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Change in humor and sarcasm use based on anxiety and depression symptom severity during the COVID-19 pandemic

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ABSTRACT

Background: Humor and sarcasm may be used as potential coping strategies during challenging times, and to improve wellbeing. We investigated changes in humor and sarcasm use during the COVID-19 pandemic in participants with varying anxiety and depression symptom severity, and in those with versus without psychiatric disorders.

Methods: Online data was collected from N = 661 Canadian adults during the height of COVID-19-related restrictions. Depression and anxiety symptom severity were assessed using the Patient Health Questionnaire (PHQ-9) and General Anxiety Disorder (GAD-7) scale. Participants were queried on current presence/absence of a psychiatric disorder, and on changes in humor and sarcasm use during compared to before the pandemic.

Results: Participants with any vs. no depression symptoms reported more sarcasm and humor use during the pandemic. Respondents with mild and severe vs. no anxiety symptoms reported using more sarcasm. However, those with any vs. no anxiety symptoms used less humor during the pandemic. Finally, less humor use was noted in those without vs. with a psychiatric disorder.

Limitations: The use of self-report measures and a sample that may limit generalizability.

Conclusions: Adults with depression symptoms used more humor and sarcasm as a potential coping strategy during COVID-19. While individuals with anxiety symptoms used more sarcasm, this was not true of humor, suggesting their decreased reliance on levity during a crisis. Humor use was greater in those with psychiatric disorders, perhaps due to self-preservation mechanisms during times of distress. Our findings have implications for using humor in therapy in individuals with mental health struggles and mood disorders.

1. Introduction

The novel coronavirus, COVID-19, will likely remain a threat to human health and profoundly impact daily functioning until large-scale vaccination of a significant proportion of the global population occurs. As of May 2021, it has claimed over three million lives globally. As a precautionary strategy to slow its spread, even as vaccination rollouts occur, many countries imposed restrictions on human interactions. This included closing public facilities, educational institutions, borders to neighboring countries, and mandating living in quarantine and social isolation (Bauerle et al., 2020). As a result of these restrictions, particularly in the early stages of the pandemic, heightened feelings of isolation, and pandemic-related consequences (e.g., unemployment, uncertainty, loss/associated grief, domestic violence), people have

reported experiencing increased fear, stress and mood disturbances (Bauerle et al., 2020; Shevlin et al., 2020; Galea et al., 2020; Naqvi, 2020; Zacher and Rudolph, 2020). These states may lead to, or be associated with, clinically significant mental health consequences, or exacerbate existing psychiatric conditions (e.g., Czeisler et al., 2021; Naqvi, 2020; Bai et al., 2004). Indeed, data from China and Australia have revealed higher levels of anxiety and depression symptoms, and decreased positive affect among the general population during the pandemic (Li et al., 2020; Tan et al., 2020). Similar findings have emerged in the United States and Canada, with increases in anxiety and depression symptoms during the pandemic compared to previous years (Czeisler et al., 2021; Findlay and Arim, 2020).

When facing challenging situations, humans often adopt strategies that help them cope with uncomfortable or distressing emotions. During

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the COVID-19 pandemic, individuals have reported using drugs and/or alcohol, eating, engaging in physical activities and various hobbies as the most frequently used coping strategies (Park et al., 2020; Savitsky et al., 2020). Collectively, these strategies involve “doing something” or using/consuming substances. However, humor use, which is psychological in nature, can also increase wellbeing, and serve as a putative coping strategy (albeit not always consciously). Indeed, the use of humor has been shown to relieve tension, lessen distress and concern, and increase positive emotions (Melton, 2016; Nezelek and Derks, 2001; Wellenzohn et al., 2016). Cross-cultural data indicate that higher levels of humor use correlate with enhanced life satisfaction and subjective health, as well as higher positive mood, optimism and wellbeing (i.e., combination of positive/negative affect and life-satisfaction; Ruch et al., 2018; Wellenzohn et al., 2018; Martínez-Martí and Ruch, 2014).

When focusing on clinical symptoms, in particular, Nezu et al. (1988) found that depression symptoms decreased over time in a student population that reported using humor as a coping mechanism. This is consistent with work indicating negative correlations with humor use and anxiety and depression symptoms in individuals who had experienced trauma (Boerner et al., 2017). Interestingly, another group noted that humor use did not alter anxiety symptoms in university students (Nezelek and Derks, 2001), which contrasts findings in nursing students (Savitsky et al., 2020), and university students in whom humor use was negatively associated with social anxiety (Tucker et al., 2013b). The latter is consistent with a large population study (N > 800) indicating that self-enhancing humor use was negatively related to anxiety and depression symptoms (Menéndez-Aller et al., 2020). Thus, although previous work is somewhat mixed with respect to the link between humor use and anxiety and depression symptoms, most published research suggests that increased humor use is associated with lower mood disturbance symptoms. To our knowledge, there is no data on the relation between anxiety and depression symptom severity and change in humor use in the context of a societal stressor, such as the COVID-19 pandemic. It is feasible that those with higher symptoms of anxiety and depression may report different changes in humor use than those with lower symptom severity; however, this is currently unclear.

The effectiveness of humor use as a potential coping mechanism to sustain or enhance wellbeing during trying times may depend on the type of humor used. Humor style is frequently empirically measured using the Humor Styles Questionnaire (HSQ), which assesses four humor types: affiliative, self-enhancing, aggressive, and self-defeating humor. Emerging data has questioned the construct validity of the HSQ, particularly the self-defeating dimension, and the rather poor distinction between affiliative and self-enhancing humor (e.g., Fritz, 2020; Heintz, 2017; Ruch and Heintz, 2013). These caveats noted, the HSQ's affiliative and self-enhancing humor styles typically refer to humor that adopts a happy outlook on life, while self-defeating humor involves self-disparagement to entertain others at one's own expense. Both affiliative and self-enhancing humor have been inversely associated with depression and anxiety symptoms in healthy populations (Frewen et al., 2008; Tucker et al., 2013a; Menéndez-Aller et al., 2020), while self-defeating humor has been linked with a negative outlook after a tragedy (Boerner et al., 2017) and higher depression and anxiety symptoms in non-clinical populations (Frewen et al., 2008; Tucker et al., 2013b; Menéndez-Aller et al., 2020).

Sarcasm, in particular, has been defined as a form of humor by some (i.e., sarcastic humor), and is often classified as disparaging and aggressive. Sarcastic humor, or simply sarcasm, is usually expressed as a literal positive statement that is expressed with a negative intention (Pexman and Olineck, 2002; Rothermich et al., 2021). It is often used to criticize or manipulate others in order to feel better about oneself (Dozois et al., 2013; Erickson and Feldstein, 2007). On the other hand, sarcastic humor can take the form of light-hearted bantering (Huang et al., 2015). Others have distinguished sarcasm from humor when considering intercorrelations among comic styles (e.g., fun, satire, humor, cynicism, sarcasm; Schmidt-Hidding, 1963), as humor and

sarcasm did not correlate, while sarcasm and cynicism did (Ruch et al., 2018). Regardless of the exact conceptualization, sarcasm use has been shown to be a potential coping mechanism, which might provide emotional catharsis, after negative events in healthy individuals (Haiman, 1998). Others, however, been shown sarcasm to be rather unhelpful in enhancing wellbeing in a student population (Rnic et al., 2016); sarcasm was also inversely related to wellbeing in an adult population (humor was positively associated; Ruch et al., 2018). The relation between sarcasm use and symptoms of depression and anxiety are unclear; the same is true of whether change in sarcasm during the COVID-19 pandemic is related to mood symptom severity or the presence/absence of a mood disorder.

Utilizing an online survey in the Canadian adult population, we examined how change in humor and sarcasm use during the COVID-19 pandemic was related to anxiety and depression symptom severity, and explored whether changes in humor and sarcasm use differed among those with versus without a psychiatric illness. We expected that people with existing psychiatric issues, particularly a mood disorder diagnosis, would increase their use of humor and perhaps sarcasm during the pandemic, as a potential coping strategy with a challenging situation (Martin et al., 1993; Rnic et al., 2016). This increase may be more pronounced in those with versus without a psychiatric illness. Further, we expected that individuals with milder forms of anxiety and depression symptoms (regardless of a psychiatric diagnosis) would show greater increases in humor and sarcasm use during the pandemic than those with more severe symptoms. These data are potentially relevant for informing treatment and prevention strategies, which may incorporate humor use to enhance wellbeing during distressing situations.

2. Methods

2.1. Procedure overview

The survey, focused on wellbeing during the COVID-19 pandemic, was developed and distributed using the Research Electronic Data Capture online platform (REDCap; Harris et al., 2009). An anonymous survey link was disseminated to adults in Canada using a community-based recruitment approach (e.g., advertisements on Facebook, Twitter, email sent to university students/staff; link was not posted on public fora to minimize data quality issues). Individuals able to consent to research participation (all respondents were >18yr), and able to read and understand English (as the survey was in English), were invited to participate.

The survey was launched on April 27, 2020 and closed July 17, 2020. During this data collection period, COVID-19-related restrictions in Canada were extensive, i.e., schools/daycares were closed, as were public venues such as bars, restaurants and movie theaters, and physical distancing and social gathering limits were imposed (limiting gatherings to <15 people in all of Canada, except the province of British Columbia [<50]). Restriction-related mandates were confirmed using information posted on governing bodies' websites. The survey took ~20–25min to complete and was approved by the Research Ethics Board of the Royal Ottawa Health Care Group (REB#2020006). Given that some of the survey questions pertained to the “past month” or “past two-week period”, this reflected a timeframe from the end of March 2020 for some respondents. This period encompassed the early stages of the pandemic when lockdowns across Canadian regions were as or more restrictive as those during data collection (April 27–July 17, 2020). Data presented in this manuscript focus on specific aspects (described below) from the larger survey.

2.2. Participants

Six-hundred sixty-one (N = 661) adults were included in the survey (Table 1). Basic demographic and socioeconomic questions were collected (e.g., gender, household income etc.), as were questions

Table 1
Participant Demographics [N & % (determined based on the entire population, N = 661) listed, as appropriate].

Demographics		N	%
Age categories (yr)	18–29	157	23.8
	30–64	434	65.7
	65+	69	10.4
Average age (yr)	43.01 (SD: 15.86)	–	–
Gender	Female	511	77.3
	Male	140	21.2
	Other (including non-binary, gender fluid, gender queer, two-spirit & other)	9	1.5
Annual household income (CDN)	<\$25, 000	38	5.8
	\$25,000 - \$50, 000	77	11.7
	\$50, 000 - \$100, 000	207	31.5
	\$100,000 - \$200, 000	206	31.3
	>\$200, 000	75	11.4
	Prefer not to say	55	8.3
Education (highest level completed)	Bachelor's Degree	215	32.5
	Master's Degree	139	21.0
	Doctorate Degree	93	14.1
	College diploma	94	14.2
	Some Post-Secondary	63	9.5
	High school	47	7.1
	Other	10	1.5
Living arrangement	Partner & children/parents	254	38.5
	Partner/spouse	194	27.4
	Alone	108	16.4
	Parents only	62	9.4
	Roommates	31	4.7
	Other	10	1.5
Current mental health disorder	No	469	71.1
	Yes	163	24.7
	Do not know	25	3.8
	Prefer not to say	3	0.5
Specific current mental health disorder	Anxiety disorder	51	7.7
	Depression	19	2.9
	Anxiety disorder & depression	42	6.4
	Depression & anxiety disorder & other	15	2.3
	Depression & other disorder (not anxiety)	4	0.6
	Anxiety disorder & other psychiatric disorder (not depression)	7	1.1
	Other (e.g., bipolar disorder, eating disorder, attention-related disorders etc.)	25	3.8
Average Patient Health Questionnaire – 9 (i.e., depression) score (max = 27)	6.84 (SD = 5.73)	661	–
Average Generalized Anxiety Inventory score (max = 21)	5.43 (SD = 4.99)	661	–

related to mental health, including the presence of any current diagnosed psychiatric disorders (yes/no; details on which disorder(s)).

2.3. Measures & data cleaning

To assess depression symptoms, the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) was administered, and depression severity categories were established (scores 0–4: none/minimal; 5–9: mild; 10–14: moderate; 15–19: moderate-severe; 20–27: severe; moderate-severe and severe symptoms were combined into one category [severe] to minimize diluting our power per category as exploratory analyses yielded a small sample in the severe symptom range).

Anxiety symptoms were examined using the Generalized Anxiety Scale (GAD-7; Spitzer et al., 2006); anxiety severity categories consisted of no (scores = 0–4), mild (scores = 5–9), moderate (scores = 10–14) and severe (scores = 15–21) symptoms. GAD-7 and PHQ-9-indexed symptoms were assessed based on the past two-week period (i.e., timeframe of questionnaires).

Respondents were asked about their change in the use of sarcasm and humor in the past month: “I find myself making sarcastic statements during the day” (1. more, 2. less, 3. about the same as before the COVID-19 pandemic); “My ability to use humor has changed during the COVID-19 pandemic” (1. more, 2. less, 3. about the same as before the COVID-19 pandemic).

Incomplete surveys (>10% of required questions unanswered) were removed from the final dataset. Missing PHQ-9 and GAD-7 values were imputed by calculating average values of participants' responses on the remaining questions, restricted to only one imputed value per questionnaire. Data quality (i.e., to ensure that participants did not respond randomly) was assessed using 15 quality control checks for consistency in participants' responses (i.e., degree of similarity between comparable questions; if responses on such questions were opposite, these were flagged; **Supplementary Material**).

2.4. Data analyses

Separate Pearson's Chi-square tests were used to assess if there was a difference in the frequency of change in humor and sarcasm use (i.e., more, less, same) based on anxiety severity (i.e., none, mild, moderate, severe) and depression severity (i.e., none, mild, moderate, severe) categories. Chi-square tests were also used to examine whether there was a difference in the frequency of change in humor and sarcasm use during the COVID-19 pandemic, based on the current presence or absence of mental illness (yes/no; individuals who responded “don't know” or “prefer not to say” were not included). Significant Chi-square test results were followed up with Bonferroni-corrected pairwise z-test post-hoc analyses ($p < .004$ for GAD-7/PHQ-9 symptom severity categories; $p < .008$ for presence/absence of mental illness). Assessment of the direction of the standardized residuals (positive/negative) per cell was used to determine the direction of the difference.

3. Results

3.1. Final dataset

A total of $n=4$ incomplete surveys were excluded. Missing data was imputed for $n=5$ on the PHQ-9 and $n=4$ on the GAD-7. Two individuals were removed from the dataset (failed >4 quality controls); the final sample consisted of $n = 661$ respondents.

3.2. Depression severity

There was a significant difference in sarcasm use during the COVID-19 pandemic based on depression severity [$\chi^2(6) = 23.11, p = .001$; frequencies presented in **Supplementary Table 1**]. Pairwise post-hoc analyses indicated that those with no depression symptoms reported higher “same” vs. “more” sarcasm use ($p < .001$; i.e., increased sarcasm use was less than expected, while same/no change was more than expected). Further, individuals with any depression symptoms (mild, moderate, severe) reported using “more” sarcasm during the pandemic than those with no symptoms ($ps < .001$).

There was a significant difference in the proportion of humor use during COVID-19 based on depression severity [$\chi^2(6) = 47.39, p < .001$; frequencies presented in **Supplementary Table 1**]. Pairwise post-hoc analyses indicated that among those with no depression symptoms, there was a difference in the proportion of “same” vs. both “less” and “more” humor use ($ps < .001$), with “same” humor use being greater (i.e., increase/decrease in humor was less than expected; same/no change in humor use was more than expected). Individuals with no depression symptoms also reported using “less” humor more than those with some symptoms (i.e., mild, moderate, severe). Interestingly, those with mild depression symptoms had a higher than expected proportion of “more” vs. “same” humor use ($p = .002$); they also reported using “more” humor during the pandemic than the asymptomatic group ($p = .004$).

3.3. Anxiety severity

There was a significant difference in sarcasm use during COVID-19 based on anxiety severity [$\chi^2(6) = 23.29, p = .001$; frequencies presented in [Supplementary Table 2](#)]. Pairwise post-hoc analyses indicated that those with mild vs. no anxiety symptoms had a higher proportion of “more” sarcasm use ($p = .001$). Similarly, individuals with severe anxiety symptoms used “more” sarcasm during COVID-19 than those with no symptoms ($p < .001$). Finally, those with no anxiety symptoms differed on the proportion of “more” vs. “same” sarcasm use (same/no change was higher; $p < .001$).

There was a significant difference in humor use during COVID-19 based on anxiety severity [$\chi^2(6) = 39.48, p < .001$; frequencies presented in [Supplementary Table 2](#)]. Pairwise post-hoc analyses indicated that in those with no anxiety, the proportion of “more” vs. “less” humor use was greater ($p = .003$). Further assessments indicated a higher proportion of “same” vs. “less” humor use in those with no anxiety ($p < .001$). Additionally, individuals with no anxiety symptoms had a greater proportion of “same”/no change in humor use than those with any anxiety symptoms ($ps < .003$). Finally, respondents with no vs. those with any anxiety symptoms had a lower proportion of “less” humor use ($ps < .001$).

3.4. Psychiatric illness presence or absence

Of the $N = 164$ individuals who reported having a current psychiatric illness, $N = 117$ had either anxiety or depression or both; much of the remainder ($N = 26$) reported having depression and/or anxiety along with another disorder ([Table 1](#)). As such, the vast majority of the sample with a psychiatric illness consisted of individuals with anxiety, depression or both.

There was no difference in sarcasm use during the COVID-19 pandemic based on the current presence or absence of a diagnosed mental illness [$\chi^2(2) = 2.03, p = .36$; frequencies presented in [Supplementary Table 3](#)].

There was a difference in humor use during COVID-19 based on the current presence or absence of a mental illness [$\chi^2(2) = 13.69, p = .001$; frequencies presented in [Supplementary Table 3](#)]. Pairwise post-hoc analyses indicated that “less” humor use was greater in those without vs. with a mental illness ($p < .001$). “Same” humor use was greater in those without vs. with a mental illness ($p < .004$). Those without a mental illness had a greater proportion of “same”/no change in humor use relative to “more” or “less” humor use during the pandemic ($ps = .001$); those with a psychiatric disorder had a greater than expected proportion of using “less” humor during the pandemic relative to the other categories ($ps = .001$).

4. Discussion

This population survey aimed to assess if self-reported humor and sarcasm use changed during the COVID-19 pandemic in relation to anxiety and depression symptom severity, and the presence or absence of psychiatric illness. We found that individuals with *any* depression symptoms reported using more sarcasm during the early stages of the pandemic than those with no depression symptoms. Further, individuals with no depression symptoms reported using less humor than those with *any* depression symptoms; this was especially true relative to those with mild depression symptoms. With respect to anxiety, respondents with mild and severe versus no anxiety symptoms used more sarcasm during the pandemic. Interestingly, those with no anxiety symptoms reported a greater proportion of more versus less humor use during the pandemic (same vs. less was greater). Further, individuals with no versus any anxiety symptoms had a greater proportion of same humor use, but a lower proportion of less humor use than expected during the pandemic, inconsistent with our hypothesis. Finally, those without versus with a current psychiatric disorder, mainly some type of mood disorder,

reported using less humor during the pandemic, supporting our predictions; no difference in sarcasm use emerged. These data point to some distinctions in the use of humor and sarcasm as putative coping strategies or simply behavioural reactions during trying times (i.e., early stages of the COVID-19 pandemic) in individuals with anxiety and depression symptoms, and mental illness more generally.

Overall, our data suggest that those with versus without depression and anxiety symptoms reported increased sarcasm use during compared to before the pandemic. There are several possible explanations for this. First, it is feasible that those with mood disturbance and anxiety symptoms may rely on different coping strategies in the context of a pandemic in order to support well-being. In other words, given heightened mood instability (vs. respondents with no symptoms) they may be more likely to use sarcasm as an outlet to “let off steam” and discharge emotionally. In healthy individuals, sarcasm is sometimes used to hide discomfort or self-doubt, to mask negative feelings, or to fake confidence due to insecurity ([Haiman, 1998](#)). Thus, it is feasible that those with mood disturbances may be using more sarcasm, because the intent and potential catharsis associated with sarcastic humor use may differ from those without mood disturbances. On the other hand, those with depression/anxiety symptoms may be more likely to be using more sarcasm as a self-defeating humor style, i.e., they make fun of their own weaknesses to deal with problems ([Fessell, 2020](#)). Self-defeating humor use has been correlated with increased depression, anxiety, hostility, aggression and psychiatric symptoms, and negatively correlated with self-esteem and psychological well-being ([Rnic et al., 2016](#)). In the context of the current study, it is not possible to discern whether respondents with mood disorder symptoms use sarcasm more during the pandemic as a potentially self-enhancing coping strategy (i.e., letting off steam) or in a self-defeating manner (i.e., consistent with the mood-congruent bias; [Erickson et al., 2005](#)). However, self-defeating and self-enhancing humor styles have been criticized for lacking construct validity (e.g., [Menéndez-Aller et al., 2020](#); [Heintz and Ruch, 2015](#)), and the use of this nomenclature should be used with this caveat in mind.

Sarcasm has been described as an aggressive form of humor ([Martin et al., 2003](#); though somewhat different conceptualizations of sarcasm exist; [Ruch et al., 2018](#)) that is generally inversely associated with well-being; more affiliative and self-enhancing humor is typically associated with facilitating relationships and decreasing social tension ([Rnic et al., 2016](#)). As such, self-enhancing humor, which relates to perspective-taking and maintaining a humorous outlook on life ([Martin et al., 2003](#)), could reflect a proactive and positive coping strategy during a stressful period, such as a global pandemic. Given that individuals with depression symptoms were more likely to report increased sarcasm *and* humor use, it is feasible that their sarcasm use may reflect a more positive/self-enhancing coping strategy, especially in those with milder symptoms, though this needs to be more directly assessed with future work. Another possible explanation is that individuals with depression symptoms may be more reactive to their environment (including cues that elicit humor/sarcasm) in the context of a chronic stressor. There is some evidence of heightened attention and response to negative information (behaviourally and neurally) in depression (e.g., [Jaworska et al., 2015](#)); however, blunted emotional processing has reported in the disorder (e.g., [Hill et al., 2019](#)). Thus, altered emotional processing in those with depressive symptomatology may interact with a stressful context (i.e., global pandemic) to modify attention/reactions to stimuli, reflected by increased sarcasm and humor use. Granted, this is speculative.

Individuals with no symptoms of anxiety had a smaller proportion of less humor use during the COVID-19 pandemic than those with some symptoms of anxiety. Further, those with no/minimal anxiety symptoms reported more versus less humor use. This suggests that individuals with no/minimal anxiety symptoms may be using more humor to potentially cope with a challenging situation (i.e., a proactive approach). Those with some anxiety symptoms, however, do not appear to be relying on

more humor use. Anxiety is characterized by dysregulated stress and/or uncontrolled worrying, and a heightened stress response (Grube and Nitschke, 2013). It is feasible that chronically heightened anxiety/stress levels may interfere with the introduction of psychological levity (i.e., humor use) to ease tensions associated with the pandemic. Conversely, individuals with no/minimal anxiety may be using humor to decrease their stress/tension. In light of this, increased use of sarcasm in individuals with anxiety symptoms, but without a concomitant increase in humor, could be viewed as a potentially maladaptive coping strategy in these individuals; though, again, this warrants follow-up.

4.1. Future directions

While our data indicate that change in humor and sarcasm use during the COVID-19 pandemic differs based on depression and anxiety symptoms, we did not explicitly ask if humor and sarcasm were used as coping strategies. Granted, respondents may not be fully cognizant of whether their behaviours, including humor and sarcasm use, are a “coping strategy” *per se*. Thus, not directly asking about coping strategies, but rather inquiring about change in sarcasm and humor use, may be more informative about both conscious and unconscious coping mechanisms. Additionally, the questions we used to measure humor and sarcasm change in the current study were limited, as they did not assess which type of humor use changed/did not change. A more nuanced understanding of humor style may have aided with interpretation (e.g., assessing change in the use of specific comic styles, e.g., wit, sarcasm, etc. in relation to depression and symptom changes). Another potential limitation is the reliance on self-report measures (Wang et al., 2020). However, the PHQ-9 and GAD-7 are well-validated measures of depression and anxiety symptoms frequently used in the community. Corroborating data regarding psychiatric illness diagnosis would have been an asset, though is not possible in an anonymous survey. Additionally, our sample was comprised largely of females, was highly educated and mainly white, which limits the generalizability of our findings. Future comparable studies should include a more diverse sample. Further, we cannot exclude the possibility that other factors contributed to our results. For instance, there were differences between individuals in the various anxiety and depression symptom severity categories (Supplementary Tables 4 and 5). Namely, those without versus any mood symptoms were older, more educated, and have a greater annual income. However, additional analyses indicated that these factors were not independently associated with humor/sarcasm use changes (data not shown). Nevertheless, it is not possible to entirely discount the contribution of these factors on our findings; the same is true for the role of sex. Lastly, our testing took place during the early stages of the COVID-19-pandemic, when restrictions were extensive and rather homogenous across the sample. It is feasible that humor and sarcasm use changes, and their relationship with mood symptoms, may be evident throughout the pandemic; however, this study was not designed to address this (i.e., best assessed with longitudinal data).

5. Conclusion

The psychological impact of the COVID-19 pandemic has become increasingly evident in the general population, and more so in individuals with existing mental health issues (Moreno et al., 2020). Our study assessed changes in humor and sarcasm use during the early parts of the pandemic in relation to anxiety and depression symptoms. Interestingly, those with depression and anxiety symptoms and those with current psychiatric issues (mainly depression/anxiety disorders) used more sarcasm compared to asymptomatic individuals; those with depression symptoms also used more humor. Individuals with anxiety symptoms, on the other hand, did not use more humor. Together, these data suggest that humor and sarcasm use may differ as a potential coping strategy based on the presence and absence of anxiety or depression symptoms.

Our results have implications for the use of positive (e.g., affiliative and self-enhancing) humor use/strategies in therapy or coaching for individuals with psychiatric disorders, or those with symptoms of depression, in particular. Several studies have shown that humor use training enhances stress resistance (Abel, 2002; Tagalidou et al., 2018), and that humor use can be a protective factor against anxiety and depression symptoms (e.g., Menéndez-Aller et al., 2020). Research has also shown that individuals displaying resilience and adaptive adjustment to serious life events are not necessarily funnier, but they do exhibit increased daily humor use (Menéndez-Aller et al., 2020). On the other hand, previous studies (Tagalidou et al., 2018) suggest no effect of humor training on depression or anxiety symptoms, calling into question the efficacy of specific humor training approaches. Thus, this is an area requiring further study. Nevertheless, the knowledge gained in this study may be considered in therapy and in coaching those with mental health struggles, particularly mood disorders.

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CRediT authorship contribution statement

Kathrin Rothermich: Conceptualization, Writing – original draft, preparation. **Ayotola Ogunlana:** Project administration, Writing – review & editing. **Natalia Jaworska:** Conceptualization, Methodology, Data curation, Formal analysis, Writing – review & editing, Validation, Supervision.

Declaration of competing interest

All authors declare that they have no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2021.05.027>.

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