aspects of actual evolving and unfolding emotional experiences, in their complexity, according to the most important facets or dimensions.
- (2) The rather stable and more global (trait-like) tendencies of “being open” to affective experiences and emotions, to treat or process them consciously along those dimensions.
- (3) The process of “developing openness” and to “become more open”, the “opening” to emotional experiences, for instance in therapeutic work, personal development and enrichment.
- (4) To be or to become emotionally open to other people, to share and exchange affective experiences with others, and to facilitate mutual emotion processing.

All four meanings are closely related to the concept, which suggests that it has three aspects: (1) an experiential, moment-to-moment view of affective processes (the *state and process approach*), (2) a more global and stable tendency (or capacity) to live and process affective experiences, also in social interactions (the *trait approach*), and (3) the process of developing, changing, and learning to be more accessible to emotions (the *intervention approach*).

Theoretical Framework of the “Dimensions of Openness to Emotions”

The DOE questionnaire “Dimensions of Openness to Emotions” (“Dimensions de l’Ouverture Émotionnelle”) is based on a multi-dimensional conception of the *experiencing and processing of emotions and affective states, as represented by the subject*. The model explicitly refers to actual emotion theory (cf. Davidson, Scherer & Goldsmith, 2003) and to emotion-focused psychotherapy (e.g. process-experiential therapy; Greenberg & Paivio, 1997; Elliot & Greenberg, 2002). It starts from the notion that emotion processing and affective experiences imply different levels of processing (e.g. Lang, 1984), as represented by the subject, i.e. cognitive-experiential, social-communicative and somatic, where the different components of affect appear and/or evolve.

The Model and its Components. Our earlier work on the cognitive representation of affective states and emotional experience (Reichert & Pauls, 1983; Reicherts & Wittig, 1984; see also Wexler, 1974) has shown the existence of various aspects that subjects propose in order to structure and describe their affective states and emotional experiences. The material elaborated by the subjects according to a standardized testing procedure allowed the

establishment of formal indicators of the differentiation, distinction and complexity of emotional experiences (see also Schroder & Suedfeld, 1971). Despite the variety and subjectivity of the individual dimensions, there was evidence of a limited number of inter-individually converging categories, which appeared to be of primary relevance for the subjects' structuring and representation of their own emotional material. Beside the common categories of valence, intensity and arousal, subjects often mentioned for example succinctness (versus vagueness) of the affective state, implication of bodily indicators and external visibility, relatedness to expression and communication, or controllability of the affective state.

Our subsequent research on stress and coping processes (Perrez & Reicherts, 1992; Reicherts, 1999a) has elaborated further aspects of emotional and particularly stress related experiences, including elements of "indirect" (e.g. active influence on situation, evasion and withdrawal) and "direct" emotion regulation ("palliation", re-evaluation, information suppression, etc.; see also Gross, 2007), and have sharpened the theoretical conception we subsequently developed.

Whereas Alexithymia-related instruments such as the TAS-20 (Taylor, Bagby & Parker, 2003) are primarily *self-reports of some deficits* in affect processing, the questionnaires referring to Emotional Intelligence (EI) provide mainly *self-reports of competencies* ("intelligence") in a few domains of emotion processing. According to Mayer (2001, p. 8), Emotional Intelligence denotes the "capacity to understand, and use emotional information", and accordingly emotional information processing includes accurate appraisal of emotions in oneself and others, appropriate expression of emotions, and adaptive regulation of emotion in such a way as to enhance living (see also Salovey & Mayer, 1990). On the other hand, EI instruments exist that aim to test certain specific objective performances in the processing of emotion relevant information (Mayer, Salovey & Caruso, 1999). However, the model of Emotional Openness is conceptually nearer to the EI dimensions, particularly when taking into account our early assessment approach (an individualized but performance-oriented instrument testing the cognitive structures of emotional experience; Reicherts & Pauls, 1983).

In contrast to these approaches, the Emotional Openness instruments are directed at the *self-reporting of tendencies of responding and processing emotional experience*. The items of the DOE are rather descriptive and face valid, but allow the analysis of multi-dimensional assessment in terms of a profile. A pronounced score on one dimension, such as strong internal bodily indicators, is not problematic *per se*, but only if the Cognitive-Conceptual Representation and/or the Regulation of Emotion are simultaneously very low. An increased score of Regulation of Emotion *per se* is only an advantage if a certain level of awareness of emotional bodily manifestations and/or Communication and Expression are present. These configurations are examples of a more complex understanding of self-reported affect processing which we try to conceptualize in the model.

As proposed by multi-level conceptions (e.g. Lang, 1984; Lazarus, 1991), emotional phenomena and processes should be conceived on three general levels or registers (cognitive-experiential, bodily and social), which also reflect their adaptive functions. The model of *Emotional Openness* starts from these notions and proposes *five main dimensions*, which are intended to characterize central aspects of affective experience and emotion processing, as perceived by the subject. The shortcomings and/or exaggerations of these dimensions seem to refer to important features of (dys)functions in affective and mental well-being or health problems: cognitive-conceptual representation of emotions, perception of internal and external bodily indicators of emotions, communication and expression towards others, and last but not least regulation of emotions. In addition to specific emotions *sensu stricto*, the processing dimensions can also refer to affective states in a broader sense (Frijda, 1993), such as “core affect” (Russell, Weiss, & Mendelsohn, 1989), moods (Morris, 1989), emotional episodes (Tomkins, 1984) or affective traits (such as timidity). We have chosen mnemonic labels applying to French and English to provide abbreviated denominations for the dimensions and the operationalized scales of the DOE instruments.

Cognitive-Conceptual Representation of Emotions (REPCOG)

The first component of the model is the Cognitive-Conceptual Representation (REPCOG) of emotions relying on valence-based mental and bodily states, and comprising situation-related components as perceived by the individual, in particular through appraisals (Ellsworth & Scherer, 2003; Mascolo, Fischer & Li, 2003). The representation emerges in terms of distinct and differentiated affects, such as emotions, moods or emotional episodes of a more or less specific quality. Cognitive and conceptual representations refer to the affective emotional concepts (e.g. “angry”), schemas or scripts (cf. Tomkins, 1984), including the option of verbalizing them. They integrate the processes implied in the affective “experiences” or “feeling states” (“sentiments” in French, “Gefühle” in German), in so far as they refer to cognitively accessible notions and concepts, etc. This level also includes the processes of situation appraisals and the perception or awareness of bodily indicators (see the paragraph “Perception of Internal and External Indicators”, below), which the model of Emotional Openness considers to be separate.

In a more general perspective, Cognitive-Conceptual Representation involves the processes implied in the “monitoring” function (Scherer, 2003), the self-perception of the representations integrating changes in all other emotion components (appraisals, physiology, or motor responses) that result in conscious feeling. The dimension as operationalized in the DOE instruments focuses on the processes of *distinguishing* different affective states (one from the other) and from other (bodily) sensations, of *differentiating* various emotions, “core affects” or moods; of *understanding the situational embedding* they refer to (the appraisals, reasons, causal attributions), and of eventually naming them verbally.

Communication of Emotions (COMEMO)

This dimension of Communication of Emotions (COMEMO) refers to *openness on the interactional level*, and the social functions of emotion and affect, directed towards other people. On the one hand, adopting the individual's perspective, this dimension comprises the processes of *expressing emotion, mostly intentionally*, by the face (Ekman, 1984; 1993), the voice (Scherer, Johnstone & Klasmeyer, 2003), by gestures, posture or body movements (de Gelder, 2006; Van den Stock, Righart & de Gelder, 2007), in order to make other people understand the affective state or emotion the person is experiencing, or to modify or mask it (e.g. "display rules"; Ekman, 1972). Due to the unconscious character of many of these processes during emotion elicitation, the spontaneous, automatic, and to a large extent bodily anchored processes of modifying facial (e.g. Matsumoto, 1987), vocal (Scherer, et al., 2003), or postural expression in response to emotional experiences, are subsumed in the external indicators dimension (see below). The crucial element for Emotional Openness is to be or to become aware of actual external, i.e. expressive, responses in these registers. Communication of Emotions therefore refers to almost voluntary (intentional) activities, which consciously "apply" or at least accept these expressive registers, and do not try to suppress them.

On the other hand, emotions and affective states are *intentionally verbalized* to share them (the other registers are then seen as non-verbal, or non-linguistic communication channels), according to the social signaling function of emotion. Such explicit, meaning based communication can be useful in areas such as warning others (e.g. communicating danger by expressing fear); seeking help to respond to or regulate negative feelings; or dealing with positive, social feelings, such as empathy, love, and sympathy (e.g. Pennebaker, 1995), etc. Since functionality can vary from simply entering into social contact, via emotional interaction, to "sharing emotions" with others (cf. Rimé, 2007), the main facets to be integrated in the dimension of the DOE were those expressive and communicative activities that one uses to enter in contact with others, to "let others know", to "disclose", and to "share" affective experience.

Perception of Internal and External Bodily Indicators of Emotions (PERINT and PEREXT)

The bodily/somatic phenomena that can characterize or accompany emotions and affective states are mostly linked with psycho-vegetative and somato-motor activation, engendering the "awareness" or perception of internal (PERINT) or external indicators (PEREXT). They reflect the emotional patterning, the synchronization of the sub-systems of the organism, and are articulated through preparation for action (or "action readiness", "action tendency"; Frijda, 1986). They reflect the perceptible "symptoms" or markers of the affect system and the overt action system (Mascolo et al., 2003). Only a few of the psycho-physiological and psychomotor indicators of emotional states which research has demonstrated (e.g. Stemmler, 2003; Levenson, 2003; Cacioppo et al., 1992) are actually perceptible to the individual (e.g. neuro-physiological), and can be linked to specific, conscious emotional experiences. But

there are some indicators or markers that many individuals are able to perceive in quite a reliable, often individualized association with their emotions (e.g. Pennebaker, 1982). Numerous references in clinical research (Davison & Neale, 2001;) underline the relevance of certain indicators, particularly in association with functional behavior analysis (e.g. SORC, see Kanfer & Saslow, 1965; SECCA, see Cottraux, 2004), for example cardio-vascular activation (when experiencing anger and anxiety or panic; Margraf & Schneider, 1989) or decrease (when experiencing sadness), respiratory activation and modulation (when experiencing feelings of oppression, fear, etc; e.g. Boiten, Frijda & Wientjes, 1994; Kreibig, Wilhelm, Gross & Roth, 2007) or temperature (when experiencing “heat” in anger). Other registers include gastro-intestinal responses (such as “butterflies in the stomach”, nausea, vomiting, intestinal problems, diarrhea, etc.).

Examples of the perception of “*external*” *emotion indicators* that can become visible to others include motor activities such as those involved in preparation for action. There is much empirical evidence for indicators of facial expression (Keltner, Ekman, Gonzaga & Beer, 2003), vocal expression (Scherer et al., 2003), gesture and posture as implied in emotional body expression (Van den Stock et al., 2007). There are also various visible markers allied with muscular activity, tension, trembling or jerking (as also described in clinical psychology, e.g. in social phobia). A large part of emotion signaling in voice and speech is dually coded, in both linguistic and non-linguistic features, in order to assume a signal function.

While the PERINT dimension refers to mostly autonomous activities (central) that are linked with emotion processes (autonomous nervous system), the PEREXT dimension refers to the somato-motor sub-system, and its peripheral activities. Their respective predominance can characterize “internalizing” versus “externalizing” patterns of emotional reactions (according to Cacioppo et al., 1992). They also correspond to the distinction of “interoceptive” versus “exteroceptive” stimulus perception in modern learning theory (cf. Bouton, Mineka & Barlow, 2001).

Regulation of Emotions (REGEMO)

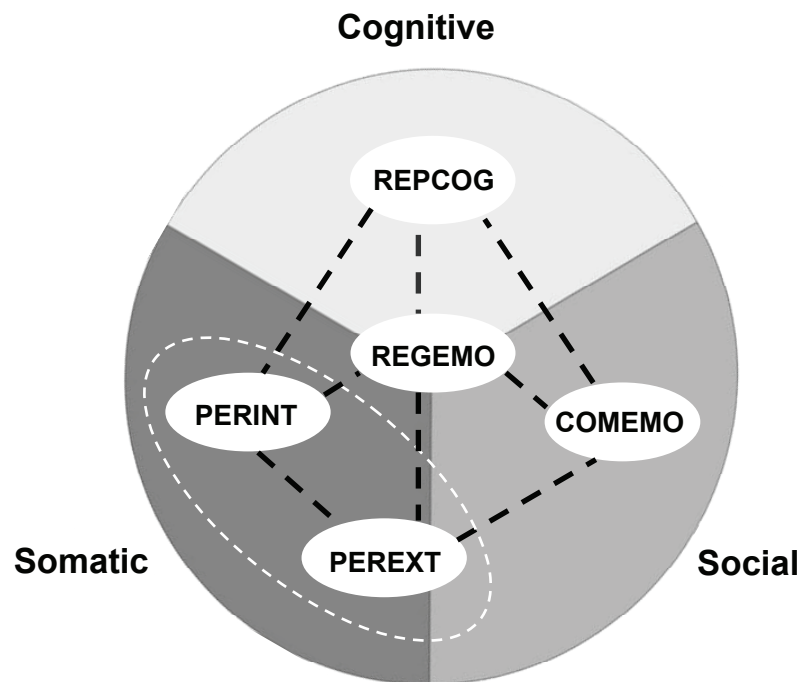
Emotion regulation has been defined as a process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of (1) feeling states, (2) emotion-related physiological or attentional processes, and/or (3) behavioral concomitants of emotion (Eisenberg & Spinrad, 2004). The term refers to the regulation of all kinds of affective phenomena, and also includes the regulation of mood, core affect and emotional episodes. The concept of emotion regulation has its roots in stress and coping research (Perrez & Reicherts, 1992; Reicherts, 1999a), and distinguishes between functional categories of regulation (or coping).

According to Krohne (2003) regulation may be used to reduce, stabilize or increase emotions, referring to either negative (affect repair) or positive feeling states; all these variants can be adaptive or maladaptive with respect to the specific situational demands. According to Bridges, Denham and Ganiban (2004), adaptive emotion regulation involves the capacity to experience genuine emotions or affects, to reduce heightened levels of negativity and to express emotions in ways that are compatible with the different goals of the people involved (including emotion regulation and others such as safety, maintaining positive social interaction, perceived competence, individual and familiar well-being). Gross and Thompson (2007) propose a regulation process that contains “indirect” regulation categories – situation selection, situation modification, and (behavioral) response modulation – in which two categories of “direct” emotion regulation are embedded: attention direction (in particular “suppression”) and cognitive change (in particular “reappraisal”). Once emotional arousal is triggered, reappraisal is antecedent-focused and suppression response-focused (Gross, 1998). Gross’ conception is very close to the coping process model (Reicherts, 1999a; Perrez & Reicherts, 1992), stipulating situation-related coping actions (instrumental) and person-oriented coping behaviors (directed towards the representation, the evaluation and the stressful emotions themselves). Voluntary emotion regulation also relies on “monitoring” activities, especially to attenuate, postpone or “repair” the impact, intensity or duration of emotional impact (by spontaneous or controlled activities). As a result, it also relies on conceptual representations (“feeling states” and appraisals that have become conscious), perception or awareness of bodily indicators accompanying the emotional experience and often to modify it through regulation. Emotion regulation also refers to communication and expression, in order to modulate the affective state by sharing and signaling it to others, which eventually leads to interpersonal emotion regulation (either to attenuate negative or enhance or amplify positive emotional states).

Normative Restrictions of Affectivity (RESNOR) – A Supplementary Dimension

“Normative Restrictions” of emotional openness (RESNOR) as perceived by the person has been introduced as an additional dimension in the Emotional Openness model. Normative restrictions may be due to social rules and conventions, etc., which rely on the more or less positive affective resonance of the environment. A particular element of normative restrictions is that the subject attributes the causes of perceived lack of emotional experience and interaction externally, blaming it on other people, circumstances or society.

Figure 1: Domains of affective phenomena and the dimension of Emotional Openness



Patterns and Profiles

Scores on these dimensions can also build *specific patterns or profiles* that can be related to both affective and psychic well-being and various emotional symptoms, disturbances and mental disorders. In addition, the different dimensions of “Emotional Openness” can be addressed by psychological interventions which are part of existing, more general treatment techniques (e.g. empathic responding; Rogers, 1951, 1961; Bohart & Greenberg, 1997; Reicherts, 2006; “Focusing”, Gendlin, 1981) or which are specifically conceived to address emotion processing problems (Reicherts, Pauls & Rossier, in prep.) Appropriate psychological intervention should result in *more adequate patterns* of emotion experience and processing, as proposed by the model, resulting for example in a more balanced interplay between a) perceiving affect-related bodily indicators, b) distinguishing and situationally embedding emotional experience, c) communicating affective states to other people, and d) adequately regulating emotional processes.

Construction of the DOE Instruments

From its conception, the construction of the DOE instruments followed a *theory-based construction rationale* including *psychometric and factorial analyses*.

Principles of the construction rationale comprised:

- Optimize representation of the dimensions/facets as theoretically conceived.
- Vary the descriptors embedded in trait-like self-descriptive formulations (responses, behaviors and behavior intentions).
- Vary the affective states that the items refer to (emotion, mood, feeling states).
- Avoid references to specific affect qualities (“qualia”).
- Refer to “normal” daily life affective experiences, not extreme situations.
- Respect the face validity and comprehensiveness of intended constructs.
- Provide some inverted items to prevent response sets.
- Respect the economy of administration, aiming at a maximum number of items per dimension.
- Build scales upon psychometric criteria and factor analyses (exploratory and confirmatory), taking validity indicators into account from the outset.

Based on the theoretically founded concepts proposed above, 8-9 items per dimension were originally developed for the preliminary version. From the beginning we applied a *5-level Likert-scale response format*, comprising level descriptors and corresponding numbers: “not at all” [0] up to “very strongly/extremely” [4]. Additionally, the response format provides a graphic pattern of the intensity or strength of each single item descriptor underlying the numbered scale (see DOE questionnaire forms in the appendix). This triple representation (label, number, and graphic) of “per fiat” scaling is highly plausible for the subject and provides good response quality. Some inverted items were developed for the COMEMO and REGEMO scales to prevent response sets, and were selected after the psychometric analyses

The items and response formats were originally developed in French. As part of the *particular psychological “space”* we developed to represent emotion processing, all the items were newly conceived and we did not refer to, take or adapt items from other, existing instruments. A first item-pool was then developed, with each item referring to one of the theoretical dimensions.

In a preliminary study (N=50 stratified non-student subjects), we conducted psychometric analyses using item difficulties, item-scale correlations and internal consistency (Cronbach's alpha). In order to build the intended scales, items presenting difficulties in terms of item means >1.0 or <3.0 and corrected item-scale correlations of $>.30$ were selected for the first version (cf. Reicherts, 1999b), which then underwent further testing regarding reliability, factorial validity and validity criteria in different unselected samples of adults and students, and in some clinical applications (Reicherts, Carrard & Pihet, 2000; Reicherts, 2001). At the

same time a short version with three dimensions (12 items) was used in a fairly large Swiss longitudinal study with young adults entering the work force (AEQUAS-project; some results of the French speaking sample are reported in the paragraph on reliability and validity).

Psychometric Properties and Factorial Validity

Principal component analyses of the DOE 36-items version with 6 dimensions, including the supplementary RESNOR dimension, regularly yielded six theoretically sound principal component solutions. All primary loadings of the items after varimax rotation corresponded to the respective theoretical dimension they were conceived for, with only a small number of secondary loadings exceeding .30. Therefore, the 6-component solutions have been robustly reproduced in different studies with different populations.

Two recent non-selected samples provided very satisfactory factorial solutions, and good psychometric properties of the 36-items DOE trait standard version (comprising the 5 basic dimensions, with “Normative Restrictions” as an additional dimension). Principal component analyses with varimax rotation yielded sound 6-factor solutions using standard criteria (Eigenvalue ≤ 1 ; Scree test, plot trace); all secondary loadings were lower than .40. Apart from one exception communalities are quite higher than .50, indicating a satisfactory explanation of the items’ variances. Varimax rotated factor solutions in both samples are highly convergent, with a Tucker’s index of coherence of .93.

Mean intercorrelations between the scales aggregated from both samples vary between .02 and .49 (mean .23; absolute values). These moderate, but partly substantial associations between the dimensions indicate that the dimensions are not fully independent, despite the fact that they are clearly identified through ACP and the simple structures obtained after Varimax rotation. This result underlines the importance of the confirmatory factor analyses (CFA) that we subsequently conducted, which did not impose independence of the components but allowed the assumed model structure to be confirmed.

Reliability. The scales’ internal consistency of the DOE 36-items version achieved satisfactory to good values over a large number of studies: mean Cronbach’s alphas of the scales are REPCOG .83, COMEMO .81, PEREXT .81, PERINT .77, REGEMO .75 and RESNOR .71. While stability over time has not yet been adequately studied, one study (DOE short version with 12 items (three dimensions only), adapted for a fairly representative longitudinal study of young adults (N=503; mean age 22.8; AEQUAS project; SNF) has shown an acceptable stability over 12 months (COMEMO .60, PERINT/EXT .55, REPCOG .54; Carrard, 2000).

Development and properties of the DOE-20

We have recently developed a *20-items version* of DOE-trait, which was selected from the 36-items version. This instrument can quickly assess the five principal dimensions (4 items each), based on very satisfactory psychometric and factorial properties. Two exploratory PCAs (N=269 and N=435) clearly indicate a 5-dimension solution (number of eigenvalues ≤ 1.0 ; scree test, plot trace). Both explain more than 60% of the variance.

On the other hand, the intercorrelations we also observed in this 20-items version (varying from .02 to .38; mean .22; absolute values) indicate that the dimensions are – as for the DOE-36 – not completely independent from each other. Nevertheless, the model structure is clearly identified by confirmatory factor analyses (CFA, using AMOS). CFAs corroborate the solutions, presenting good model fit indices (in the N=269 study: $\chi^2/df=1.54$; CFI=.95; RMSEA=.041; in the N=430 study: $\chi^2/df=2.26$; CFI=.92; RMSEA=.064). Additionally, Tucker’s index of correspondence of the loading matrices reaches .96, indicating an excellent convergence of both factor structures obtained in different samples. Reliabilities of the five 4-item sub-scales are also quite satisfactory, mean Cronbach’s alpha being .83 (REPCOG), .78 (PEREXT), .77 (COMEMO), .74 (PERINT) and .67 (REGEMO).

Altogether, the theoretically suggested dimensions proposed by the Emotional Openness model appear to be very coherent. A multi-dimensional evaluation is possible, allowing the creation of a profile that can be used to assess individuals.

Table 1: DOE-36 – Scales and item examples

Scale	DOE-36 - Item examples	Alpha mean
REPCOG	“I can easily distinguish between the different ways I’m feeling”	.82
COMEMO	“I willingly share my feelings with other people, even uncomfortable ones”	.82
PERINT	“My strong feelings are accompanied by internal bodily reactions”	.77
PEREXT	“My mood shows through my behavior and my expressions”	.72
REGEMO	“I manage to calm my feelings even in difficult situations”	.76
RESNOR	“I would like feelings to be expressed more easily in our society”	.73

Variants and Versions of the DOE Instruments

Three variants of the instrument have been conceived to facilitate its application across different assessment and research contexts:

- The *trait-oriented version* of the questionnaire to describe the person's self-reported tendencies to process emotional experiences: the DOE-36 and DOE-20;
- A *state-oriented version* applying to actual emotion processing responses and states in specific situations, e.g. experimental and repeated measurement contexts: the DOE-state;
- A *self-monitoring version*, an extra short state/process version, with actual descriptors of experiencing and emotion processing (affect relevant behaviors), to be applied in trained and instructed self-observation, such as high-resolution ambulatory assessment of daily life (Fahrenberg et al., 2007; Reicherts, 1999a): the DOE-self-monitoring, which can also be combined with the Learning Affect Monitor (LAM; Reicherts, Salamin, Maggiori & Pauls, 2007), in which case it is called DOE-LAM.

As shown in the preceding paragraphs, the dimensions refer to the subject's responses or their response tendencies in experiencing and processing emotions and affective states. We put the accent on the processing characteristics, independent of affect quality and not strongly linked to the general quality (valence) or type of emotions concerned.

Individual multi-dimensional measures can also be analyzed in terms of *profiles*. Profiles describe configurations or patterns of responses or response tendencies concerning the processing of affective states and emotions, which can correspond to some *types of emotion processing*, particularly in relation to well-being or mental health problems. Examples of research results in health psychology include the emergence of patterns that correlate with both eating disorder risk factors (Reicherts et al., 2000) and people presenting eating disorders, obesity or being over-weight.

Other examples are patterns in patients suffering from dependence disorders both with and without personality disorders, especially antisocial and borderline personality (Reicherts, Casellini, Duc & Genoud, 2007) (although there are certain similarities, the patterns differ slightly). The patterns are more or less specific, but reveal additional difficulties in individuals presenting a dual diagnosis.

DOE-trait versions: DOE-36 and DOE-20

The *original DOE trait* version with 36 items was used as a reference for developing other variants and versions. Items were selected, reformulated and adapted to other applications. For instance, state versions were used in the description or self-monitoring of activities and processes that take place either in specific situations/moments, or in ongoing processes of affect processing.

DOE-state

The DOE-state version consists of 15 items, three items from each of the five original scales (REPCOG, COMEMO, PERINT, PEREXT, REGEMO). Since the participant receives an instruction specifying the situation or the moment/time frame the emotion processing descriptors refer to, the items are formulated in either the past or present tense. The activity or process descriptors are similar to the items of the trait version (see table). They refer to a specific situation or moment in time, allowing an *ad hoc*, momentary description, near to the occurrence of the ongoing emotional processes. Under certain circumstances (e.g. experimental realization and/or high resolution self-monitoring), it would even be possible for the individual to state the exact sequence in which his or her activities and responses of emotion processing take place; e.g. the sequence: first PERINT, then REPCOG, followed by REGEMO, then PERINT again.

Table 2: DOE-state version: scales and item examples

Scale	DOE-state - Item examples
REPCOG	“I could accurately name every emotion that I was feeling“
COMEMO	“I willingly shared ma feelings with other people, even uncomfortable ones ”
PERINT	“My strong feelings were accompanied by internal bodily reactions ”
PEREXT	“My mood showed trough my behavior and my expressions”
REGEMO	“I was able to alleviate or postpone the impact of a strong emotion”

DOE-self-monitoring

In order to provide a version for research and diagnostics of affect processing in daily life using the methodology of *Ambulatory Assessment* (e.g. Fahrenberg et al., 2007), we have developed an extra-short version with 6 items referring to the respective dimensions of REPCOG, COMEMO, PERINT and PEREXT and two items covering both facets of REGEMO: negative (postponing, attenuating) and positive (maintaining, enhancing) emotion regulation. Participants are trained to apply the emotion processing descriptors in daily life, as they do in other affect monitoring instruments (COMES; Perrez & Reicherts, 1992; or LAM, Reicherts, Salamin et al., 2007). High-resolution description can be coupled with time or event-based sampling.

DOE-couple and DOE-interaction

Although the original conception of Emotional Openness refers to *intrapersonal* emotion processing (despite the fact that EMOCOG and PEREXT belong to the social dimension of affectivity), it is assumed that the same basic dimensions of openness should play an important role in *interpersonal* emotion processing and regulation. The interplay of mutual processes of perceiving correctly, representing conceptually, expressing and communicating emotions as well as helping to regulate emotions between spouses or partners should

contribute to the couple’s affective lives, psychological well-being and relationship satisfaction. Therefore, we proposed an *interpersonal conception of Emotional Openness* (Reicherts, Genoud & Maggiori, 2007), which suggests a double perspective of “receiving” and “offering” the respective components of emotion processing between two people.

Tables 3 and 4: DOE-couple: scales, item examples (original French version) and internal consistencies (N=305)

Scale	DOE-couple, version “offered” (original French version)	Alpha
REPCOG	“Je distingue bien les différents états affectifs dans lesquels mon partenaire se trouve”	.76
COMEMO	“Je fais facilement remarquer à mon partenaire les humeurs qu’il/elle exprime”	.68
PEREXT	“Pour moi, l’humeur de mon partenaire se voit au travers de ses comportements et de ses expressions”	.71
REGEMO	“Je peux aider mon partenaire à atténuer ses émotions, même dans des situations difficiles”	.78

Scale	DOE-couple, version “received” (original French version)	Alpha
REPCOG	“Mon partenaire distingue bien les différents états affectifs dans lesquels je me trouve”	.81
COMEMO	“Mon partenaire me fait facilement remarquer les humeurs que j’exprime”	.76
PEREXT	“Pour mon partenaire, mon humeur se voit au travers de mes comportements et de mes expressions”	.80
REGEMO	“Mon partenaire peut m’aider à atténuer mes émotions, même dans des situations difficiles”	.87

To this end we have developed a *two perspectives questionnaire* with 56 (2 x 28) items in its raw version (Reicherts & Genoud, 2007a), which is based on the DOE dimensions as realized in the couple’s relationship. We used the original dimensional concept of REPCOG, COMEMO and REGEMO, but we included only PEREXT, i.e. awareness of external bodily indicators, that become visible to the partner. The original DOE items have been reformulated to adopt an interpersonal perspective.

Psychometric properties and factorial validity of this preliminary version were tested with N=305 individuals. After the preliminary item selection, according to item and scale analyses using item difficulty, item-scale correlations and Cronbach’s alpha, the resulting psychometric indicators of a 19-items version for both “received” and “offered” perspective yielded acceptable to good values (alphas ranging from .87 to .76 for the dimensions “received”, and from .78 to .68 for the dimensions “offered”). Confirmatory factor analyses

yielded satisfactory model fit indexes for the “received” dimensions ($\text{Chi}^2/\text{df}=2.32$; CFI=.92; TLI=.91; RMSEA=.066), and the indexes for the “offered” version were also acceptable ($\text{Chi}^2/\text{df}=2.68$; CFI=.90; TLI=.89; RMSEA=.074).

In two subsequent studies, a total of 70 couples assessed their interpersonal Emotional Openness using both the 19-items DOE-couples questionnaire and instruments measuring individual well-being and couple satisfaction. Analyses provided a series of validating results: for example, a substantial multiple correlation of $R=.50$ between the components of Emotional Openness partners “received” and their individual, global well-being (total score of WHOQoL-bref; OMS, 1997; EO “offered” yielded a significant $R=.35$), and their satisfaction with their relationship (PFB total score; “Partnerschaftsfragebogen”; Hahlweg, 1998). The multiple correlation with the couple’s satisfaction was $R=.50$ for both “received” and “offered” components of Emotional Openness. Based on the results of this beta version, a slightly corrected version of the *DOE-couple* questionnaire presenting 20 items for both perspectives is now available (Reicherts & Genoud, 2007a).

We further applied the model of interpersonal affect processing and emotion regulation to *actual situations or contexts* in which individuals engage in important interactions where mutual emotion processing articulation may become crucial, for example in psychotherapy, counseling or mentoring. In order to support this approach we elaborated a version called *DOE-interaction* (Reicherts & Genoud, 2007b). It comprises *state/process item* formulations, directly based on the most recent DOE-couple version, and presents 20 items per perspective (offered and received).

The Language Versions: French, Italian, German, Spanish, and English

The entire Emotional Openness model was developed in French. Therefore, the *French version* of the 36-items trait questionnaire (including the 20-items version) is the original, reference version, with which all the steps of the instrument were first elaborated and most studies realized. Consequently, for both concerning psychometrics and application, this version rests on a large body of empirical evidence. After the encouraging results of the French version, an *Italian version* was adapted and validated in a series of studies, mostly clinical with matched normal control samples. A *German version* of the questionnaire was adapted at the same time, providing preliminary clinical and therapeutic evidence (e.g. Pauls & Reicherts, 1999). A preliminary *Spanish version* has also been developed and submitted to preliminary tests.

The *English version*, which underlies the item examples in the present manual, is included in the appendix. It is based on a preliminary version that also yielded quite acceptable reliability indicators (after deletion of one item per scale: REPCOG .81, COMEMO .79, PERINT .67, PEREXT .63, RESNOR .87; REGEMO has not been included; cf. Uwimanimpayé, 2000).

Validity and Applications

A large number of validity studies were conducted with the original trait version (36 items; and recently with the DOE-20), and a smaller number, particularly experimental research, with the DOE-state version (15 items). As the model and the instrument were originally developed in French, the majority of studies were conducted with the French versions. Several studies also used the Italian version, some the German and English versions.

Emotional Openness and other Instruments of Emotion Processing: TAS-20 and TMMS

Regarding the instruments stemming from other models of emotion processing, in particular “Alexithymia” and “Emotional Intelligence”, different studies show a number of plausible, mostly low to moderate, associations and underline the specific dimensional structures of the respective instruments.

Trait-Meta-Mood Scale (TMMS)

Regarding the Trait-Meta-Mood-Scale (TMMS; Salovey, Mayer, Goldman, Turvey & Palfai, 1995), we used a preliminary French adaptation and in one study (N=97) analyzed its correlations with the DOE dimensions (Champion, 2001). As expected, Regulation of Emotion REGEMO shows a moderate correlation with TMMS for Repair (.36), and Clarity (.48). As also expected, Cognitive-Conceptual Representation REPCOG is quite strongly correlated with TMMS Clarity (.68) and slightly correlated with Repair (.28). Perception of Internal and External Indicators, PERINT and PEREXT, are significantly correlated with TMMS Attention, but the correlations are rather low (.39 and .18). Communication of Emotion COMEMO reveals a particular pattern, correlating evenly with TMMS Clarity, Attention and Repair (about .25). In conjunction with the fact that, except for Clarity and REPCOG, all correlations are rather moderate or low, results clearly indicate the different representational space of the DOE in comparison with the TMMS, at least in its French adaptation.

Toronto Alexithymia Scale (TAS-20)

The associations between the DOE and Alexithymia, measured by the Toronto Alexithymia Scale TAS-20 (Taylor et al., 2003), have been analyzed in a first study (see Genoud, Rossier & Reicherts, 2005; Zbinden, in prep.). As expected, Cognitive-Conceptual Representation is negatively associated with the Difficulty of Identifying Feelings DIF (-.62). However, Regulation of Emotion is negatively correlated with DIF (-.66) and Difficulty in Describing and Differentiating Feelings DDF (-.50). As also expected, Perception of Internal Indicators is positively correlated with Difficulty in Identifying Feelings (DIF) and Difficulty in Describing and Differentiating Feelings (DDF) (.64 and .52). Perception of External Indicators is also linked with the TAS (DIF). Neither Communication of Emotion nor Normative Restrictions correlated with any of the TAS-20 dimensions. For further studies see also Zimmermann, Genoud and Reicherts (2007).

Despite a number of associations that are almost plausible, the DOE is far from being “reducible” to the other measures. On the contrary: there is evidence that the *psychological space* for parsing emotion processing as represented by the subject and measured by the DOE scales is quite different, and is at least as valid in respect of external criteria. Regarding important criteria (e.g. therapeutic recovery in anorexia), the actual studies demonstrate that several of the DOE dimensions have a higher incremental validity than other instruments.

Emotional Openness and Personality Traits

A series of studies have tested aspects of construct validity of the DOE-scales in relation to personality factors (for more details, see also Rossier, Genoud & Zimmermann, in prep.). As expected according to Eysenck’s model of personality (using the EPI, Eysenck & Eysenck, 1971), *Neuroticism* is negatively associated with Regulation of Emotion and Cognitive-Conceptual Representation, *Extraversion* positively with Communication of Emotions (Reichert, 1999b); the correlations being generally low or moderate and rarely exceeding .40. Correlations with *Lying* are generally weak and rarely significant, which indicates quite good divergent validity of the DOE dimensions with aspects of social desirability.

Regarding the 5-factor models of personality, comparable patterns have been observed with Costa and McCrae’s NEO-PI model (Genoud, Rossier & Reicherts, 2005): negative correlations between *Neuroticism* and Cognitive-Conceptual Representation and Regulation of Emotion, and positive correlations between *Extraversion* and Communication and Expression of Emotions, *Consciousness* also with REPCOG.

A study with N=430 young adults using the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ-III-R; Zuckerman, Kuhlman, Joireman, Teta & Kraft, 1993) showed similar plausible links (Verardi, Aluja, Reicherts & Rossier, 2004): The factor *Anxiety-neuroticism* is negatively correlated with REGEMO and REPCOG, and positively with the awareness of internal and external markers of emotions PERINT and PEREXT. *Aggressivity-hostility* is negatively associated with REPCOG, and positively with increased PERINT and PEREXT. *Activity* has links with PERINT and RESNOR. As expected, *Sociability* correlates positively with COMEMO and PEREXT. *Sensation-seeking*, a specific scale of Zuckerman’s model of personality, is not associated with any of the DOE-scales.

Emotional Openness and other Psychological Characteristics

Self-report assessment of *social competencies* according to Buhrmeister, Fruman, Wittenberg and Reis (1988; Riemann, Kälén & Semmer, 1997) also showed plausible and moderate associations with some DOE dimensions (N=110). COMEMO correlated with the Disclosure subscale (.53); REPCOG with Disclosure (.30), Initiation (.30), Conflict Management and Emotional Support (both .27). Both DOE dimensions also showed associations with the total score of self-reported social competencies (.38 and .37 respectively).

In another study (N=50) we assessed *Empathy* according to a French version we adapted from Mehrabian and Epstein (1972; Banse, Etter & Reicherts, 1995). Factor analyses of the adapted version suggested a 2-factor solution we called “Perspective Taking” and “Emotional Resonance”. Very plausibly, Perspective Taking correlated with REPCOG (.55) and Emotional Resonance with COMEMO and RESNOR (.36 and .38 respectively; Reicherts, 1999b).

Sex and Age Differences in Emotional Openness

Gender specific response patterns of Emotional Openness (DOE-36 trait) are very coherent in both large samples (N=430 and N=269): women describe more Communication of Emotions ($d=+0.52$ and $+0.38$ respectively), and men more Regulation of Emotions ($d=+0.34$ and $+0.35$ respectively). Both differences are highly significant ($p<.01$). Women of the young adult sample also present somewhat a somewhat more pronounced Perception of External Indicators ($d=+0.22$; $p<.05$).

In both samples *age* is negatively correlated with COMEMO; younger subjects describe more Communication and Expression of Emotions. Additionally, in the young adults’ sample, age is slightly and positively correlated with REGEMO ($r=.095$; $p<.05$) and REPCOG ($r=.085$; $p<.10$). All response patterns in the DOE-20 short version are very similar. Some age differences become more pronounced when studying older subjects and comparing their responses with the adult reference scores; for example, “young olds” in our study on daily life affectivity (N=72; mean age=67.0; SD=4.3) described significantly lower COMEMO ($d=-0.46$) and higher REGEMO ($d=+0.37$; e.g. Walther, 2007; Maggiori, in prep.) than the adults’ reference scores.

Emotional Openness in Clinical Studies

Dependence Disorders and Personality Disorders

Emotion processing is thought to play an important role in psychological dysfunctions in both Dependence (alcohol or drug) and Personality Disorders. The dimensional framework of the Emotional Openness model suggests that patients who are drug- or alcohol-dependent, borderline or antisocial show *reduced* (a) Cognitive-Conceptual Representation of affective

states, (b) Regulation of Emotion and (c) Communications of Emotions, but (d) *increased* awareness or Perception of Internal Indicators of affectivity. Drug-dependent patients with PD comorbidity (in particular borderline or antisocial) are thought to present even stronger deficits in REPCOG and REGEMO. Furthermore, (e) appropriate psychological treatment is supposed to improve these patterns.

Four clinical studies (see Reicherts, Casellini et al., 2007; Reicherts, Casellini, Duc, Grespi, Romailier, & Balmelli, 2004) used the DOE-36-items questionnaire to compare 117 patients (21 drug-dependent without personality disorder, 30 drug-dependent with borderline or antisocial personality, 14 with borderline disorder, 32 alcohol dependent and 20 dependent in-patients before and after receiving psychological therapy) with normal control subjects (N=51 matched, N=32 matched, and N=14 matched Italian speaking; N=20 French speaking with French normative values), including one pre-post treatment comparison.

Results confirm marked restrictions of Emotional Openness in patients with Dependence or Personality Disorders for Cognitive Representation ($d=-1.14$) and Regulation ($d=-0.93$), as well as a restriction of Communication of Emotions ($d=-0.70$), but a slightly increased awareness of body internal indicators (PERINT $d=+0.32$) of affectivity. Differences of patients with a *double diagnosis* are much greater, corresponding to effect sizes of $d=-1.84$ for REPCOG and $d=-1.74$ for REGEMO; differences in COMEMO are less important ($d=-0.31$). Awareness of body internal emotion indicators is also slightly increased ($d=+0.27$) but does not differ significantly from the control group. As expected, patients with a double diagnosis (DD and PD) described significantly stronger deficits in Cognitive-Conceptual Representation and Regulation of Emotion.

One group of Dependence Disorder patients (N=20) receiving multi-component treatment, including individual and group therapeutic intervention according to a client-centered approach, and working on emotion processing, showed marked differences from the reference group at the beginning of the treatment ($d=-0.91$ for Cognitive-Conceptual Representation, $d=-0.82$ for Regulation of Emotion and $d=+0.46$ for Perception of Internal Bodily Indicators). As expected, pre-post comparisons indicate improvement with change, effect sizes of $d=+0.99$ for REPCOG, $d=+0.97$ for REGEMO, as well as $d=+0.88$ for COMEMO. In addition, changes following treatment are highly significant and substantial, except for the awareness of internal bodily indicators, which decreased very slightly. Nevertheless, patients “normalize” their emotion processing following treatment, describing increased Cognitive Representation and Regulation of Emotion, as well as Communication and Expression of Emotion.

Results underline the importance of dysfunctional modes of emotion processing in both pathologies, and the validity of applying the model and the DOE instrument.

Eating Disorders and Alimentation Behavior Problems

In a first study, that was embedded in a large scale study of young adults entering the work place (AEQUAS study; N=503; mean age=22.7; 290 female subjects), we analyzed prototypical profiles of Emotional Openness and compared them with indicators of psychological well-being, including a composite indicator of the risk of developing eating behavior problems (items: fear of gaining weight, non-satisfaction with bodily appearance, fear of losing control over eating). Amongst participants presenting predefined prototypical profiles (N=187; 37%), those with a higher risk of dysfunctional eating behavior were much more likely to also follow the profile of Emotional Openness characterized by lowered REPCOG and COMEMO, and increased PERINT (Reicherts et al., 2000).

A similar pattern has also been observed in a preliminary clinical study with 17 bulimic in-patients: compared with the French speaking reference sample, they presented restricted Cognitive Representation ($d=-.82$) and Communication of Emotions ($d=-.52$) but increased Perception of Internal Bodily Indicators PERINT ($d=+.85$). In a pilot treatment evaluation, five of these in-patients were assessed after receiving a Cognitive Behavior Therapy, and presented important improvement in all three scales (Carrard, 2000).

A clinical study analyzed the patterns of Emotional Openness of anorexic in-patients at the beginning and end of a CBT treatment (Perroud, Reicherts & Guerry, 2004; see also Guerry, 2004). Compared with the normative reference group, N=21 female patients with a mean Body Mass Index (BMI) of 14.2 (SD 1.61) presented at the beginning of the treatment a profile similar to that which we observed in the large scale study mentioned above: Compared with the reference values, Cognitive Representation ($d=-1.11$), Regulation of Emotion ($d=-.55$) and Communication of Emotion ($d=-.24$; tendency) were reduced, while Perception of Internal Indicators increased ($d=+.33$; tendency).

DOE variables were associated with several variables of the EDI-2 questionnaire (Eating Disorder Inventory-2; Garner, 1991) which indicate psychological dysfunctions linked with eating behavior problems: REPCOG correlated negatively with Ineffectiveness ($-.52$) and Interoceptive Awareness ($-.72$), REGEMO with Ineffectiveness ($-.57$), Interoceptive Awareness ($-.56$) and Impulse Regulation ($-.49$). COMEMO was negatively, and plausibly, associated with Interpersonal Distrust ($-.74$) and Social Insecurity ($-.49$). This pattern of clinical associations underlines the differential character of the three DOE-variables, and supports the construct validity of these affect processing variables in the analysis of psychological dysfunctions.

Post-test assessment reveals a series of important changes: substantially increased BMI (17.2; SD=1.44; $d_{\text{change}}=1.88$) and significant improvement of all EDI-2 scales and depression scores (BDI-2) indicate a clinically important improvement at the end of the treatment, while Cognitive Representation ($d=+0.88$) and Communication of Emotion ($d=+0.49$) increased significantly at the same time. Regulation of Emotion increased only slightly ($d=+0.36$; n.s.), and remains below the normative level.

Additionally, the improvement of the main symptomatic indicator of Anorexia Nervosa, *gains in BMI*, could be explained substantially by *changes in DOE variables*: Cognitive Representation (beta=.38; $p < .03$) and Communication of Emotion (beta=.43; $p < .02$) improved simultaneously, and both contributed substantially to overall weight gain (multiple $R = .62$; $R^2_{adj} = .32$).

In a study on *overweight* individuals, several associations with EO affect processing have been found (Braunschweig, 2006). Fifty-eight women suffering from overweight or obesity showed a specific pattern of affect processing, compared with the female reference subjects: an increase of PERINT ($d = +0.66$) and PEREXT ($d = +0.35$; a tendency), and a decrease of REGEMO ($d = -0.48$), COMEMO ($d = -0.46$) and REPCOG ($d = -0.38$; a tendency). While, as expected, awareness of bodily indicators of affective experiences is somewhat strengthened, cognitive representation and regulation of emotion are reduced, but not to the same extent as for other disorders. The pattern also corresponds well to a (sub-)group of anorectic-bulimic patients ($N = 11$) of another in-patient study (Guerry, 2004) in which reliability of DOE-36 is very high (mean alpha .82). There are also some plausible associations with other psychological variables (depression correlates about .30 with REPCOG, REGEMO and COMEMO), and the BMI is negatively associated with COMEMO (-.41) and PEREXT (-.20). Similar results have been found in an Italian-speaking sample (Pucci, 2006).

Somatoform Disorders

A recent study (Salamin & Reicherts, 2007; Salamin, in prep.) analyzed emotion processing in female in-patients suffering from physically unexplained symptoms (somatoform disorder; $N = 20$). Compared with the reference group, patients described much lower Communication of Emotions ($d = -1.16$), Regulation of Emotions ($d = -0.90$) and reduced Cognitive Representation ($d = -0.50$) at the beginning of their treatment, whereas awareness of bodily indicators increased slightly. As in the Dependence Disorders studies, the pattern corresponds quite well with some hypotheses of dysfunctions in affect processing (see also hypotheses in alexithymia, e.g. Waller & Scheidt, 2004).

Phobic Behaviors

In an experimental study (Reicherts, Rossier & Rossier, 2007) we compared emotional responses according to the Emotional Openness model in participants with and without arachnophobia ($N = 20$ in both groups). Arachnophobia was assessed by the Fear of Spider (FSQ; Szymanski & O'Domhohue, 1995; cit. Antony, Orsillo & Roemer, 2001) and Spider Phobia Questionnaires (SPQ; Korman, Hastings, Weerts, Melamed & Lang, 1973; cit. Antony et al., 2001). Both instruments revealed clinically increased cut-off scores. Using the *DOE-state* version we contrasted their processes of bodily awareness and perception, of cognitively representing and regulating affect during exposition to various visual stimuli (mostly taken

from the IAPS system; Center for the Study of Emotion and Attention, CSEA, 1999; Lang, Bradley & Cuthbert, 1999), including spiders and snakes. In a 2 x 2 design, subjects had to explicitly rate pictures presented on a screen according to three dimensions: global valence (positive versus negative), fear (frightening versus reassuring) and disgust (disgusting versus appealing). As hypothesized, arachnophobic subjects showed strong increases in their perception of bodily affect indicators (both PERINT and PEREXT) and of Cognitive-Conceptual Representation, whereas their Regulation of Emotion remained on the same level. Conversely, control subjects reported increased Regulation of Emotion but only rarely changes in bodily perception (both PERINT and PEREXT).

Results that revealed significant interaction effects (univariate and multivariate) demonstrated highly plausible patterns of changes in emotion processing during the experiment when exposure to phobic stimuli can trigger symptom-like affective episodes, which are typical for episode-related psychological disorders such as an animal phobia, panic attack or gambling. Arachnophobic subjects did not differ significantly from normal controls on the DOE-trait dimensions. This finding is in line with the expectation of a temporarily disturbed emotional system in circumscribed phobic problems, which do not necessarily affect general emotion processing.

Gambling Behaviors

A similar experimental study using a gambling paradigm (Bechara, Damasio, Damasio & Anderson, 1994; Petry, 2001) has been carried out in the context of *pathological gambling* (Genini, 2003; Guarneri, 2003). Amongst thirty participants assessed using the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987), 8 subjects were identified as probable pathological gamblers, 11 as potential (at risk) gamblers and 11 as occasional players. Affect processing of pathological gamblers was compared with potential gamblers and occasional players measuring Emotional Openness with the DOE-trait version and using the DOE-state version referring to the experimental situation (the paradigm was based on Bechara et al., 1994; adapted from Petry, 2001). As in the arachnophobia study, there are no differences between the groups concerning the DOE-trait; i.e. subjects do not differ in the general affective functioning they describe. However, *during the experimental gambling tasks* pathological gamblers showed increased Perception of Internal Bodily Indicators and lower Emotion Regulation and Communication of Emotions than occasional and potential gamblers. The pattern that emerged during the experiment resembles that of arachnophobic subjects, but unlike those, the gamblers did *not sharpen* their Cognitive Representation: it appears that they do not strengthen REPCOG in recognizing and distinguishing their emotional state during gambling, which suggests that they remain in a more diffuse representation of their own affect. The fact that this result relies on only 8 pathological gamblers compared with a combined group of 22 potential or occasional gamblers, is somewhat compensated for because of the highly significant differences observed in the response patterns of the three

groups, according to the gambling paradigm (Guarneri, 2003). Results underline the importance of assessing individuals with the DOE-state during pathologically relevant episodes, where differential configurations of affective treatment emerge.

Burnout

The analysis of affect processing according to the EO model also contributes to a better understanding of the “burnout” syndrome (Maslach & Jackson, 1981). Two recent studies on medical care and nursing professionals (N=232) and on university students (N=278) underline that quite a large part of the total score of the Maslach Burnout Inventory (MBI; Maslach, Jackson & Leiter, 1997) can be explained by the DOE dimensions: Multiple regression on the DOE dimensions yield $R^2_{adj}=.17$ and $R^2_{adj}=.41$, respectively. Emotion Regulation (REGEMO) and Communication of Emotion (COMEMO) seem to be “protective factors” preventing from burnout, in providing to the subject the capacity of “managing” negative affective states and of sharing them with others. On the other hand, focalising perception on internal markers of emotion (PERINT) seems to exacerbate the sentiment of “emotional exhaustion” (Genoud & Reicherts, 2007).

Changes of Emotional Openness in Clinical Treatment Studies

As described above, the DOE trait version has been applied in clinical treatment studies; one based on strategies of cognitive-behavior therapy (CBT) of anorectic eating disorder (N=21; Perroud et al., 2004), one on CBT treatment of bulimic in-patients (N=5; Carrard, 2000), and another based on client-centered therapy (CCT) principles in treating Dependence Disorder patients (N=20; Reicherts, Casellini et al., 2007). The treatment programs included some emotion-related work, but did not use specific interventions based on the EO model, or refer to it conceptually.

In the CBT treatment of anorectic in-patients, change effect sizes were $d=+0.88$ for REPCOG, $d=+0.49$ for COMEMO and $d=+0.36$ for REGEMO. The pilot assessment of 5 bulimic in-patients also indicated a clear improvement of REPCOG and COMEMO and a decrease of PERINT, all corresponding to change effect sizes of about $d=1$.

In the Dependence Disorder treatment study, in-patients receiving a multi-component treatment, including individual and group therapeutic intervention according to a client-centered approach, and working on emotion processing, indicated stronger improvement in the EO dimensions, with change effect sizes of $d=+0.99$ for Cognitive Representation, $d=+0.97$ for Regulation of Emotion, and $d=+0.88$ for Communication and Expression. These changes are highly significant and substantial, except for the awareness of internal bodily indicators, which decreased only slightly.

Because the effects we observed in the DOE dimensions in these studies are not conceptually biased, the estimations of changes in emotion processing are rather conservative. The DOE trait version therefore seems plausibly linked with the changes of emotion processing that were observed in psychotherapy. Despite their trait-like character, DOE-dimensions provide treatment sensitivity.

Emotional Openness and Psychological Intervention

The model of Emotion Openness provides a clear conceptual and evidence based framework to delineate and conceive interventions that respond to specific problems diagnosed in different dimensions and facets of affect processing. It seems very plausible to develop a variety of specific psychological interventions based on EO or to integrate existing methods and techniques into the model, its dimensions or facets (Reicherts et al., in prep.).

A first domain of interventions enhances Emotional Openness by improving affect processing in order to reinforce well-being, personal growth and richness of experience. Psychological and physical well-being might benefit from improvements in response strategies, which more accurately articulate emotional experiences and affect processing. Health psychology, counseling, mentoring, etc. can usefully apply the model, the instruments, and the interventions proposed.

A second domain of intervention refers to a more clinical perspective of psychological disorders and problems associated with various forms of dysfunctional affect processing, in which it might be very useful to integrate the intervention strategies and exercise modules mentioned above, in order to provide specific work on affect processing dysfunctions. On the other hand, when treating severe psychological problems interwoven with affect processing problems (e.g. PTSD; personality, somatoform, or dependence disorders, etc.; gambling and phobic behaviors), one might refer to existing therapeutic approaches (e.g. empathic work; e.g. Rogers, 1957; Bohart & Greenberg, 1997; motivational interview), methods (e.g. emotion-focused therapy; Greenberg & Paivio, 1997), and techniques (e.g. Focusing; Gendlin, 1981). Applying the model and the instruments of EO within these approaches and methods provides interesting screening tools (DOE-20; DOE-state; DOE-couple) and daily monitoring methods (DOE-self-monitoring), and will help to improve intervention-oriented diagnostic and treatment evaluation. The model provides an interesting approach for the functional analysis of emotional experiences and affect processing. Tools for diagnostic and intervention based on EO are presented in more detail by Reicherts et al. (in prep.).

Administration: Scoring and Assessment

Scores for each scale are determined by calculating the mean value of the items constituting the respective scale, according to the item key, adding up the raw scores (0 - 4), after having inverted the negative items. The scale mean scores should not be calculated if more than one value is missing.

The scale mean scores can be compared with the reference values. Mean scores equal or above one standard deviation of the reference values indicate an *“increased” tendency* of the respective scale; mean scores lower or equal indicate a *“reduced” tendency* as characterized by the construct; otherwise, scale means lying between these standard deviation limits are characterized as being of “average” or middle manifestation of the construct indicated by the scale (e.g. “increased” Cognitive-Conceptual Representation of affective states, or a “reduced” Regulation of Emotion).

Furthermore, the individual configuration of the scale means can be analyzed in terms of a profile. Particular configurations can be assessed according to some specific reference groups, such as individuals suffering from dependence or personality disorders. In the large scale study on young adults entering the work force we previously defined profiles in terms of “high” or “low” characteristics on the important dimensions, according to the “tercil” values, i.e. the lowest or the highest 33% of each distribution. Results showed for example that the profile with the low Cognitive Representation, low Communication of Emotion and high Perception of Internal Indicators not only presented the highest risk for alimentary behaviour problems but also higher depression scores and psychosomatic complaints, and a lesser general self-efficacy. The profile with the most favourable health indicators was high on Cognitive Representation and Communication and low on Perception of Bodily Indicators.

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