Emotion recognition ability as a predictor of wellbeing during the Covid-19 pandemic

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Abstract

This study examined emotion recognition ability (ERA) as a predictor of positive and negative affect in two Australian and one German-speaking samples (total $N = 469$) during the first two weeks of major public life restrictions in the Covid-19 pandemic in March/ April 2020. Individuals with higher ERA did not report more positive affect, but they felt less burdened and reported less negative affect. This association was fully mediated by lower Covid-19-related media consumption and less negative affect after reading an eyewitness report from an Italian city with a high Covid-19 death toll. However, higher ERA was also related to arguing more with close others. For low-to-medium ERA, an adaptive cognitive emotion regulation style predicted lower media consumption and for medium-to-high ERA, a maladaptive regulation style marginally increased the perceived likelihood of experiencing a similar situation as in Italy, suggesting that regulation style may moderate the ERA – affect relationship.

Keywords: Covid-19, emotion recognition, wellbeing, emotion regulation, positive and negative affect, emotional intelligence.

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The nonverbal communication of emotions is a crucial element in everyday social interactions (Knapp et al., 2013; McArthur & Baron, 1983). Feelings that are expressed through the face, voice, or body contain information that helps us navigate social encounters and relationships with others (Hall & Schmid Mast, 2018). Being accurate at perceiving and labeling nonverbal emotions cues is therefore generally considered an adaptive interpersonal skill – a skill with important individual differences (e.g., Hall et al., 2009).

It has long been established that higher emotion recognition ability (ERA) relates to better interpersonal outcomes in work, educational, or medical settings and in peer and romantic relationships (for reviews, see Hall & Schmid Mast, 2018; Hall et al., 2009). For example, higher ERA has been linked to being perceived as more cooperative in negotiations (Schlegel et al., 2018), to higher interpersonal skill ratings of medical students (Hall et al., 2014), and higher friendship quality among primary school children (Wang et al., 2019). In line with these findings, ERA has been conceptualized as a basic component of ability emotional intelligence (EI; e.g., Mayer & Salovey, 1997), causally preceding the more complex abilities of emotion understanding (defined as "expertise in the meaning of emotions", Castro et al., 2016) and the ability to manage one's own and others' emotions (Joseph & Newman, 2010).

Given the vast literature on ERA and interpersonal outcomes, it is surprising that relatively few studies have investigated whether ERA is also beneficial on an intrapersonal level, that is, with respect to a person's own subjective wellbeing. Subjective wellbeing (SWB) is a multifaceted construct often defined in terms of three components: The cognitive evaluation of one's achievements within and across life domains (life satisfaction), the overall level of positive affect, and the overall level of negative affect (Pavot & Diener, 2013). The latter two components determine the overall hedonic level of a person but tend to be experienced relatively independently (Pavot & Diener, 2013).

While numerous studies have found a moderate positive association between people's self-rated EI, SWB, and health (see meta-analyses by Sánchez-Álvarez et al., 2016; Martins et al., 2010), only few SWB studies measured EI with performance-based tests. These studies found either low positive (Sánchez-Álvarez et al., 2016; Martins et al., 2010) or no significant associations (Zeidner et al., 2016), but did not distinguish between different EI facets.

Direct evidence regarding the ERA – SWB link is limited and inconsistent, and theory is lacking (Palese & Schmidt Mast, 2020). On the one hand, emotion recognition deficits have been observed in various mental disorders (e.g., Kohler et al., 2010) and ERA showed a small negative association with depressive symptoms in non-clinical populations (Hall et al., 2009). On the other hand, one study suggested the opposite pattern, although it was based on self-reported ERA (Ciarrochi et al., 2002). An analysis of 18 effect sizes from non-clinical samples yielded no significant correlation (Schlegel, 2020). One reason for the absence of an overall effect could be that personal experiences or life circumstances moderate the ERA – SWB link (Schlegel, 2020).

The goal of the current study was to shed further light on the ERA – SWB relationship using the context of the Covid-19 pandemic. Based on the assumption that ERA cascades into more complex EI facets such as emotion management in oneself and others, and based on the positive manifold among emotional abilities (Elfenbein & MacCann, 2017; Joseph & Newman, 2010), the following section proposes several pathways that might link ERA to SWB.

Potential pathways between ERA and higher SWB

Individuals with high ERA are not only more accurate at interpreting others' nonverbal signals, but also more attuned to and perceptive of emotional information in their surrounding (Elfenbein et al., 2017; Bechtoldt et al., 2011). As a consequence, they are faced with a higher amount of emotional information that needs to be processed and likely affects their own emotions (Künecke et al., 2014). It is thus conceivable that in order to maintain a

high level of wellbeing high ERA individuals have developed strategies to regulate their exposure to (negative) emotional information.

A first possible pathway might involve actively choosing the type and amount of emotions that high ERA individuals expose themselves to, using situation selection or modification and attentional deployment (Gross & John, 2003). In particular, high ERA individuals might choose to limit their exposure to negative emotions by avoiding situations in which these are likely to be observed and by actively seeking out positive situations (Todd et al., 2012). High ERA individuals might for example spend less time following media coverage that focusses other people's suffering – a practice recommended by the World Health Organization (WHO, 2020) to minimize stress and anxiety.

Relatedly, high ERA individuals may prioritize the perception of emotions that are directly relevant to them (such as their partner's emotions) over less personally relevant emotions (such as those expressed by a stranger on the news). Therefore, they might be less emotionally affected by news broadcasts related to the Covid-19 pandemic. A second consequence might be that high ERA individuals feel less personally threatened by the pandemic if they devote less attention to negative emotions in their more distant surrounding.

While the first pathway described above refers to a person's *intrapersonal* functioning, the second possible pathway is based on the well-established link between ERA and better *interpersonal* relationships (Hall et al., 2009). Being accurate at understanding people's nonverbal signals enables flexible reactions to other' intentions and preferences (Carrard et al., 2018), thus making interactions smoother and more successful (Palese & Schmid Mast, 2020). As a consequence, high ERA individuals may receive more social support and face less social rejection from others (Hall et al., 2009). They might also have better resources for setting adaptive social goals for periods of lockdown, such as using technology to communicate more often with friends and family or planning fun social activities within their household or remotely. This could relate back to the intrapersonal pathway in that it helps the

creation and selection of situations in which more positive and more personally relevant emotions can be perceived.

Besides these theoretical pathways linking ERA to positive SWB outcomes, it is also conceivable that ERA may be negatively related to SWS. In a laboratory study by Bechtoldt and Schneider (2016), high ERA individuals showed higher cortisol reactivity and slower recovery when completing a stressful task. Further, Elfenbein and colleagues (2017) found that although high ERA individuals were more attuned to others' emotions, they were not better at actively "tuning out" of emotional information in an experimental setting. It thus seems possible that during stressful situations or exposure to others' distress (such as during a global crisis), ERA might become a burden or a "curse" leading to lower SWB (Antonakis et al., 2009). However, empirical evidence in this direction is lacking and results from laboratory studies might not necessarily generalize to real life, where people have more choice over which events and emotions they experience.

Cognitive emotion regulation as a potential moderator of the ERA – SWB link

One pertinent variable to modulate the ERA – SWB relationship may be cognitive emotion regulation, which refers to a set of cognitive strategies to change the meaning of a felt (negative) emotion (e.g., Gross, 2013; Garnefski & Kraaij, 2006). They come into play once a situation can no longer be modified and one's attention cannot be deployed (Gross & John, 2003). Cognitive emotion regulation encompasses adaptive strategies such as acceptance, reappraisal, refocusing on positive aspects of the situation, or focusing on finding a solution for a problem, and maladaptive strategies such as self-blame, rumination, and catastrophizing (Garnefski & Kraaij, 2006). These strategies are typically measured with self-report questionnaires (e.g., Garnefski & Kraaij, 2006) and reflect stable traits which are distinct from concrete behaviors intended to regulate one's exposure or attention to situations that might cause a negative emotion. The frequent use of adaptive strategies correlates with better psychological health and wellbeing, whereas the frequent use of maladaptive strategies

negatively correlates with wellbeing and positively with depression (e.g., Jermann et al., 2006; Gross, 2013). However, adaptive and maladaptive strategies are largely independent, and it is possible to score high or low on both styles (Dixon-Gordon et al., 2015).

Although emotion regulation is, like ERA, part of ability EI (e.g., Mayer & Salovey, 1997), cognitive emotion regulation is mainly studied outside the EI field. Cognitive regulation is measured with self-report questionnaires that assess the frequency of habitually using each of the strategies (e.g., Garnefski & Kraaij, 2006), whereas in ability EI, performance-based tests are used to assess a person's knowledge about the efficiency of different strategies (e.g., Mayer et al., 2003). Cognitive emotion regulation thus shows only small positive or non-significant associations with ability EI and ERA in particular (e.g., Schlegel & Mortillaro, 2018; Rossen et al., 2008).

It is plausible to assume that ERA and cognitive emotion regulation interact in predicting SWB, especially in stressful or negative situations, such that a more adaptive and less maladaptive style amplifies the positive effects of high ERA or buffers the negative effects of low ERA on SWB. High ERA individuals might be more emotionally affected by the (negative) emotions they perceive in others and may thus have to regulate their feelings more often. As such, high ERA individuals might particularly benefit from a frequent use of adaptive and an infrequent use of maladaptive strategies. On the other hand, lower ERA individuals may experience more negative feelings resulting from conflict, misunderstandings, or ambiguity in their interpersonal relationships which need to be regulated. Being good at regulating emotions may help buffer potentially negative effects on SWS for these individuals, whereas being bad at emotion regulation might enhance the negative effects. To our knowledge, no study so far has investigated interactions between ERA and emotion regulation when predicting SWB or other outcomes.

The present study

The Covid-19 pandemic has been affecting the lives of most individuals and the economic situation of most countries around the globe (Holmes et al., 2020). Many countries implemented temporary public life restrictions or lockdowns to slow down the spread of the infection. Given that the ERA – SWB link might depend on recent experiences or events (Schlegel, 2020), periods of severe restrictions or lockdowns represent a useful study setting because they impact on the daily lives of all people within a given region, presenting them with personal, social, professional, and financial challenges (Altena et al., 2020; Brooks et al., 2020; Holmes et al., 2020). Accordingly, in a large-scale German study people reported lower positive affect and higher negative affect in the period of the first lockdown in March to May 2020 as compared to December 2019 (Zacher & Rudolph, 2020). We can thus assume that people assessed during lockdown are more homogeneous in terms of experienced stressors than during "normal" times.

In the present study, we investigated the relationship of ERA and cognitive emotion regulation with SWB in one sample recruited in Germany and Switzerland and two samples recruited in Australia in March and April, 2020. All samples completed the study within the first two weeks after the governments had first closed most shops and restaurants and banned gatherings of more than two or five people, respectively.

Besides standard tests of ERA and cognitive emotion regulation, participants completed a range of SWB measures to capture positive affect, negative affect, and feelings of being burdened over the last seven days, which were combined into two main outcome variables (wellbeing/ positive affect and burden/ negative affect; see results). We expected that high ERA would predict more wellbeing/ positive affect and less burden/ negative affect, which we tested using multiple regressions.

Further, six variables related to the potential pathways discussed above were measured: Participants read a news article on the very high death toll of the pandemic in Northern Italy, and subsequently rated their negative affect and the perceived likelihood of a

similar situation happening in their own country. Participants also reported, for the last seven days, the average time they spent daily on Covid-19-related media coverage, the frequency of remote communication and of arguing with close others, and the extent to which they set positive goals for the lockdown period. In a first step, ERA and emotion regulation were assessed as predictors for each of these variables using multiple regressions. In the second step, these variables were assessed as mediators of the ERA – SWB link. Specifically, we expected that the effects of ERA on SWB would be mediated by (a) less time following Covid-19-related media coverage, indicating a strategy to limit exposure to negative emotional information; (b) less negative affect after reading the Covid-19 article about Italy and lower perceived likelihood to experience a situation like in Italy due to a stronger focus on close others' emotions as compared to emotions in one's more distant surrounding; and (c) a higher frequency of remote communication and lower frequency or arguing with close others and more adaptive goals for the lockdown period indicating better interpersonal functioning and more social support. Finally, we examined whether better emotion regulation amplified the positive effects of high ERA or buffered the negative effects of low ERA on SWB.

Method

Sample, procedure, and measures

The study comprised three samples with a total *N* of 469 that were analyzed together. Sample 1 consisted of 168 participants from Germany and 5 participants from Switzerland (age mean 33.0 years, *SD* = 7.8; 46% female; all native German speakers) who completed the survey on March 27, 2020, one to two weeks after schools, kindergartens, and non-essential shops had been closed. Citizens had not been allowed to gather in groups of more than two people for five days in Germany and in groups of more than five people for seven days in Switzerland. Sample 2 consisted of 165 native English-speaking participants residing in Australia (age mean 35.6 years, SD = 8.9; 47% female) who completed the survey on March

28, 2020. By that time, restaurants had been closed for five days (longer in some States and Territories) and a ban for gatherings of more than two people had just been announced. Sample 3 was recruited in Australia on April 9, 2020 (mean age 35.3, SD = 9.3; 50% female) with all restrictions still in place. All participants were recruited online through Prolific (www.prolific.co) and were paid £4.50. Participants from sample 2 were excluded from participating again on April 9. Additional information on the three samples is provided in Supplementary Table S1.

The survey was administered on Qualtrics (Qualtrics, Provo, UT) and the study was approved by the Institutional Review Board of the authors' university. The measures used in the study were the same for all three samples (presented either in German or in English and always in the same order) and are described in Table 1 along with data exclusions. Before completing these measures, participants provided informed consent and demographic information.

Table 1

Description of all Study Measures and Data Exclusions

Measures	Descriptions and data exclusions
Measures of stable traits	
Short version of the Geneva Emotion Recognition Test (GERT-S; Schlegel & Scherer, 2016)	Participants watched 42 short video clips in which 10 actors express 14 emotions (pride, amusement, joy, pleasure, relief, interest, anger, irritation, fear, anxiety, disgust, despair, sadness, surprise) while uttering a sentence without meaning. After each clip, participants chose which of the 14 emotions best described the emotion the actor intended to express. Responses were scored as correct or incorrect, yielding a total average GERT-S score. GERT-S scores of 6 participants who reported technical problems when watching the clips were excluded from the analysis.
Short version of the Cognitive Emotion Regulation Questionnaire (CERQ-short; Garnefski & Kraaij, 2006; Loch, Hiller, & Westhöft, 2011)	Participants rated the frequency of using five adaptive emotion regulation styles (acceptance, putting into perspective, positive reappraisal, positive refocusing, problem solving) and four maladaptive emotion regulation styles (rumination, catastrophizing, self-blame, other-blame) when experiencing negative or stressful situations on a scale of 1 ((almost) never) to 5 ((almost) always). Each strategy was measured with 2 items. Responses were averaged for all adaptive strategies (CERQ adaptive score) and maladaptive strategies (CERQ maladaptive score).
Difficulties in Emotion Regulation Scale (DERS-18; Victor & Klonsky, 2016;	Two subscales (goals and impulsivity) were used, each consisting of three items in which participants rated their behaviors while being upset on a scale of

Ehring, Svaldi, Tuschen-Caffier, & Berking, 2013)	1 ((almost) never) to 5 ((almost) always). The goals subscale measures difficulties to engage in goal-directed behavior and the impulsivity subscale measures difficulties in controlling one's actions.

Table 1, continued

Measures of subjective wellbeing and behaviors over the last 7 days	
Wellbeing Index of the World Health Organization (WHO-5; Topp et al., 2014; Brähler et al., 2007)	Participants rated how often they felt active, rested, in good spirits etc. on 5 items using a scale from 1 (almost never) to 6 (all of the time) for the last 7 days, yielding one total wellbeing score.
Positive and Negative Affect Schedule (PANAS; Krohne et al., 1996; Watson et al., 1988))	Participants rated the extent to which they felt 10 positive emotions (e.g., interested, excited, proud) and 10 negative emotions (e.g., distressed, sad, nervous) over the last seven days on a scale of 1 (not at all) to 5 (extremely), yielding a positive affect score and a negative affect score.
Burden scale (adapted from the Stress and Coping Inventory; Satow, 2012)	Participants rated how burdened they felt over the last 7 days by 15 different issues such as uncertainty regarding one's financial stability, work, family, or health; by one's own and others' expectations and pressure; and by general worries about their country, society, etc. Responses were provided on a scale from 1 (not at all) to 7 (very much) and formed one total score (see Supplementary Materials for the 15 items).
Adaptive goals (self-developed)	Participants rated 5 statements about the extent (during the last 7 days) to which they had set adaptive goals for the coming weeks on a scale from 1 (not at all) to 5 (very much), yielding one total score (see Supplementary Materials for the 5 items).
Time spent following Covid-19 media coverage	Participants reported how many hours per day (averaged for the last 7 days) they spent informing themselves about the current situation regarding the Covid-19 pandemic. Data of 11 participants who entered values of 17 hours or more were excluded from the analyses, as these values were considered unrealistic.
Communicating with close others (self-developed)	Participants rated how often they communicated with family and friends remotely via phone, Skype, and other media over the last 7 days on a 5-point scale (1= much less than usual, 2 = a bit less than usual, 3 = about as much as usual, 4 = a bit more than usual, 5 = much more than usual).
Arguing with close others (self-developed)	Participants rated how often they argued with close others (partner, children, parents, siblings, close friends) over the last 7 days on a 5-point scale (1= much less than usual, 2 = a bit less than usual, 3 = about as much as usual, 4 = a bit more than usual, 5 = much more than usual).
Measures of affective reactions to Covid-19 article	Participants read a 1000-word-excerpt of an article entitled "Thousands of Covid-19 victims in Italy: Lonely death" (Hornig & Stöhr, 2020). The article was published on March 21st, 2020, on the German news website www.spiegel.de . In the words of various citizens, the article described the devastation from Covid-19 in the region around Bergamo, a city in Northern Italy. The text was translated into English for the Australian samples by the first author (see Supplementary Material for the full excerpt). After reading the text, participants were instructed to summarize the article by writing at least 80 words.
Negative affect scale from the PANAS	Participants rated the extent to which they felt 10 negative emotions (e.g., distressed, sad, nervous) "right now, in this moment", on a scale of 1 (not at all) to 5 (extremely). Data of 4 participants were excluded because their written summary suggested that they did not read the article.
Perceived likelihood of situation similar to Northern Italy happening in own country	Participants rated, using a slider with 10 points ranging from 0 (very unlikely) to 10 (very likely), how likely it is, in their view, that a similar situation like in Northern Italy (as described in the article) will occur in their own country in the next weeks or months. Data of 4 participants were excluded because their written summary suggested that they did not read the article.

Note. All questionnaires are provided in the Supplementary Material.

Data analysis

Prior to hypothesis testing, composite scores for affective outcomes and for emotion regulation were created for variables with high intercorrelations (see Supplementary Tables S2 and S3). PANAS positive affect and the WHO-5 scale correlated at $r = .66$, $p < .001$, and were combined into a total wellbeing / positive affect score by calculating the mean of the two *z*-standardized values. PANAS negative affect and the burden scale correlated at $r = .61$, $p < .001$, and were combined into a total burden / negative affect score in the same way. These two facets of SWB were negatively correlated, $r = -.42$, $p < .001$. Finally, the CERQ maladaptive regulation scale and the two DERS scales (intercorrelations between $r = .44$ and $r = .55$) were combined into a total maladaptive regulation score.

In a first step, eight multiple linear regressions were computed to examine the association of ERA (as measured by the GERT-S) and emotion regulation with SWB (wellbeing/ positive affect and burden/ negative affect) and the six pathway variables as dependent variables. In each regression, age, gender, and two dummy variables for the three samples were included as control variables and GERT-S, adaptive emotion regulation (mean score of the adaptive CERQ scales), and maladaptive emotion regulation (combined maladaptive CERQ and DERS score) as well as three interaction terms (GERT-S * adaptive regulation, GERT-S * maladaptive regulation, and adaptive * maladaptive regulation) were included as independent variables. The last interaction was included because a previous study found differential associations with psychopathology for different combinations of adaptive and maladaptive strategies (Dixon-Gordon et al., 2015). For the interpretation of the interaction terms, *p*-values were Bonferroni-corrected by multiplying them by 8, given that no individual hypotheses were specified for the eight outcome or mediating variables, respectively. GERT-S, adaptive, and maladaptive regulation were *z*-standardized prior to calculating the interaction terms. Being unemployed vs. not, providing childcare from home

vs. not, working from home vs. not, and number of people living in the household were also assessed as potential control variables; see Supplementary Material and Table 3 for details.

In the second step, mediation analyses were conducted with the PROCESS (Hayes, 2017) macro while controlling for age, gender, and sample. A power analysis conducted with G*Power (Faul et al., 2007) revealed a necessary *N* of 133 participants to detect small to medium effect sizes ($f^2 = .10$) for a power of .95 and an alpha level of .05 in a multiple regression. The study was therefore well-powered. The data can be obtained upon request from the first author.

Results

Descriptive statistics as well as ANOVAs comparing the samples are provided in Table 2. The samples differed significantly with respect to positive affect, general wellbeing (WHO-5 scale), perceived likelihood of experiencing a similar situation to Northern Italy, and media consumption. Zero-order correlations between all variables are provided in Supplementary Tables S2-S5. Media consumption was related to lower SWB, supporting the assumption that extensive time spent on Covid-19-related media reports can be detrimental.

The results of the eight multiple regressions predicting SWB and the pathway variables are shown in Table 3. ERA predicted significantly lower feelings of burden/ negative affect but was unrelated to wellbeing/ positive affect. ERA also predicted less negative affect after reading the Covid-19 article. Unexpectedly, ERA did not predict adaptive goals or more frequent communication with close others. Furthermore, ERA was related to a significantly higher (instead of lower) frequency of arguing with close others, although the overall regression model did not reach significance. All eight regressions were recalculated without the five Swiss participants and all coefficients remained virtually the same.

Table 2

Means (SD) for All Measures per Subsample, Cronbach's α for the Full Sample, and Sample Comparisons per Measure.

	Sample 1 (Germany & Switzerland)	**Sample 2 (Australia, March 28)**	**Sample 3 (Australia, April 9)**	**Cronbach's α**	**ANOVA**
GERT-S	0.65(0.12)	0.60(0.11)	0.60(0.11)	0.66	F(2, 460) = 11.95***
CERQ adaptive	3.27(0.61)	3.26(0.65)	3.27(0.65)	0.80	F(2, 466) = 0.01
CERQ maladaptive	2.55(0.61)	2.75(0.61)	2.88(0.64)	0.73	F(2, 466) = 22.23***
DERS goals	2.98(1.03)	3.32(1.12)	3.24(1.08)	0.92	F(2, 466) = 5.10*
DERS impulsivity	1.92(0.89)	1.95(0.91)	1.96(1.00)	0.88	F(2, 466) = 0.13
WHO-5 (last 7 days)	4.10(1.19)	2.81(1.06)	3.08(1.14)	0.90	F(2, 466) = 63.75***
Burden scale (last 7 days)	3.59(1.08)	3.85(1.11)	3.53(1.13)	0.87	F(2, 466) = 0.09
PANAS positive (last 7 days)	2.71(0.71)	2.53(0.76)	2.54(0.77)	0.90	F(2, 466) = 4.35*
PANAS negative (last 7 days)	2.10(0.71)	2.18(0.77)	2.07(0.73)	0.88	F(2, 466) = 0.04
PANAS negative (after reading Covid-19 article)	2.11(0.67)	2.15(0.84)	1.95(0.74)	0.88	F(2, 462) = 2.57
Adaptive goals	3.01(0.87)	2.88(0.96)	2.87(0.97)	0.79	F(2, 466) = 1.82
Perceived likelihood of situation similar to Northern Italy happening in own country	4.54(2.03)	5.01(2.31)	3.15(2.18)		F(1, 469) = 24.69***
Media consumption (hours)	2.61(2.91)	3.53(3.55)	1.75(1.66)		F(1, 469) = 4.58*
Remote communication frequency with close others	3.69(0.82)	3.61(1.05)	3.64(0.95)		F(1, 469) = 0.29
Frequency of arguing with close others	2.78(0.81)	2.69(0.98)	2.69(0.99)		F(1, 469) = 0.71

Note. GERT-S = Geneva Emotion Recognition Test Short Form, CERQ = Cognitive Emotion Regulation Questionnaire, DERS = Difficulties in Emotion Regulation Scale; WHO-5 = World Health Organization Wellbeing Scale, PANAS = Positive and Negative Affect Schedule. * $p < .05$, ** $p < .01$, *** $p < .001$.

Additionally, two interactions between GERT-S and regulation were found. As shown in Figure 1, for participants with low and average GERT-S levels, higher adaptive regulation predicted less media consumption (Bonferroni-adjusted *p*-value of the interaction: $p = .008$). The relationship between adaptive regulation and media consumption was very strong at low (1 SD below the mean) GERT-S levels, (unstandardized $B = -0.66$, $SE\ B = 0.17$, 95% $CI\ B$ = [-1.00; -0.32], $t(439) = -3.86$, $p < .001$), marginally significant at average ($B = -0.26$, $SE\ B$ =

0.14, 95% *CI B* = [-0.52; 0.01], *t*(439) = -1.92, *p* =.056), and non-significant at high (1 SD above the mean) GERT-S levels (*B* = 0.14, *SE B* = 0.19, 95% *CI B* = [-0.23; 0.52], *t*(439) = 0.76, *p* =.448). Figure 2 shows that for individuals with average and high GERT-S scores, maladaptive regulation positively predicted perceived likelihood of experiencing a similar situation to Northern Italy, with a marginally significant *p*-value after Bonferroni correction (*p* = .056). The relationship between maladaptive regulation and perceived risk was non-significant at low (-1 SD) GERT-S levels, (*B* = 0.11, *SE B* = 0.13, 95% *CI B* = [-0.15; 0.36], *t*(446) = 0.83, *p* = .407) and significantly positive at average and high GERT-S levels (average level: *B* = 0.35, *SE B* = 0.11, 95% *CI B* = [0.14; 0.56], *t*(446) = 3.28, *p* =.001; high level: *B* = 0.59, *SE B* = 0.15, 95% *CI B* = [0.30; 0.88], *t*(446) = 3.98, *p* < .001).

Table 3

Multiple Regressions Predicting Affective Outcomes and Behaviors from Emotion Recognition Ability (GERT-S), Emotion Regulation Strategies, and their Interactions, Controlling for Age, Gender, and Sample, for *N* = 469.

	wellbeing/ positive affect last 7 days				burden/ negative affect last 7 days			
Independent variables	*Beta*	*t*	*sr*	*B (CI)*	*Beta*	*t*	*sr*	*B (CI)*
(Constant)		1.75		.32 (-.04, .67)		-.71		-.13 (-.48, .23)
gender	-.08*	-1.98	-.0	-.14 (-.29, .00)	.14***	3.47	.14	.26 (.11, .40)
age	.06	1.40	.0	.01 (.00, .02)	-.06	-1.37	-.06	-.01 (-.02, .00)
study dummy 1	-.29***	-6.37	-.2	-.55 (-.71, -.38)	.03	.72	.03	.06 (-.11, .23)
study dummy 2	-.21***	-4.78	-.1	-.44 (-.61, -.26)	-.09*	-2.05	-.08	-.19 (-.37, -.01)
GERT-S	-.06	-1.58	-.0	-.06 (-.13, .01)	-.10***	-2.38	-.10	-.09 (-.16, -.02)
maladaptive regulation	-.28***	-6.78	-.2	-.26 (-.33, -.18)	.48***	11.25	.45	.43 (.36, .51)
adaptive regulation	.30***	7.49	.2	.27 (.20, .34)	-.04	-.88	-.04	-.03 (-.10, .04)
GERT-S x maladaptive	-.04	-.88	-.0	-.03 (-.09, .04)	.01	.32	.01	.01 (-.05, .07)
GERT-S x adaptive	-.03	-.82	-.0	-.03 (-.09, .04)	.02	.49	.02	.02 (-.05, .08)
adaptive x maladaptive	.02	.57	.0	.02 (-.05, .09)	.02	.47	.02	.02 (-.05, .09)
R^2 (adjusted R^2); F-test	.31 (.30); *F* (10, 450) = 20.421, *p* < .001				.29 (.27); *F* (10, 450) = 18.116, *p* < .001			

Table 3, continued

	negative affect after reading Covid-19 text				perceived likelihood of similar situation in own country			
	Beta	*t*	*sr*	*B (CI)*	*Beta*	*t*	*sr*	*B (CI)*
(Constant)		1.62		1.72 (1.4, 2.04)		7.93		4.01 (3.01, 5.00)
gender	.25***	5.86	.25	.38 (.25, .51)	.09*	2.06	.09	.42 (.02, .82)
age	-.04	-.93	-.04	.00 (-.01, .00)	.00	.08	.00	.00 (-.02, .03)
study dummy 1	.00	-.06	.00	-.01 (-.16, .15)	.07	1.35	.06	.32 (-.15, .79)
study dummy 2	-.15**	-3.05	-.13	-.25 (-.41, -.09)	-.30***	-5.97	-.26	-1.51 (-2.01, -1.02)
GERT-S	-.16***	-3.72	-.16	-.12 (-.19, -.06)	-.06	-1.26	-.05	-.13 (-.33, .07)
maladaptive regulation	.33***	7.36	.31	.25 (.18, .32)	.15**	3.27	.14	.35 (.14, .56)
adaptive regulation	.07	1.54	.06	.05 (-.01, .11)	.10*	2.26	.10	.23 (.03, .43)
GERT-S x maladaptive	-.04	-1.00	-.04	-.03 (-.09, .03)	.12**[a]	2.71	.12	.24 (.07, .42)
GERT-S x adaptive	-.01	-.25	-.01	-.01 (-.06, .05)	-.03	-.61	-.03	-.06 (-.23, .12)
adaptive x maladaptive	.00	.05	.00	.00 (-.06, .06)	.11*[b]	2.39	.10	.23 (.04, .42)
R^2 (adjusted R^2); F-test	.22 (.20); F (10, 446) = 12.214, p < .001				.17 (.15); F (10, 446) = 9.017, p < .001			

	adaptive goals for Covid-19 period				daily time spent following Covid-19-related media reports			
	Beta	*t*	*sr*	*B (CI)*	*Beta*	*t*	*sr*	*B (CI)*
(Constant)		14.99		3.09 (2.69, 3.50)		1.82		1.21 (-.10, 2.52)
gender	.05	1.13	.05	.09 (-.07, .26)	.11*	2.34	.11	.63 (.10, 1.16)
age	-.06	-1.34	-.06	-.01 (-.02, .00)	.05	1.01	.05	.02 (-.02, .05)
study dummy 1	-.06	-1.07	-.05	-.11 (-.30, .09)	.13*	2.48	.11	.79 (.16, 1.42)
study dummy 2	-.06	-1.17	-.05	-.12 (-.33, .08)	-.16**	-3.04	-.14	-1.02 (-1.68, -.36)
GERT-S	-.01	-.22	-.01	-.01 (-.09, .07)	-.13**	-2.77	-.12	-.38 (-.64, -.11)
maladaptive regulation	.02	.34	.02	.02 (-.07, .10)	.07	1.54	.07	.22 (-.06, .50)
adaptive regulation	.34***	7.50	.33	.31 (.23, .40)	-.09	-1.89	-.09	-.26 (-.52, .01)
GERT-S x maladaptive	-.05	-1.09	-.05	-.04 (-.11, .03)	-.03	-.56	-.03	-.07 (-.30, .17)
GERT-S x adaptive	-.01	-.16	-.01	-.01 (-.08, .07)	.15**[c]	3.35	.15	.4 (.17, .63)
adaptive x maladaptive	.03	.72	.03	.03 (-.05, .11)	-.05	-1.06	-.05	-.14 (-.39, .11)
R^2 (adjusted R^2); F-test	.12 (.11); F (10, 450) = 6.377, p < .001				.12 (.10); F (10, 439) = 6.024, p < .001			

	frequency of communicating remotely with family/ friends over last 7 days				frequency of arguing/ fighting with close others over last 7 days			
	Beta	*t*	*sr*	*B (CI)*	*Beta*	*t*	*sr*	*B (CI)*
(Constant)		3.13		.45 (.17, .74)		-.19		-.03 (-.32, .27)
gender	.09	1.92	.09	.11 (.00, .23)	.05	1.05	.05	.06 (-.06, .18)
age	-.03	-.53	-.02	.00 (-.01, .01)	-.07	-1.44	-.07	-.01 (-.01, .00)
study dummy 1	-.07	-1.35	-.06	-.09 (-.23, .04)	-.01	-.15	-.01	-.01 (-.15, .13)
study dummy 2	-.05	-.86	-.04	-.06 (-.21, .08)	-.03	-.59	-.03	-.05 (-.19, .10)
GERT-S	.10*[d]	2.02	.09	.06 (.00, .12)	.10*	2.01	.09	.06 (.00, .12)
maladaptive regulation	.00	.04	.00	.00 (-.06, .06)	.06	1.25	.06	.04 (-.02, .10)
adaptive regulation	.12*[d]	2.44	.11	.07 (.01, .13)	-.03	-.57	-.03	-.02 (-.08, .04)
GERT-S x maladaptive	.04	.84	.04	.02 (-.03, .07)	-.04	-.74	-.03	-.02 (-.07, .03)
GERT-S x adaptive	-.05	-.95	-.04	-.03 (-.08, .03)	.02	.48	.02	.01 (-.04, .07)
adaptive x maladaptive	.07	1.54	.07	.04 (-.01, .10)	-.06	-1.23	-.06	-.04 (-.09, .02)
R^2 (adjusted R^2); F-test	.04 (.02); F (10, 450) = 2.047, p = .027				.03 (.01); F (10, 450) = 1.598, p = .104			

Note. GERT-S = Geneva Emotion Recognition Test Short Form, sr = semipartial correlation.

Study dummy 1 = sample 2 (Australia) vs. sample 1 and sample 3, dummy 2 = sample 3

(Australia) vs. sample 1 and sample 2. Bonferroni-adjusted *p*-values, [a] p =.056, [b] p = .136, [c] p = .008. For perceived likelihood and frequency of communication, additional control variables were examined (see Supplementary Material for results); [d] these effects were no longer significant after additionally controlling for providing childcare at home and working from home, see Table S7. * $p < .05$, ** $p < .01$, *** $p < .001$.

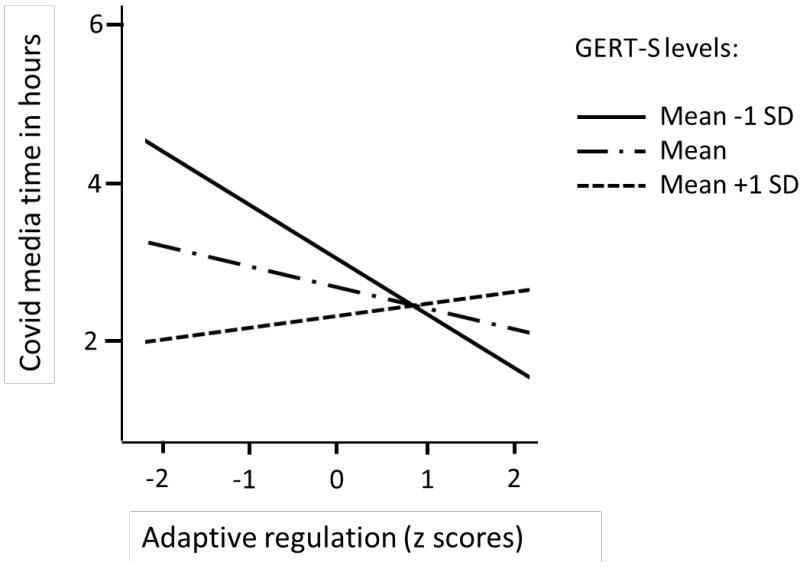

Figure 1. Time spent on Covid-19-related media coverage (in hours per day) as a function of GERT-S scores and adaptive emotion regulation.

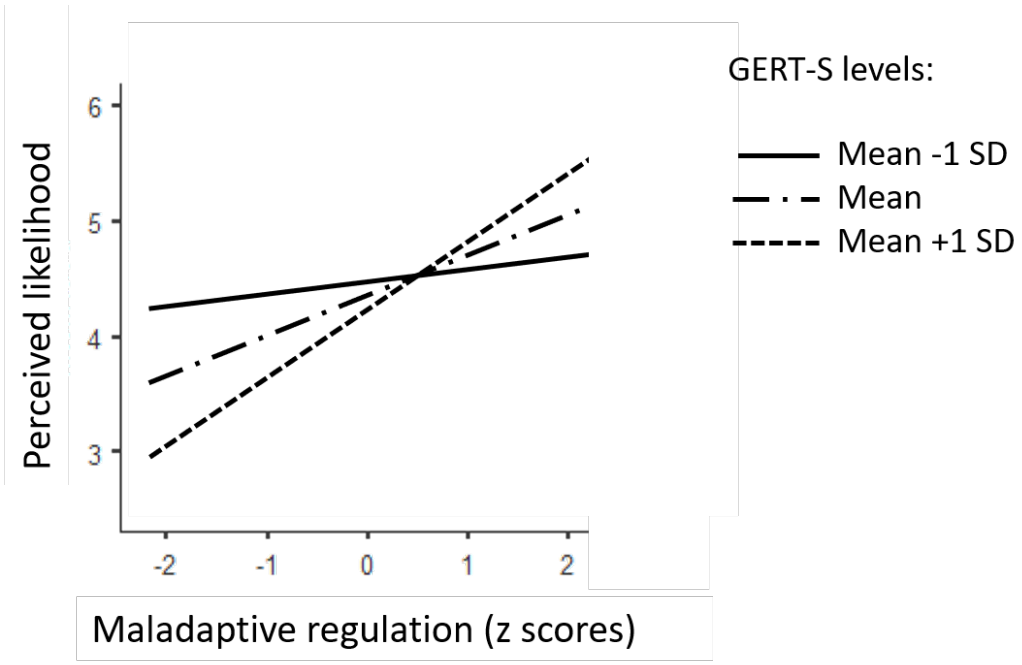

Figure 2. Perceived likelihood of similar situation as described in COVID-19 article happening in one's own country as a function of GERT-S scores and maladaptive emotion regulation strategies.

In the second step, one mediation analysis was conducted to examine potential mechanisms underlying the ERA – burden/ negative affect link, with media time, negative affect after reading the Covid-19 article, and perceived likelihood of similar situation in own country as mediators. Mediation was not analyzed for wellbeing/ positive affect because no overall effect of ERA was found. Arguing, communication, and adaptive goals were omitted from the list of mediators, as arguing was related to ERA in the opposite direction of our prediction and adaptive goals and communication were unrelated to ERA.

As shown by the 95% confidence intervals for indirect effects in the bootstrapped mediation analysis (Table 4), media consumption and negative affect after reading the Covid-19 article, but not perceived likelihood of a similar situation in one's own country, mediated the relationship between GERT-S and burden/ negative affect. The direct effect of GERT-S was no longer significant, indicating a full mediation.

Table 4

Indirect Effects of GERT-S Scores (IV) on Burden/ Negative Affect (DV) Mediated By Media Consumption, Negative Affect After Reading Covid-19 Article, and Perceived Likelihood of Similar Situation as in Northern Italy Controlling For Gender, Age, and Study.

	Total effects	Direct effects			Indirect effects	
	IV → DV	IV → M	M → DV	IV → DV	IV → M → DV	
	B (*p*)	B *(p)*	B *(p)*	B *(p)*	estimate	95% CI
DV: burden/ negative affect	-.12 (.003)			.01 (.801)		
M1: media consumption		-.37 (.007)	.03 (.001)		-.014	[-.031; -.002]
M2: negative affect after reading Covid-19 article		-.15 (<.001)	.76 (<.001)		-.124	[-.182; -.067]
M3: perceived likelihood of similar situation as in Northern Italy to occur in own country		-.17 (.105)	.05 (.001)		-.009	[-.023; .001]

Note. DV = dependent variable; M = mediator; IV = independent variable (Geneva Emotion Recognition Test short form). All reported coefficients are unstandardized. Indirect effects are considered significant if the confidence intervals do not include zero.

Discussion

While the interpersonal benefits of high ERA (such as better supervisor ratings) are well-established (e.g., Hall & Schmid Mast, 2018), it is less clear how accurate emotion recognition predicts SWB (an intrapersonal outcome). The present study showed that during the initial phase of drastic restrictions of public and social life due to the Covid-19 pandemic, higher ERA was associated with feeling less burdened and experiencing less negative affect. However, ERA was unrelated to the positive affect component of SWB. Multiple regressions predicting six additional "pathway" variables showed that individuals with high ERA experienced less negative affect after reading a (potentially upsetting) Covid-19 article. Unexpectedly, they did not set more adaptive goals for the lockdown period and did not use

remote communication more frequently, but they reported more frequent arguments with close others (with a small effect size). For the other two pathway variables – perceived risk of experiencing a similar situation as described in the Covid-19 article and time spent following Covid-19-related media coverage – the effect of ERA was qualified by an interaction with emotion regulation. Individuals with low-to-medium ERA spent less time on Covid-19 news reports if they frequently use adaptive strategies such as reappraisal or acceptance. Individuals with medium-to-high ERA perceived the risk as higher if they frequently used maladaptive regulation strategies such as rumination (this effect was only marginally significant). Finally, a mediation analysis showed that the link between ERA and less feelings of burden/ negative affect was fully mediated by less media consumption and less negative affect after reading the Covid-19 article.

The association between ERA and less negative affect and the absence of a correlation with positive affect mirror the contradictory results of past meta-analyses in non-clinical populations, which found high ERA to be linked to fewer depressive symptoms (Hall et al., 2009) but not to higher general SWB (Schlegel, 2020). While Hall's meta-analysis specifically tapped into negative affect (depressive symptoms), Schlegel's (2020) meta-analysis included mainly positive affect and life satisfaction measures but did not assess them separately. In terms of the multiple components of SWB (Pavot & Diener, 2013), these results suggest that ERA might be a protective factor against negative affect, even though it does not necessarily make people happier or more satisfied.

The present data sheds some light on the possible mechanisms underlying the ERA – negative affect relationship. In the introduction, we proposed that in order to prevent being overly emotionally affected by others' negative emotions, high ERA individuals may (a) strategically regulate their level of exposure to negative emotions and (b) might be less strongly affected by it when it involves their more distant surrounding as opposed to people they personally interact with. These mechanisms tap into *intrapersonal* processes related to

situation selection/ modification and attentional deployment (Gross & John, 2003; Todd et al., 2012). The mediating effect of lower Covid-19-related media consumption is in line with this pathway, as much of the coverage in the beginning of the public life restrictions involved bad news and, at the same time, was not as important to be processed as emotions expressed by one's partner or family. The second significant mediator – lower negative affect after reading the Covid-19 article about a different country – also fits within this pathway. High ERA individuals may have directed their attention more to the facts of the article rather than to emotional information. However, the perceived risk rating after reading the article did not mediate the ERA – negative affect link, probably because it depended on emotion regulation in addition to ERA.

The second pathway underlying a positive ERA – SWB link proposed in the introduction relates to *interpersonal* processes, suggesting that high ERA individuals may provide and receive better social support and interact with others more smoothly. However, ERA was unrelated to communication frequency and to setting more adaptive goals (e.g., organizing social activities) during lockdown, and positively related to arguing (although the effect was small), providing no evidence for this pathway.

One possibility is that this finding is specific to the Covid-19 pandemic. In the beginning of the lockdown, interpersonal interactions might have presented a higher potential for conflict, thus leading to more arguing and less opportunities for setting adaptive social goals. During "normal" times, the interpersonal interactions of high ERA people might involve much more positive emotions, thus contributing to better SWB and higher positive affect. Another possibility is that the interpersonal pathway generally has little effects on SWB and that its benefits are mostly found in the interpersonal realm in terms of being perceived as a more cooperative negotiator, a more empathic doctor, etc. (Hall & Schmid Mast, 2018). In general, more research is needed to assess whether the associations between ERA, intra- and interpersonal pathways, and positive and negative facets of SWB found here

generalize to situations outside the context of the Covid-19 pandemic. Specifically, future studies should assess how the ERA – SWB link is affected by the circumstances or events a person experiences (e.g., personal, professional, and societal), as well as by more long-term stressors. It could for example be that ERA represents a protective factor in the short term (e.g., during the first few weeks of lockdown), but not when facing prolonged stress (e.g., when facing long-term relationship, health, or financial problems).

The present study was one of the first to examine whether ERA interacts with a person's self-reported adaptive and maladaptive cognitive emotion regulation strategies in predicting outcomes. Results showed that frequently using adaptive strategies contributed to lower media consumption for low-to-medium ERA participants. It could be that these individuals were following news reports to enhance their understanding or to reduce their ambiguity about what others were feeling, or to get distracted from one's own problematic interactions with others. In this case, adaptive strategies such as acceptance or focusing on more positive aspects of a situation appeared to reduce the need to follow media reports. Additionally, for medium-to-high ERA participants, frequently using maladaptive strategies like rumination and catastrophizing was related to a higher perceived risk to experience a situation similar to Northern Italy. This is in line with the idea that higher ERA individuals might be excessively aware of negative emotional information, at least in combination with maladaptive regulation strategies (Antonakis et al., 2009). Taken together, the present findings imply that adaptive strategies may be particularly beneficial at lower ERA levels while maladaptive strategies may be particularly harmful at higher ERA levels. These findings call for future studies to examine interactions between ERA and emotion regulation as well as interactions among emotional abilities more generally. However, main effects of ERA and regulation were more frequent than interaction effects in the present study, suggesting that both variables mainly operated independently.

More generally, the present study sheds some light on the personality factors that predict adaptive outcomes and resilience during crises. In line with previous studies, habitual cognitive emotion regulation emerged as a strong predictor of SWB (Jermann et al., 2006). However, ERA – a performance-based ability which can be successfully improved through brief training programs (e.g., Preis et al., 2020) – independently contributed to wellbeing, even though effect sizes were small. The present study thus adds to the evidence that ERA is not only relevant to interpersonal success, but may also represent a protective factor against negative affect. Furthermore, the present study confirmed the WHO's recommendation that limiting one's media exposure may prevent detrimental effects on SWB during global crises (WHO, 2020).

Finally, some limitations should be considered. First, results may have been different in countries with higher numbers of confirmed cases and deaths, different health care systems, or differences in financial support provided by the government. Second, data collection was limited to the first two weeks of the first lockdown in 2020. While this phase captured people's initial adjustment to a drastic lifestyle change along with a high uncertainty about how the number of cases would develop, issues like loneliness and financial problems might become more severe as the duration of public life restrictions increases (Altena et al., 2020; Holmes et al., 2020). Future studies should therefore assess the long-term psychological consequences of the Covid-19 pandemic.

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