



Article scientifique

Article

2014

Published version

Open Access

This is the published version of the publication, made available in accordance with the publisher's policy.

Experimentally observed responses to humor are related to individual differences in emotion perception and regulation in everyday life

Papousek, Ilona; Schuler, Günter; Lackner, Helmut K.; Samson, Andrea Christiane; Freudenthaler, H. Harald

How to cite

PAPOUSEK, Ilona et al. Experimentally observed responses to humor are related to individual differences in emotion perception and regulation in everyday life. In: Humor, 2014, vol. 27, n° 2, p. 271–286. doi: 10.1515/humor-2014-0018

This publication URL: <https://archive-ouverte.unige.ch/unige:97945>

Publication DOI: [10.1515/humor-2014-0018](https://doi.org/10.1515/humor-2014-0018)

Ilona Papousek*, Günter Schuler, Helmut K. Lackner,
Andrea Samson and H. Harald Freudenthaler

Experimentally observed responses to humor are related to individual differences in emotion perception and regulation in everyday life

Abstract: This study aimed to investigate the relevance of an individual's typical emotion perception and emotion regulation behavior to his or her responsiveness to humor. This was studied behaviorally by examining responses to different types of humorous stimuli in an experimental paradigm, in a sample of $n = 54$ participants aged between 18 to 41 years (29 women, 25 men). Individual differences in emotion perception and regulation were assessed by relevant subscales of an established self-report instrument. Higher scores on emotion perception were related to higher amusement ratings in response to the humorous stimuli. Higher scores on emotion regulation were associated with shorter response latencies for the amusement ratings, particularly when it was important to mentalize with the characters in the cartoons in order to understand the humor. The cognitive understanding of the humor was unaffected. The findings suggest that good emotion perception and emotion regulation skills may contribute to greater humor responsiveness in everyday life, which may be an adaptive trait promoting successful functioning and resilience.

Keywords: emotion perception, emotion regulation, positive emotional responsiveness

*Corresponding author: **Ilona Papousek:** University of Graz. E-mail: ilona.papousek@uni-graz.at

Günter Schuler: University of Graz.

Helmut K. Lackner: Medical University of Graz.

Andrea Samson: Stanford University.

H. Harald Freudenthaler: University of Graz.

1 Introduction

In recent years, a body of literature has provided evidence of the impact of deficits in an individual's emotion perception and emotion regulation skills and behavior

on various forms of psychopathology (for reviews see, e.g., Chida and Hamer 2008; Kohler et al. 2010, 2011). In contrast, little research has been done linking individual differences in emotion perception and regulation with specific adaptive functions of personality. In this context, positive emotional responsiveness – the tendency to respond with positive affect or amusement to events in daily life – may be relevant. Greater positive emotional responsiveness may promote successful functioning and foster resilience against, and recovery from, affective disorders (Catalino and Fredrickson 2011; Rottenberg et al. 2002). The experience of positive emotions, especially amid challenge and adversity, contributes to successful adaptation to challenges, including those of later life (Ong et al. 2006). Humor serves important cognitive and emotional functions in these processes. Therefore, one way to study positive emotional responsiveness behaviorally is to examine cognitive and affective responses to humorous stimuli, which typically evoke a positive emotional response that can differ greatly inter-individually (Ruch 2007). When exposed to humorous material, the sudden perception of incongruity between a concept (or expectation) and the observed object or situation results in a pleasurable experience accompanied by feelings of amusement. The sense of having understood the joke (having “gotten the point”) arises when the surprising incongruity can be resolved by consideration of information available elsewhere in the joke or cartoon (Ruch 2007).

A recent brain imaging study suggested that brain circuits related to emotion perception as well as circuits related to emotion regulation contribute to the affective response to humor in cartoons (Kohn et al. 2011). In the present study, these relationships were studied at the behavioral level, examining the self-reported functionality of emotion perception and regulation in everyday life.

Emotion perception refers to noticing and accurately recognizing emotions in others. It requires basic sensory and attentional processes as well as knowledge or memory regarding contingencies between an expression of emotion and other information with which that expression has been directly or indirectly associated (Adolphs 2002; Jahshan et al. 2013). Emotion regulation refers to altering the intensity, duration, or direction of an emotion in oneself. It captures basic automatic processes including inhibitory and reinforcing processes at the neuronal level as well as volitional emotion regulation efforts (Gross 1998; Kappas 2011; Phillips et al. 2008). In differential psychology, individual differences in emotion perception and regulation have been conceptualized in two different ways, as abilities or as typical behavior. In ability-based concepts, emotion perception and regulation are defined as emotion-related cognitive abilities, best measured by maximum-performance tests (e.g., Mayer and Salovey 1997). Alternatively, emotion perception and regulation can be viewed as affect-related behavioral tendencies, referring to an individual’s typical behavior in everyday life, supposed to be best

measured through self-report (e.g., Pérez et al. 2005; Petrides and Furnham 2001). In the present study, measures of emotion perception and regulation ability and measures of the typical emotion perception and regulation behavior were used. Specific subscales of established instruments were selected.

When viewing humorous cartoons, emotion perception should be relevant to the identification of affectively relevant information and the production of the affective state in the viewer. In addition, the appreciation of most humor requires mentalizing, with varying importance in different types of humor (Samson et al. 2008). Mentalizing refers to the (mostly automatic, unintentional) cognitive process by which individuals make inferences about the mental states of others, including their feelings, beliefs, and intentions (Frith and Frith 2006). These functions are interrelated, with difficulties in emotion perception being associated with poor mentalizing (Theory of Mind) skills (Ashwin et al. 2006). However, in contrast to maximal emotion perception abilities, in which reasoning in terms of Theory of Mind (i.e., cognition) plays a greater role, typical emotion perception behavior may relate to a more global susceptibility to the emotions of others, encompassing processes that are more automatic and emotional in nature. For instance, self-reported typical tendencies to effectively perceive the emotions of others have been shown to moderate the impact of experimental emotional contagion, which is an automatic (non-cognitive) process (Papousek et al. 2008, 2011). By using different types of humor in which the importance of social reasoning skills varies, this issue can be examined in more detail.

Emotion regulation should be relevant to the modulation of evoked emotions, which should be primarily positive in the case of viewing humorous cartoons. Previous research indicated that individual differences in emotion regulation play a lesser role in the context of positive than of negative affect (Papousek et al. 2008, 2011; Volokhov and Demaree 2010). At first glance, therefore, it appears doubtful that individual differences in emotion regulation will affect responses to humor. Yet, most jokes also involve negative emotional aspects, such as the inclusion of a victim who, for instance, has a false belief, which is associated with negative feelings that the viewer may adopt to a certain extent (Moran 1996). Previous evidence indicated that the ability to inhibit potential nascent negative feelings during viewing cartoons (induced by sympathizing with the victim of the joke) may promote and speed up the perception of amusement elicited by the humor (Papousek et al. 2013; Samson et al. 2012).

In the present study, potential effects of individual differences in emotion perception and regulation on responses to humorous stimuli were examined in an experimental paradigm. Participants were presented with humorous cartoons and rated the cartoons for perceived amusement. They also indicated whether they did or did not understand the punch line, and the time it took them to deliver

the ratings was recorded. Three types of cartoons were used, varying in the social cognition (mentalizing) requirements to understand the joke. The amusement rating is directly related to positive emotional responsiveness. As it implicates the participants' reflection on their own emotional state, the response latencies to the amusement rating may reflect how difficult it is to perceive and judge one's own amusement. The response latencies to the comprehensibility rating are primarily determined by the cognitive process of detecting the punch line (Samson et al. 2012).

It was expected that (1) individual differences in the functionality of emotion perception in everyday life would be related to positive emotional responsiveness, whereas they should play a lesser role in the cognitive process of detecting the punch line. Few differences between the different types of humor were expected for typical emotion perception. (2) Higher scores on emotion regulation may be associated with shorter response times to the amusement ratings or more positive responses. The effect of emotion regulation was expected to be greatest in responses to humor in which it is important to mentalize with the characters in the cartoons in order to appreciate the humor (i.e., in Theory of Mind cartoons), because when viewing these cartoons, the likelihood that viewers will adopt the inferred feelings of the protagonists will be highest (see Samson et al. 2012). (3) The effect of the more cognition-based ability measure of emotion perception on positive emotional responsiveness may be strongest for cartoons in which social reasoning is required to appreciate the humor. According to its conceptualization as an emotion-related cognitive ability, it may also predict the cognitive process of detecting the punch line, especially in cartoons requiring Theory of Mind skills.

2 Methods

2.1 Participants

Fifty-four participants (29 women, 25 men) aged between 18 and 41 years ($M = 23.7$, $SD = 5.0$) completed the experiment. All participants were university students enrolled in various fields at the universities of Graz (Austria) and were Caucasian. Eight further persons (3 women, 5 men) failed to return to the second test session and were not included in the sample. Participants were recruited by flyers posted on the university campuses. No participant reported using drugs or psychoactive medication and none had participated in an experiment using cartoons before. The study was performed in accordance with the 1964 Declaration of Helsinki and was approved by the local ethics committee. Participants gave their written consent to participate.

2.2 Humor paradigm

The stimulus material consisted of three types of non-verbal cartoons as well as non-humorous pictures serving as a control condition. They were used in previous studies (e.g., Papousek et al. 2013; Samson et al. 2008, 2012). Visual puns (PUN) are cartoons where the punch line is based on the visual similarity or identity of two different objects that might partially overlap in their meaning or function. Social cognition is not required to understand the punch line in PUN cartoons. In semantic cartoons (SEM) the punch line is based on the incongruity and (if resolved) the semantic relations between two scripts or meanings. The incongruity has to be resolved by recognizing the underlying cognitive rule of the cartoon (e.g., analogy). In SEM cartoons, the mental states of others play a role but are not the main focus of the joke. In Theory of Mind (TOM) cartoons it is crucial to take into account (false) mental states of the characters in the cartoon to understand the punch line. The non-humorous control pictures were cartoon-like pictures containing an incongruity which could not be resolved meaningfully, that is, they did not contain a punch line (irresolvable incongruities, INC). Examples of PUN, SEM, TOM, and INC cartoons can be found in Samson 2012 and Samson et al. 2012.

A total of 96 cartoons (24 PUN, 24 SEM, 24 TOM, and 24 INC) were presented, divided into three blocks. A 10 minute break was provided between the blocks. Within each block, the cartoons were presented in random order. The order of blocks was counterbalanced.

The participants indicated via mouse click whether or not they had understood the punch line of the cartoon (comprehension rating) and rated the funniness (amusement rating) of each cartoon from 1 (not funny) to 6 (very funny). The computer program also calculated the response latencies to the comprehension questions (starting from the onset of the cartoon) and amusement ratings (starting from the onset of the rating scale). In addition, the participants were asked to indicate after each block how much effort they had made to accomplish the task using a 17-point rating scale, from 1 (not at all) to 17 (extremely). Previous findings indicated that motivation/effort may influence the behavioral data in this paradigm (Samson et al. 2012).

2.3 Questionnaires

2.3.1 Self-report emotional ability scale (SEAS)

The SEAS (Freudenthaler and Neubauer 2005; see also Papousek et al. 2008, 2011) encompasses six subscales for the typical handling of emotion in everyday

life. Overall, it includes 49 items, which are rated on a 6-point Likert scale. The present study analyzed the two subscales referring to perception of the emotions of others (11 items, e.g., “I can tell immediately if a friend is worrying about something” and “Even in strangers I have no trouble recognizing insincere expressions of emotion”, $\alpha = .83$) and regulation of one’s own emotions (6 items, e.g., “When I am scared of something I can barely do anything against it” and “It’s easy for me to get over a disappointing experience”, $\alpha = .70$).

2.3.2 Mayer-Salovey-Caruso emotional intelligence test (MSCEIT)

The emotion perception subscale (perceiving emotions branch score, 50 items, $\alpha = .76$) and the emotion management (emotion regulation) subscale (20 items, $\alpha = .85$) of the German version of the MSCEIT were used (Steinmayr et al. 2011). Two subscales are used to measure emotion perception in four faces and six pictures, respectively. For example, participants are asked to indicate the degree to which each of five feelings (e.g., happiness, sadness, fear, anger, and disgust) is expressed by a color photograph of a human face. The emotion regulation subscale includes five vignettes of emotionally laden situations along with four different ways to cope with the emotions depicted in the scenarios. Participants are required to indicate the effectiveness of each solution on a 5-point scale ranging from very ineffective to very effective. The MSCEIT is an ability-based test using a consensus-based scoring approach. In consensus scoring, each response option is weighted according to responses provided by a normative sample of 3653 respondents (German version). For example, if a participant selects a response alternative chosen by 70 percent of the normative sample, his or her score is incremented by .70.

2.3.3 Depression

As it seemed plausible that depressed mood could affect the participants’ responsiveness to humor, depression was controlled using the Center for Epidemiologic Studies depression scale (CES-D, German version, Hautzinger and Bailer 1993) which consists of 20 items, $\alpha = .89$. These 20 items refer to mood and attributions over the past week, and the scale is particularly suitable to measure sub-clinical depressive experiences in the general population (Wood et al. 2010). Scores have a potential range of 0 to 60.

Descriptive statistics of all questionnaire measures are given in Table 1.

Table 1: Descriptive statistics for questionnaires

| | <i>M</i> | <i>SD</i> | Range |
|-------------------------------------|----------|-----------|-----------|
| SEAS | | | |
| Typical Emotion Perception Behavior | 49.3 | 6.5 | 37–63 |
| Typical Emotion Regulation Behavior | 22.2 | 4.6 | 11–31 |
| MSCEIT | | | |
| Emotion Perception Ability | 47.4 | 7.6 | 22.3–57.4 |
| Emotion Regulation Ability | 36.4 | 5.3 | 22.0–44.3 |
| CES-D | | | |
| Depression | 12.7 | 8.6 | 3–38 |

2.4 Procedure

Participants were tested one by one in a sound-attenuated examination room. After the CES-D and the MSCEIT were administered, the participants received instructions for the task and were given sample cartoons and the required responses. Each cartoon was presented for six seconds on a computer screen, along with two buttons at the bottom of the screen (“not understood”, “understood”). Participants were required to indicate via mouse click whether they had or had not understood the punch line of the cartoon and were instructed to click the respective button as soon as they had understood the punch line or were sure that they did not understand it. After presentation of each cartoon, a scale appeared for four seconds on which the participants rated via mouse click the funniness of each cartoon. The experimenter remained outside the examination room during the whole experiment; the participants were monitored through a one-way window and an intercom. The SEAS was administered in a separate session 16 to 24 weeks prior to the humor experiment, in order to reduce common situation variance in the self-report data.

2.5 Data analysis

Data from “not understood” PUN, SEM, and TOM cartoons were excluded from further analysis. On average, $M = 21.8$ ($SD = 2.3$), $M = 22.5$ ($SD = 1.8$), $M = 22.7$ ($SD = 2.3$) trials were valid for PUN, SEM, TOM, respectively. Data of INC pictures were only used if participants indicated that they had not detected a punch line ($M = 17.0$, $SD = 4.4$). For each type of cartoon, the amusement ratings and the response latencies to the amusement and the comprehension ratings were averaged

across all items of all blocks. Residualized scores were calculated, in order to control for general individual differences in response tendencies and response speed. This was done by conducting linear regressions using the scores of the control pictures to predict those of the cartoons (see Samson et al. 2012). The use of residualized scores ensured that the analyzed residual variability was specific to the participants' evaluation of the experience of humor, as opposed to the evaluation of any pictures or recognition of any incongruence. Consequently, results can be interpreted more unequivocally. As there was only very little variance in the answers to the comprehension questions (the great majority of the punch lines were understood), they were not further analyzed.

To evaluate whether individual differences in emotion perception and emotion regulation may predict the participants' responses to humor, hierarchical multiple regression analyses were performed, with the amusement rating or the response latency to the amusement or the comprehension rating as the dependent variable. In Step 1, sex, depression, and effort were entered. The scores of the two SEAS scales or the two MSCEIT scales were entered in Step 2. ΔR^2 indicates the amount of variance emotion perception and regulation could explain independently of variance that might be explained by sex, depression, or effort.

3 Results

3.1 Typical emotion perception and regulation behavior

Emotion perception, but not emotion regulation, predicted how funny PUN, SEM and TOM cartoons were perceived (hypothesis 1). Higher scores in SEAS perception were associated with higher amusement ratings (PUN $F_{change}(2,48) = 4.2$, $p < .05$; perception $\beta = .35$, $p < .01$, regulation $\beta = .0$, ns.; $\Delta R^2 = .12$; SEM $F_{change}(2,48) = 2.4$, $p < .10$; perception $\beta = .29$, $p < .05$, regulation $\beta = .01$, ns.; $\Delta R^2 = .08$; TOM $F_{change}(2,48) = 4.1$, $p < .05$; perception $\beta = .34$, $p < .05$, regulation $\beta = .04$, ns.; $\Delta R^2 = .12$) (Table 2). Women rated PUN ($\beta = .30$, $p < .05$) and TOM ($\beta = .38$, $p < .05$) cartoons as more funny than men (SEM: $\beta = .18$, ns.). Greater effort predicted higher funniness of PUN cartoons ($\beta = .29$, $p < .05$; SEM $\beta = .21$, ns.; TOM $\beta = .20$, ns.).

Individual differences in the response latencies to the comprehension ratings were not explained by SEAS perception or regulation (hypothesis 1) (PUN $F_{change}(2,48) = 1.5$, ns.; SEM $F_{change}(2,48) = .7$, ns.; TOM $F_{change}(2,48) = .8$, ns.).

Emotion regulation, but not emotion perception, was a significant predictor of the response latencies to the amusement ratings (hypothesis 2). This only held

for TOM cartoons. Participants with higher scores on emotion regulation took less time to respond to the amusement ratings (TOM $F_{change}(2,48) = 3.1, p = .05$; perception $\beta = -.08, ns.$, regulation $\beta = -.34, p < .05$; $\Delta R^2 = .11$; PUN $F_{change}(2,48) = .8, ns.$; SEM $F_{change}(2,48) = .4, ns.$) (Table 2). The contributions of sex, effort, and depression were all not significant in these analyses.

The correlation between SEAS perception and SEAS regulation was $r = .27$ ($p = .05$).

Table 2: Prediction of emotional responses to cartoons by individual differences in typical emotion perception and emotion regulation behavior

| | Emotion Perception | | Emotion Regulation | |
|--|--------------------|--------|--------------------|--------|
| | β | sr^2 | β | sr^2 |
| PUN | | | | |
| Amusement Ratings | .35** | .11* | .00 | .00 |
| Response Latencies (Amusement ratings) | -.17 | .03 | -.02 | .00 |
| SEM | | | | |
| Amusement Ratings | .29* | .08* | .01 | .00 |
| Response Latencies (Amusement ratings) | -.05 | .00 | -.11 | .01 |
| TOM | | | | |
| Amusement Ratings | .34* | .10* | .04 | .04 |
| Response Latencies (Amusement ratings) | -.08 | .00 | -.34* | .08* |

Note. β standardized regression coefficient, sr^2 squared semipartial correlation (unique explained variance); * $p < .05$, ** $p < .01$. PUN visual puns, SEM semantic cartoons, TOM theory of mind cartoons. Controlling for sex, depression and effort. None of the response latencies to the comprehensibility ratings were predicted by emotion perception or regulation.

3.2 Emotion perception and regulation ability

The MSCEIT scales did not predict any of the behavioral variables in the humor paradigm: Amusement rating PUN $F_{change}(2,48) = .3, ns.$; SEM $F_{change}(2,48) = .4, ns.$; TOM $F_{change}(2,48) = 2.9, ns.$; latency (amusement) PUN $F_{change}(2,48) = .1, ns.$; SEM $F_{change}(2,48) = .6, ns.$; TOM $F_{change}(2,48) = .2, ns.$; latency (comprehension) PUN $F_{change}(2,48) = 1.3, ns.$; SEM $F_{change}(2,48) = .9, ns.$; TOM $F_{change}(2,48) = 1.8, ns.$ (hypothesis 3). The correlation between the two MSCEIT scales was $r = .44$ ($p < .005$).

SEAS and MSCEIT scales were not correlated (perception $r = .10, ns.$; regulation $r = .10, ns.$). Intercorrelations between the dependent variables (residualized

Table 3: Mean amusement ratings (from 1 to 6) and response latencies (in seconds) to the amusement and the comprehension ratings

| | PUN | SEM | TOM |
|--|-----------|-----------|-----------|
| Amusement (1–6) | 3.5 (0.8) | 3.7 (0.6) | 3.9 (0.7) |
| Response Latencies Amusement (sec) | 1.1 (0.3) | 1.2 (0.3) | 1.2 (0.3) |
| Response Latencies Comprehension (sec) | 3.0 (0.5) | 3.4 (0.5) | 3.5 (0.5) |

Note. PUN visual puns; SEM semantic cartoons; TOM Theory of Mind cartoons. Standard deviations are given in parentheses.

scores, averaged across types of cartoons) were: amusement and latency (comprehension) $r = -.26$, ns.; amusement and latency (amusement) $r = -.12$, ns; latency (comprehension) and latency (amusement) $r = .39$, $p < .005$. One-way repeated measures ANOVAs showed that PUN cartoons were rated less funny compared to TOM and SEM cartoons ($F(2,106) = 24.1$, $p < .001$, $\eta_p^2 = .31$) and produced faster response latencies to the comprehension ratings ($F(2,106) = 109.6$, $p < .001$, $\eta_p^2 = .67$) and the amusement ratings ($F(2,106) = 5.7$, $p < .01$, $\eta_p^2 = .10$) (Table 3). The punch line was more often undetected in PUN cartoons ($M = 2.2$, $SD = 2.3$) than in SEM ($M = 1.5$, $SD = 1.8$) and TOM ($M = 1.3$, $SD = 2.3$) cartoons ($F(2,106) = 6.8$, $p < .01$, $\eta_p^2 = .11$). No participant reached the time allotment for the comprehension rating ($Min = 1.7s$, $Max = 4.4s$) or the amusement rating ($Min = 0.7s$, $Max = 2.5s$).

4 Discussion

The findings of the present study indicate that an individual's typical emotion perception and emotion regulation behavior in everyday life is relevant to positive emotional responsiveness, assessed in an experimental paradigm in which the participants were exposed to humor. The measures of typical emotion perception and regulation were obtained several weeks before the experimental paradigm; that is, they predicted the responses in the humor experiment. Moreover, the responses to the humorous stimuli, particularly the response latencies, were behavioral in nature, further precluding concerns about a possible influence of biases in self-reports.

Higher scores on effective emotion perception in everyday life were associated with greater humor responsiveness, as indicated by higher amusement ratings in response to the humorous cartoons. This effect was not only observed in response to cartoons requiring social reasoning to understand the humor: similar effects

were observed for all types of humor (hypothesis 1). This supports the assumption that typical emotion perception as assessed by the applied self-report instrument may relate to a more global susceptibility to social-emotional information that is based on primarily automatic, emotional processes rather than social cognitive processes (Papousek et al. 2008, 2011).

The participants' responses to the humor were also affected by effective emotion regulation, with higher scores on typical emotion regulation in everyday life being associated with shorter response latencies to the amusement ratings, particularly for TOM cartoons (hypothesis 2). This may be attributed to the fact that most jokes also evoke negative emotions such as embarrassment or pity as well as amusement (Moran 1996). Effective (down)-regulation of these emotions may facilitate the perception and judgment of one's level of positive affect. This interpretation is in line with other evidence that suggested that higher levels of negative affect while viewing the cartoons slow down the responses to the amusement ratings (Papousek et al. 2013; Samson et al. 2012). Since in TOM cartoons it is more important to mentalize with the protagonists in order to understand the humor than it is in SEM and PUN cartoons, the likelihood that the viewers will align themselves with the victim in the cartoons, and so experience negative aspects is highest (see Samson et al. 2012).

The habitual emotion perception and regulation behavior of an individual did only affect the participants' emotional, not their cognitive, responses to the humor. No relationship with the ease of detecting the cartoons' punch lines was observed (hypothesis 1). Thus, both emotion perception and emotion regulation were only related to the emotional response, whereas the cognitive comprehension of the incongruities in the cartoons and their resolution was not affected. This may be related to the observation that depressive symptoms do not necessarily affect an individual's sense of humor, such as the ability to detect punch lines (Falkenberg et al. 2011).

As potential effects of depression were statistically controlled, the findings cannot be attributed to the association of poor emotion perception and regulation with negative affectivity as a trait (Chida and Hamer 2008; Kohler et al. 2011). The general insignificance of the level of depression in predicting the responses to the humorous stimuli may be contrary to expectations. However, the level of depression in the healthy sample of the present study was generally low.

In contrast to individual differences in effective emotion perception and regulation in everyday life, which showed meaningful associations with humor responsiveness, no relationships were found for the more cognitive-based ability measures of emotion perception and regulation (hypothesis 3). This may be explained by the structure of the applied instrument with its consensus-based scoring, defining the correct response as what the group agrees upon (Zeidner and

Olnick-Shemesh 2010). According to critics, consensus scoring may rather assess convergence to popular opinion than emotional skills *per se* (Freudenthaler & Papousek 2013). The problem is most obvious with difficult items for which perhaps only the 10 or 20 percent most able individuals pick the correct response option (Matthews et al. 2004). Even more importantly, the performance on this test may predominantly reflect declarative knowledge about emotions or what individuals would theoretically be capable of doing, but may not capture how much of an individual's potential translates into practice, and abstract knowledge about emotions may not be sufficient for showing adaptive behavior in everyday life (Freudenthaler et al. 2008; Mikolajczak et al. 2009). The failure of the ability-based emotion perception and emotion regulation scales to predict positive emotional responsiveness is in line with mostly weak or non-significant associations to common indicators of personal adaptation and well-being reported in the literature (for review see Zeidner and Olnick-Shemesh 2010). On the other hand, there is broad evidence of clear relationships between other (also ability-based but more complex) approaches such as experimental or physiological indicators of emotional perception and regulation with, for instance, the susceptibility to affective disturbances (Chida and Hamer 2008; Kohler et al. 2011). This indicates that ability-based approaches (other than the MSCEIT) may also yield valid indicators of individual differences in emotion perception and regulation typically shown in everyday life.

A limitation of the present study is that explanations of why the participants found the cartoon funny after viewing each one were not obtained. Such explanations would provide evidence of the validity of the judgments of having understood the jokes. However, previous research confirmed that participants were able to give a reasonable explanation as to why they found a cartoon funny in virtually all cases and, thus, the responses of having understood the jokes can be considered valid (e.g., Samson 2012; Samson and Hegenloh 2010). Moreover, having used the same humor paradigm as in the present experiment, a recent study demonstrated a clear cardiovascular response in the immediate context of the participants' response of having understood the punch line, which could be interpreted as the effect of the sudden insight when a punch line was detected (Lackner et al. 2013). This finding also adds to the validity of the responses in the applied paradigm.

A further limitation of the present study may be that the typical functionality of an individual's emotion perception and regulation behavior was assessed by self-report. However, it has been suggested that self-reports may be the best way to measure behavioral tendencies referring to typical emotion-related behavior in everyday life (Petrides and Furnham 2001). Nevertheless, replication with behavioral or physiological indicators of an individual's emotion perception and regu-

lation behavior would be desirable. In the present study, only depression was controlled. Future studies may examine the potential roles of other psychopathology variables that are characterized by deficits in emotion-related skills as well as specific difficulties in understanding humor such as social anxiety and the autism spectrum (e.g., Samson et al. 2012; Weiss et al. 2013). Finally, the number of regression analyses in the present study is at the limits of what can be tolerated from a statistical point of view. The restricted size of the sample, due to the intricate experimental design of the study, precluded alternative statistical approaches. Replication of the findings will be important for determination of the robustness of the observed effects.

Taken together, the self-reported functionality of the emotion perception and regulation behavior in everyday life predicted an individual's affective responses to humorous stimuli in a behavioral experiment several weeks later. Individual differences in emotion perception and regulation may therefore be relevant to the propensity to positive emotional responsiveness – particularly in situations involving humor – which may be one adaptive function explaining the contribution of effective emotion perception and regulation to emotional robustness and mental health (e.g., Chida and Hamer 2008; Kohler et al. 2011). Furthermore, by hampering positive emotional responsiveness, emotion perception and regulation deficits may contribute to accompanying affective symptoms in psychopathologies that are associated with such deficits.

References

- Adolphs, Ralph. 2002. Recognizing emotion from facial expressions: Psychological and neurological mechanisms. *Behavioral and Cognitive Neuroscience Reviews* 1(1). 21–61.
- Alden, Lynn E. & Charles T. Taylor. 2004. Interpersonal processes in social phobia. *Clinical Psychology Review* 24(7). 857–882.
- Ashwin, Chris, Emma Chapman, Livia Colle & Simon Baron-Cohen. 2006. Impaired recognition of negative basic emotions in autism: A test of the amygdala theory. *Social Neuroscience* 1(3–4). 349–363.
- Catalino, Lahnna & Barbara L. Fredrickson. 2011. A Tuesday in the life of a flourisher: The role of positive emotional reactivity in optimal mental health. *Emotion* 11(4). 938–950.
- Chida, Yoichi & Mark Hamer. 2008. Chronic psychosocial factors and acute physiological responses to laboratory-induced stress in healthy populations: A quantitative review of 30 years of investigations. *Psychological Bulletin* 134(6). 829–885.
- Falkenberg, Irina, Jana Jarmuzek, Mathias Bartels & Barbara Wild. 2011. Do depressed patients lose their sense of humor? *Psychopathology* 44(2). 98–105.
- Freudenthaler, H. Harald & Aljoscha C. Neubauer. 2005. Emotional Intelligence: The convergent and discriminant validities of intra- and interpersonal emotional abilities. *Personality and Individual Differences* 39(3). 569–579.

- Freudenthaler, H. Harald, Aljoscha C. Neubauer & Ursula Haller. 2008. Emotional intelligence: Instruction effects and sex differences in emotional management abilities. *Journal of Individual Differences* 29(2). 105–115.
- Freudenthaler, H. Harald & Ilona Papousek. 2013. The typical and maximum performance of intra- and interpersonal emotion management. In Changiz Mohiyeddini (ed.), *Emotional relationships: Types, challenges, and physical/mental health impacts* (pp. 125–160). Hauppauge, NY: Nova Science Publishers.
- Frith, Chris D. & Uta Frith. 2006. The neural basis of mentalizing. *Neuron* 50(4). 531–534.
- Gross, James J. 1998. The emerging field of emotion self-regulation: An integrative review. *Review of General Psychology* 2(3). 271–299.
- Hautzinger, Martin & Maja Bailer. 1993. *Allgemeine depressions skala* [General depression scale]. Weinheim. Beltz.
- Jahshan, Carol, Jonathan K. Wynn & Michael F. Green. 2013. Relationship between auditory processing and affective prosody in schizophrenia. *Schizophrenia Research* 143(2–3). 348–353.
- Kappas, Arvid. 2011. Emotion and regulation are one. *Emotion Review* 3(1). 17–25.
- Kohler, Christian G., Lauren J. Hoffman, Lucas B. Eastman, Kristin Healey & Paul J. Moberg. 2011. Facial emotion perception in depression and bipolar disorder: A quantitative review. *Psychiatry Research* 188(3). 303–309.
- Kohler, Christian G., Jeffrey B. Walker, Elizabeth A. Martin, Kristin M. Healey & Paul J. Moberg. 2010. Facial emotion perception in schizophrenia: A meta-analytic review. *Schizophrenia Bulletin* 36(5). 1009–1019.
- Kohn, Nils, Thilo Kellermann, Ruben C. Gur, Frank Schneider & Ute Habel. 2011. Gender differences in the neural correlates of humor processing: Implications for different processing modes. *Neuropsychologia* 49(5). 888–897.
- Lackner, Helmut K., Elisabeth M. Weiss, Günter Schultze, Helmut Hinghofer-Szalkay, Andrea C. Samson & Ilona Papousek. 2013. I got it! Transient cardiovascular response to the perception of humor. *Biological Psychology* 93(1). 33–40.
- Matthews, Gerald, Richard D. Roberts & Moshe Zeidner. 2004. Seven myths about emotional intelligence. *Psychological Inquiry* 15(3). 179–196.
- Mayer, John D. & Peter Salovey. 1997. What is emotional intelligence? In Peter Salovey & David J. Sluyter (eds.), *Emotional development and emotional intelligence*, 3–31. New York: Basic Books.
- Mikolajczak, Moira, Konstantinos V. Petrides, Nathalie Coumans & Oliver Lumiet. 2009. The moderating effect of trait emotional intelligence on mood deterioration following laboratory-induced stress. *International Journal of Clinical and Health Psychology* 9(3). 455–477.
- Moran, Carmen C. 1996. Short-term mood change, perceived funniness, and the effect of humor stimuli. *Behavioral Medicine* 22(1). 32–38.
- Ong, Anthony D., C. S. Bergeman, Toni L. Bisconti & Kimberly A. Wallace. 2006. Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality and Social Psychology* 91(4). 730–749.
- Papousek, Ilona, Eva M. Reiser, Elisabeth M. Weiss, Andreas Fink, Andrea C. Samson, Helmut K. Lackner & Günter Schultze. 2013. State-dependent changes of prefrontal-posterior coupling in the context of affective processing: Susceptibility to humor. *Cognitive, Affective, and Behavioral Neuroscience* 13(2). 252–261.

- Papousek, Ilona, H. Harald Freudenthaler & Günter Schuler. 2008. The interplay of perceiving and regulating emotions in becoming infected with positive and negative moods. *Personality and Individual Differences* 45(6). 463–467.
- Papousek, Ilona, H. Harald Freudenthaler & Günter Schuler. 2011. Typical performance measures of emotion regulation and emotion perception and frontal EEG asymmetry in an emotional contagion paradigm. *Personality and Individual Differences* 51(8). 1018–1022.
- Pérez, Juan C., Konstantinos V. Petrides & Adrian Furnham. 2005. Measuring trait emotional intelligence. In Ralf Schulze and Richard D. Roberts (eds.), *International handbook of emotional intelligence*, 181–201. Cambridge, MA: Hogrefe and Huber.
- Petrides, Konstantinos V. & Adrian Furnham. 2001. Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality* 15(6). 425–448.
- Phillips, Mary L., Cecile D. Ladouceur & Wayne C. Drevets. 2008. A neural model of voluntary and automatic emotion regulation: Implications for understanding the pathophysiology and neurodevelopment of bipolar disorder. *Molecular Psychiatry* 13(9). 833–857.
- Rottenberg, Jonathan, Karen L. Kasch, James J. Gross & Ian H. Gotlib. 2002. Sadness and amusement reactivity differentially predict concurrent and prospective functioning in major depressive disorder. *Emotion* 2(2). 135–146.
- Ruch, Willibald. 2007. *The sense of humor: Explorations of a personality characteristic*. Berlin: Mouton de Gruyter.
- Samson, Andrea C. 2012. The influence of empathizing and systemizing on humor processing: Theory of mind and humor. *Humor: International Journal of Humor Research* 25(1). 75–98.
- Samson, Andrea C. & Michael Hegenloh. 2010. Stimulus characteristics affect humor processing in individuals with Asperger Syndrome. *Journal of Autism and Developmental Disorders* 40(4). 438–447.
- Samson, Andrea C., Helmut K. Lackner, Elisabeth M. Weiss & Ilona Papousek. 2012. Perception of other people's mental states affects humor in social anxiety. *Journal of Behavior Therapy and Experimental Psychiatry* 43(1). 625–631.
- Samson, Andrea C., Stefan Zysset & Oswald Huber. 2008. Cognitive humor processing: Different logical mechanisms in non-verbal cartoons – an fMRI study. *Social Neuroscience* 3(2). 125–140.
- Steinmayr, Ricarda, Astrid Schütz, Janine Hertel & Michela Schröder-Abé. 2011. *Mayer-Salovey-Caruso test zur emotionalen intelligenz* [Mayer-Salovey-Caruso emotional intelligence test]. Bern: Hans Huber.
- Volokhov, Rachael N. & Heath A. Demaree. 2010. Spontaneous emotion regulation to positive and negative stimuli. *Brain and Cognition* 73(1). 1–6.
- Weiss, Elisabeth M., Bianca C. Gschaidbauer, Andrea C. Samson, Krista Steinbäcker, Andreas Fink & Ilona Papousek. 2013. From Ice Age to Madagascar: Appreciation of slapstick humor in children with Asperger's syndrome. *Humor: International Journal of Humor Research* 26(3). 423–441.
- Wood, Alex M., Peter J. Taylor & Stephen Joseph. 2010. Does the CES-D measure a continuum from depression to happiness? Comparing substantive and artifactual models. *Psychiatry Research* 177(1). 120–123.
- Zeidner, Moshe & Dorit Olnick-Shemesh. 2010. Emotional intelligence and subjective well-being revisited. *Personality and Individual Differences* 48(4). 431–435.

Bionotes

Ilona Papousek is a professor at the Biological Psychology Unit of the Department of Psychology, University of Graz, Austria. Her main research interests are in the field of affective neuroscience. Her specializations include humor related issues and affective flexibility.

Günter Schulter was head of the Biological Psychology Unit of the Department of Psychology, University of Graz, Austria, before he retired in 2009. His main research interests focus on the biological foundations of personality and psychopathology.

Helmut K. Lackner is a senior lecturer at the Institute of Physiology at the Medical University of Graz, Austria. His research is concerned with cardiovascular psychophysiology. His specializations include the physiological responses to the perception of humor.

Andrea Samson completed her Ph.D. in Psychology (University of Fribourg, Switzerland) on cognitive humor processing, Theory of Mind and its neuronal correlates. She is currently a postdoctoral researcher at the Department of Psychology, Stanford University. Her research interests focus on neural correlates of humor, emotion regulation, Autism, and mixed emotions.

H. Harald Freudenthaler is a professor at the Psychological Assessment and Research Methods Unit of the Department of Psychology, University of Graz, Austria. His main research interests focus on emotional skills and competencies.