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Cognitive flexibility and depression: The moderator roles of humor styles

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Abstract

Humor style, which involves both adaptive and maladaptive forms, refers to the ways people use humor in daily life. Maladaptive humor styles (self-defeating and aggressive) can be risk factors for various mental disorders, including depression and anxiety. In contrast, adaptive humor styles (affiliative and self-enhancing) are perceived as resilience factors and buffer the negative impact of other risk factors. Cognitive flexibility reflects a capacity to come up with alternative interpretations and resolutions to demanding situations while perceiving them as controllable. Although the connection of high cognitive flexibility with low depression levels has been consistently documented, its interaction with trait-like factors received limited attention. The current study aims to explore the moderator role of humor styles in the association of cognitive flexibility with depression. Data were gathered from 436 (320 women) participants aged 18 and 70 ($M = 35.4$, $SD = 9.18$) through scales assessing humor styles, cognitive flexibility, and depression. The results revealed that the interaction of affiliative humor style with cognitive flexibility was significantly linked to the individual differences in depression levels, highlighting that affiliative humor is functional if individuals have difficulty approaching problematic situations from different angles. However, a similar pattern was not observed for other humor styles.

Keywords Cognitive flexibility · Depression · Humor style · Emotion regulation

"A pleasurable affect followed by laughter", "a cognitive state of mirth", or "non-serious social incongruity". All reflect an ever-lasting effort to define humor (Gervais & Wilson, 2005; Meyer, 2000; Romero & Cruthirds, 2006). Although there is no agreement on a widely accepted definition of humor in the literature, it has been suggested that it includes carrying an incongruous meaning which might amuse others or self (Martin, 2007). Humor can be conceptualized as a defense and coping mechanism, which involves the capacity to see the humorous side of adverse life events (Martin, 1996; Martin et al., 2003). Besides reducing anxiety and tension (Kuiper & Martin, 1998), humor also helps individuals' distance themselves from negative experiences and had been documented to buffer the stress arousing from negative life events (Menéndez-Aller et al., 2020; Samson & Gross, 2014). In other words, humor provides the capacity for approaching a painful situation from an unconventional perspective and transform the pain into something more tolerable or even pleasurable (Haig, 1986).

According to Martin et al. (2003) individuals use humor in four different styles as self-enhancing, affiliative, self-defeating, and aggressive humor. "Self-enhancing humor style" involves finding the funny sides of a stressful or challenging situation to change one's perspective. By doing so, individuals can enhance their mood by seeing the humorous aspects of life. "Affiliative humor style" is related to making others laugh and experience a positive shift in the mood state of both the self and the others. By using affiliative humor style, people also boost social bonds and increase group cohesion. "Self-defeating humor style", on the other hand, is characterized by entertaining other people by mocking the self. The very main motive for using such a humor style is gaining approval or being seen as a part of a group at the expense of the self. Lastly, "aggressive humor style" involves teasing or attacking someone in a hostile and sarcastic manner to amuse both the self and the audience or just with the purpose of putting that individual due to dislike.

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Although the use of humor is perceived as an adaptive and mature strategy (Braniecka et al., 2019; Martin et al., 2003), not all humor styles are associated with pleasant life outcomes, which gives rise to a differentiation between adaptive and maladaptive humor styles. Notably, self-defeating, and aggressive humor styles are considered maladaptive humor styles (Martin et al., 2003; Menéndez-Aller et al., 2020). Whereas affiliative humor and self-enhancing humor had been categorized as the adaptive humor styles. Adaptive humor styles are associated with greater acceptance of negative emotions, reappraising the meaning of adverse life events, and reconstruction of their perspective in a way that they can distance themselves from negative emotions (Amjad & Dasti, 2020). Consistent with Martin et al.'s (2003) conceptualization, studies indicated adaptive humor styles to be negatively correlated with psychological distress (Besser et al., 2015; Chuang et al., 2021; Dyck & Holtzman, 2013; Edwards & Martin, 2010; Lu et al., 2023) and higher levels of happiness and life satisfaction (Jovanovic, 2011; Páez at al., 2012). More specifically, the use of affiliative humor styles enhances social bonds, which maximizes social support received by the individual and thus is responsible for a lower vulnerability for depression (Frewen et al., 2008). In the case of self-enhancing humor style, the element that is believed to act as a protector factor is the individuals' ability to perceive negative situations and potential threats from a different perspective and enhance own mood state by both changing their how they understand the situation and distracting the self by focusing on the amusing aspects of the situation (Braniecka et al., 2019).

The findings on maladaptive humor, instead, indicate that both aggressive humor and self-defeating humor styles are linked with elevated levels of depression and lower levels of well-being (Chuang et al., 2021; Frewen et al., 2008). More specifically, the self-defeating humor style is believed to reinforce a negative self-concept and interfere with the maintenance of a healthy self-esteem (Stieger et al., 2011) especially when the others approve the individuals self-disparaging jokes (Rnic et al., 2016). Likewise, aggressive humor style interferes with the social support mechanisms by alienating others (Ibarra-Rovillard & Kuiper, 2011). However, there is mixed evidence regarding the associations of self-defeating humor style with negative affect (Heintz, 2017) or depression and anxiety (Ford et al., 2017; Heintz & Ruch, 2018). Quite the contrary, Ruch and Heintz (2013) revealed significant positive correlations between self-defeating humor and adaptive coping using a different version of this subscale, which only focuses on the frequency of mocking self without the intention of amusing or pleasing others. Heintz and Ruch (2018) provided further support for the adaptive aspect of self-defeating humor style by using cognitive interview techniques. More specifically, findings demonstrated that self-defeating humor might function as a protective factor, especially for those with low self-esteem and negative affect (Heintz & Ruch, 2018). As suggested earlier (Ruch & Heintz, 2013, 2018), the exact nature of the self-defeating humor style is derived from a non-humorous context, not from the humorous side of self-defeating humor. In other words, while people engage in self-defeating humor, the ameliorating function of SD is to be able to consider the funny sides of mistakes and weaknesses. Furthermore, since self-defeating humor requires interacting with others, strengthening social bonds can be another protective function of the SD humor style (Heintz & Ruch, 2018).

A glance at the research focusing on the contribution of humor styles to depression indicates that humor is mostly used as an emotion regulation strategy (Amjad & Dasti, 2020; Horn et al., 2018; Poncy, 2017). In fact, especially the adaptive humor styles can function as an adaptive emotional regulation strategy by helping the individuals distance themselves from an adverse emotional state by looking at the situation from a different perspective (bearing similarities with cognitive reappraisal) (Braniecka et al., 2019; Samson & Gross, 2014). In fact, humor use goes a step further from cognitive reappraisal, which refers to reinterpreting and changing mental perspective toward an adverse situation, since having an adaptive humor style helps individuals interpret a stressful occurrence in a more absurd way resulting in a broader perspective (Samson & Gross, 2014). From a similar vein, Horn et al. (2018) reported that individuals use humor with the purpose of upregulating positive emotions experienced by both them and the individuals around them. Altogether, adaptive humor style might function as an adaptive emotion regulation strategy while facing distressful events by enhancing positive emotions, reducing negative emotions, and increasing distance from negative emotions. In line with this, Boerner et al. (2017) stated that the use of adaptive humor styles more frequently relates to lower levels of difficulties in the regulation of difficult emotions.

Even though the previous studies reveal significant relationships between humor styles and mental health outcomes, how they interact with trait-based vulnerability and resilience factors is less clear. Chuang et al. (2021) reported all humor styles, except for self-defeating humor, significantly moderated the association between rumination and depression. That is, both affiliative and self-enhancing humor styles were able to reduce the negative impact of rumination on depression. The findings are partially in line with Tucker et al. (2013), who studied the moderator role of different humor styles in the association between social anxiety and depression. Their results revealed that affiliative humor style was associated with lower self-report symptoms of

depression among the socially anxious university students. The exact opposite results were seen for self-defeating humor style. Affiliative humor style was also documented to buffer the negative impact of long-term isolation that is experienced due to COVID-19 (Tsukawaki & Imura, 2021). All these studies indicate that the implications of different humor styles may change depending on the other risk or resilience factors, and it is crucial to study the association between humor styles and mental health outcomes by considering the contribution of other variables (Tucker et al., 2013). Thus, the present study aims to examine the interaction between humor styles and cognitive flexibility, which is believed to be associated with a reduced vulnerability to mental health problems, including depression (Chuang et al., 2021; Curran et al., 2021; Martin, 2007; Soltani et al., 2013).

Cognitive flexibility (CF) refers to the capacity for flexibly switching attention from one task/stimulus to another depending on the requirements of the situation (Diamond, 2013). Previous studies indicated CF as a robust resilience factor since CF allows the individual to shift focus away from the maladaptive aspects of the situation to the adaptive ones during times of stress and allows for the consideration of alternative ways of looking at the situation (Inozu et al., 2022; Keith et al., 2015). According to Dennis and Vander Wall (2010), CF involves the resources that are used in challenging and replacing maladaptive ways of interpreting negative and/or ambiguous stimuli and switching to more adaptive ways of thinking.

Previous research indicated CF to be predictive of lower levels of depression (Kashdan & Rottenberg, 2010; Wang et al., 2019; Wu et al., 2021) since its three main characteristics may act as resilience factors by allowing individuals to perceive and cope with difficult situations in a more adaptive way. CF was also documented to be one of the variables through which especially cognitive restructuring-based interventions for the treatment of depression operate. In other words, a good CF capacity is imperative in the acquisition and use of coping skills, which allows for better adjustment to changing life circumstances (Johnco et al., 2013). More specifically, it was found that CF was associated with low levels of depression through enhancing the individual's capacity for upregulating negative emotions and generating alternative thinking styles (Kacar Basaran et al., 2022; Duriez et al., 2021). Notably, elevated levels of CF also act as a protective factor and buffer the negative impact of trait anxiety on depression (Wang et al., 2019). CF has strong links with coping since high flexibility allows the individual to disengage from the response patterns that are not suitable for the current situation and switch to a new pattern that is more adaptive (Kashdan & Rottenberg, 2010). Thus, it is reasonable to say that high CF capacity enhances problem-solving and adaptive coping, which is a finding reported by several studies (Bedel & Ulubey, 2015).

Previous studies on CF indicate that it is not just associated with better mental health but is also able to buffer other risk factors. However, research until now did not focus on how CF interacts with resilience-related factors and whether this capacity is augmenting the positive impact of protective factors as well as buffering the risk factors. It is important to understand CF from this perspective since greater CF capacity not just reduces the intensity of negative life events/mood by allowing the individual to focus on more neutral or positive aspects of the environment (Koster et al., 2011) but at the same time CF allows for better utilization of the other resources that are likely to act as protective factors (Johnco et al., 2013). Humor styles have also been documented as protective factors that have robust associations with adaptive coping (Amjad & Dasti, 2020; Braniecka et al., 2019; Samson & Gross, 2012). It is also crucial to examine different humor styles individually in terms of their association with depression and CF since all humor styles have different interpersonal functions and thus may have different associations with mental health outcomes (Tucker et al., 2013). However, it is less frequently investigated in terms of its association with psychological distress and how this relationship changes in the presence or absence of other resilience-related characteristics.

The results of the previous studies also indicate that the association between humor styles and psychological distress can be better understood by examining the interaction of humor styles with other characteristics (Tucker et al., 2013). However, the studies assessing this relationship have mainly examined risk factors such as rumination (Chuang et al., 2021). The current study, different from the previous studies investigates how the relationship between humor styles with depression will change depending on the levels of CF using a cross-sectional design. CF is one of the protective factors that has potential for strengthening the relationship of humor styles with depression due to its strong associations with adaptive coping strategies. The current study aims to focus on the interaction of different humor styles with CF in terms of their relationship with depression. More specifically, we expect the strength of the association between CF and depression to change based on humor styles.

Method

Participants

Participants were 436 (320 women, 73.4%) individuals between the ages of 18 and 70 (M = 35.4, SD = 9.18). 50% of

the participants were single, 37.4% were married and 9.6% were divorced. The remaining 3% did not want to disclose their marital status. Many of the participants have at least an undergraduate degree (91.8%) and 8.2% had graduated from high school. 85.6% of the participants were actively working. Finally, around 73.3% perceived themselves as having a low-to-average income.

Measures

Humor Styles Questionnaire (**HSQ**, Martin et al., 2003). HSQ was developed for the assessment of individuals use of different types of humor. The HSQ has 32 items based on a 7-Likert-type format. The scale is composed of eight items on each subscale, evaluating the four facets of humor: Self-defeating (e.g., *"I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders, or faults"*), Aggressive (e.g., *"If someone makes a mistake, I will often tease them about it"*), Affiliative (e.g., *"I laugh and joke a lot with my closest friends"*), and Self-enhancing (e.g., *"If I am feeling depressed, I can usually cheer myself up with humor"*). HSQ appeared to be a reliable measure (0.80, 0.81, 0.77, 0.80 for affiliative, self-enhancing, aggressive, and self-defeating humor styles, respectively). Martin et al. (2003) reported promising evidence for construct and criterion validity of the scale. HSQ was translated to Turkish by Yerlikaya (2003), which yielded satisfactory psychometric properties (alphas range between 0.67 and 0.78). Criterion validity of the scale has been evidenced by its correlations with measures of depression, negative affect, positive affect, self-esteem, humor responses, and dysfunctional attitudes.

Cognitive Flexibility Inventory (**CFI;** Dennis & Wal, 2010). CFI is a self-report measure designed to assess the capacity for accepting hard situations as controllable, the capacity to come up with alternative interpretations, and the ability to produce alternative solutions. The CFI is composed of 20 items scored on a 5-Likert type format. High scores on CFI reflect greater cognitive adaptability linked with greater cognitive flexibility in challenging situations. The original scale appeared to be reliable (0.91, 0.84, and 0.90 for alternatives, control, and total, respectively). Convergent and concurrent validity of the scale was obtained through its correlation with other measures of cognitive flexibility and depression. The scale was adapted to Turkish by Gülüm and Dağ (2012), and it was found to be reliable ($\alpha = 0.90$) and has moderate correlations with measures of anxiety, depression, positive and negative affect, providing evidence for validity.

Patient Health Questionnaire-9 (**PHQ-9;** Kroenke et al., 2001). PHQ-9 was designed with the purpose of measuring depression symptoms experienced by the respondents in the previous week based on DSM-IV criteria. The scale has a 4-Likert-type format, and it consists of 9 items. Higher scores on the scale indicates more severe forms of depression. The original scale has satisfactory psychometric properties ($\alpha = 0.89$), including satisfactory construct and criterion validity. It was adapted to Turkish by Sarı et al. (2016), and the Turkish version of the scale yielded satisfactory levels of reliability ($\alpha = 0.84$) in addition to evidence for good criterion validity.

Procedure

Ethical approvalfor the current study was obtained from (Author Institution) University Institutional Review Board prior to the data collection process which was carried out on an online data collection platform (Qualtrics). The participants were recruited through snowball sampling by posting ads to different social media platforms such as Twitter, Instagram, and Facebook and the data from the participants were collected between September and October 2022. Due to the cross-sectional nature of the study, all participants responded to all questionnaires on a single time point. The informed consent form was followed by online administration of the questionnaires and the administration of the scales was done in a counter-balanced fashion. The questionnaires were not presented to the participants who did not give content to participate in the study. The completion of the questionnaires, on average, took 15 min. The participants did not receive any incentives upon participating in the study.

Statistical analysis

IBM SPSS (Version 27) was used to calculate descriptive statistics and zero-order correlations. Path analysis testing the interaction between HS and CF was performed via AMOS (Arbuckle, 2019). Model fit was determined as good fit based on the following criteria (1) the chi-square statistic (χ^2)/degrees of freedom ratio below 3, (2) the root mean square error of approximation (RMSEA) score below 6, (3) the comparative fit index (CFI) and the Goodness of Fit index (CFI) above 0.95, and (4) the standardized root mean square residual (SRMR) below 0.08. We compared different competing nested models using the chi-square difference test (Hu & Bentler, 1999; Schumacker & Lomax, 1996). Significant interactions were further probed with PROCESS macro (Hayes, 2022; Model 1).

Results

As presented in Table 1, skewness and kurtosis of the study variables are within acceptable limits (Byrne, 2010). All variables showed significant correlations with each other, except for the association between PHQ and aggressive humor style. Furthermore, age was not significantly correlated with self-enhancing humor and was also weakly correlated with CF, affiliative humor, and aggressive humor. Sex, on the other hand, had significant associations with only aggressive humor, with male participants reporting using this strategy more frequently than their female counterparts.

Moderation analysis

The initial model provided a less than satisfactory fit $\chi^2 = 86.596$, $df = 19$, $\chi^2/df = 4.558$, $p < .001$, CFI = 0.89, GFI = 0.97, RMSEA = 0.090 (0.072, 0.110), Pclose = 0.00, SRMR = 0.049. However, an additional constraint was added between sex and aggressive HS based on the modification indices. The modified model has a satisfactory fit to the data, $\chi^2 = 45.617$, $df = 18$, $\chi^2/df = 2.53$, $p < .001$, CFI = 0.98, GFI = 0.96 RMSEA = 0.059 (0.038, 0.080), PClose = 0.22, SRMR = 0.04, significantly improving the model fit $\Delta\chi^2$ (1) = 40.979 (Table 2).

These significant interactions were further probed using the simple slope analyses (PROCESS, Model 1). The first analysis exploring the interaction between CF and Affiliative HS indicated that Affiliative HS is not associated with individual differences in depression among individuals who have high levels of CF ($\beta = 0.008$, SE = 0.062, $p = .893$, 95% CI [−0.112, 0.129]). However, for the individuals who have difficulty in identifying and generating alternative perspectives for problematic situations, more frequent use of affiliative HS is associated with lower levels of depression ($\beta = 0.089$, SE = 0.042, $p = .037$, 95% CI [−0.173, −0.005]) (See Fig. 1). These results indicate that Affiliative HS significantly moderated the relationship between CF and depression.

Probing of the significant association between CF and aggressive HS, on the other hand did not yield a significant pattern. Notably, aggressive HS is not associated with depression at both low ($\beta = 0.069$, SE = 0.052, $p = .179$, 95% CI [−0.032, 0.171]) and high ($\beta = -0.01$, SE = 0.052, $p = .796$, 95% CI [−0.115, 0.088]) levels of CF (see Fig. 2).

Discussion

The current study explored the moderator role of different humor styles in the association of CF with depression. Contrary to the hypotheses, among different humor styles, only

Table 1 Descriptive statistics, reliability coefficients and zero-order correlations

	M	SD	S	K	HS-AF	HS-SE	HS-AG	HS-SD	CFI	PHQ-9	Age
HS-AF	46.41	7.11	−0.88	0.32	(0.84)						
HS-SE	36.93	9.20	−0.40	−0.23	0.448**	(0.82)					
HS-AG	22.55	8.21	0.79	0.36	0.203**	0.211**	(0.77)				
HS-SD	29,98	8.99	0.18	−0.27	0.281**	0.257**	0.297**	(0.79)			
CFI	78.53	9.98	−0.24	0.15	0.192**	0.295**	−0.118*	−0.123*	(0.88)		
PHQ-9	18.23	6.65	0.73	−0.41	−0.161**	−0.191**	0.056	0.198**	−0.294**	(0.91)	
Age	35.42	9.18			−0.137*	−0.020	−0.104*	−0.174**	0.112*	−0.249**	-
Sex					−0.010	0.053	0.280**	0.044	0.072	−0.066	0.065

Note CFI = Cognitive Flexibility Inventory, PHQ = Patient Health Questionnaire, HS-AF = Affiliative Humor Style, HS-AG = Aggressive Humor Style, HS- SD = Self-Defeating Humor Style, HS-SE = Self-Enhancing Humor Style, S = Skewness, K = Kurtosis. Internal consistency coefficients are presented in parentheses

**$p < .001$, *$p < .05$

Table 2 Results of the moderation analysis

Predictor	Estimate	SEE	p
CFI	−0.186**	0.32	<0.001
HS-AF	−0.163*	0.33	0.001
HS-SE	−0.127*	0.34	0.012
HS-AG	0.030	0.32	0.532
HS-SD	0.234**	0.31	<0.001
CFI x HS-AF	0.114*	0.31	0.020
CFI x HS-SE	0.032	0.29	0.516
CFI x HS-AG	−0.092*	0.30	0.048
CFI x HS-SD	−0.025	0.29	0.597
Age	−0.206**	0.03	<0.001
Gender	−0.044	0.66	0.26

Note $^{**}p < .001$, $^{*}p < .05$

CFI = Cognitive Flexibility Inventory, PHQ = Patient Health Questionnaire, HS-AF = Affiliative Humor Style, HS-AG = Aggressive Humor Style, HS- SD = Self-Defeating Humor Style, HS-SE = Self-Enhancing Humor Style, SEE = Standard error of estimate.

affiliative humor appeared to moderate this relationship. The results for other humor styles were not significant.

More specifically, our results revealed that individuals with high levels of CF reported experiencing less intense levels of depression independent from how frequently they utilized affiliative humor. However, for the participants with low levels of CF, the habit of joking to improve relationships with others and sense of belonging (a.k.a affiliative humor) was associated with significantly lower levels of depression. The results suggest that reliance on affiliative humor is functional and is associated with relatively lower levels of depression if the person does not generally feel in control of difficult situations and finds it difficult to approach problematic situations from different angles to entertain options for coping or problem solving. In fact, affiliative humor had been referred to as "interpersonal humor style" (Lu et al., 2023) since it takes place in a social context and involves an interaction between the self and others through highlighting the amusing aspects of a particular situation. Similar to certain types of interpersonal emotion regulation strategies, affiliative humor has the potential for enhancing social bonds, making the individual seem more attractive (Dyck & Holtzman, 2013; Frewen et al., 2008) and increasing one's chances of receiving social support at times of distress. Although we did not directly assess social support in the current study, the warmth of interpersonal relationships and the idea that one can receive support from others at times of need may be one of the factors that will explain the current results.

Affiliative humor can also be used as a form of distraction. More specifically, in the absence of cognitive resources for coping with difficult situations and dealing with emotions, joking about the current negative situation may effectively distract the individual and disengage attentional focus away from the depressogenic content, and thus be associated with lower levels of depression. In addition, as Ruch

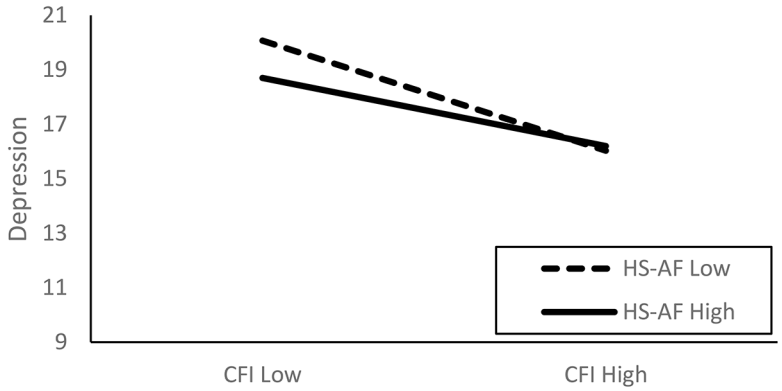


Fig. 1 The interactive effect of CF with affiliative humor style on depression

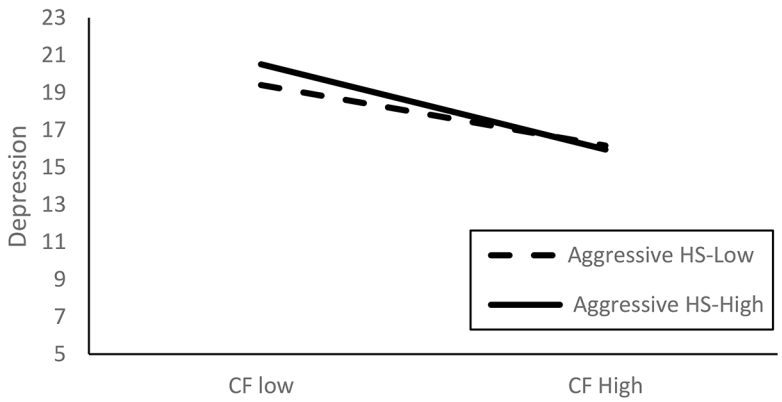


Fig. 2 The interactive effect of CF with aggressive humor style on depression

and Heintz (2017) reported, only affiliative humor styles' construct validity was fully supported compared to others. Therefore, the "humor" content in "humor styles" sounds more reasonable for affiliative humor style. In other words, the humorous function of affiliative HS might be more dominant than it is for other HS, resulting in the interaction mentioned earlier.

Our results also revealed that despite not interacting with CF, there was a significant association of both self-defeating and self-enhancing humor styles with the levels of depression. Aligned with the previous research (Menéndez-Aller et al., 2020; Tucker et al., 2013), we found that the habit of regulating emotions and maintaining a positive attitude on life using humor was related to reduced levels of depression but making fun of the self, which is a maladaptive way of using humor was associated with elevations in depression levels. Consistent with previous findings (Fox et al., 2016; Kuiper et al., 2004; Martin, 2003; Schneider et al., 2018), aggressive humor style was not associated with depression, which may be related to the direction of it, namely, aggressive humor style is directed to others, not oneself. That's why aggressive humor style may harm one's mental health over time since it tends to alienate others (Martin, 2007). Therefore, longitudinal studies might be able to identify aggressive humor style's significant associations with psychopathology.

Although the positive association between self-defeating and self-enhancing humor styles seems confusing, understanding how they work may illuminate the confusion. As stated earlier, while individuals engage in self-defeating humor style, they perceive the amusing side of their mistakes and shortcomings, changing their perspective and resulting in enhanced mood and subjective well-being (Ruch & Heintz, 2013, 2018). In other words, both self-defeating and self-enhancing humor styles involve finding the funny side (or absurdities) of demanding circumstances to change one's perspective. Janes and Olson (2015) also stated that self-defeating humor can have an adaptive aspect. Notably, when people make jokes that mock their certain characteristics, they have the chance of appearing more approachable. Also, the self-defeating humor style, different from the aggressive humor style, does not appear threatening to the people in the environment and thus has chances of enhancing the individuals' social bonds.

Limitations and further studies

In addition to its novel findings, the current study also has certain limitations that needs to be mentioned. First, the study has a cross-sectional design, which makes it impossible to make causal inferences. Secondly, there is a significant gender imbalance, with nearly 73.4% of the participants being women. Also, the data were collected via an online data collection platform using self-report measures and the dataset is vulnerable to self-report biases. Also, we were unable to reach the population that does not have internet access. Finally, although the scales that we used in the current study have acceptable psychometric properties, especially the scale that we used for measuring CF levels, has certain limitations since it only focuses on perceived CF, rather than CF that refers to the capacity for flexibility moving the attentional focus depending on the requirements of the situation. To overcome the limitations, future research can utilize the experience sampling method (ESM) to record what participants do, feel, and think on random occasions providing systematic self-reports. Also, experimental methods can be used in humor research to shed better light on the causality issues. The future studies may also use behavioral measures for the assessment of CF, which is a crucial characteristic that can be complementary to what CFI measures (Lounes et al., 2011).

Conclusion

In conclusion, the current study is the first, to the best of our knowledge, to examine how different humor styles interact with CF, which is a trait-based characteristic that is associated with positive mental health outcomes. The finding provided support for a possible buffering effect of affiliative humor style, which is the humor style that has the effect of strengthening the social bonds, on the association of CF with depression levels. Despite the cross-sectional nature of the study, the findings could have important implications for interventions indicating the importance of forming bonds with the social environment using humor as a way of overriding the difficulties stemming from problems in generating alternative explanations/resolutions to challenging situations.

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Data availability Data is available upon reasonable request.

Declarations

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Prior to participation in the study, all participants provided informed consent.

Conflict of interest Authors declare that they have no conflicts of inter-

est in the publication of this work.

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