Central Lancashire Online Knowledge (CLoK)

Title	Humor styles influence the perception of depression-related internet memes in depression
Type	Article
URL	https://clok.uclan.ac.uk/id/eprint/38326/
DOI	https://doi.org/10.1515/humor-2021-0045
Date	2021
Citation	Gardner, Kathryn Jane, Jabs, Nicola-Maria, Drabble, Jennifer and Akram, Umair (2021) Humor styles influence the perception of depression-related internet memes in depression. International Journal of Humor Research (HUMOR). ISSN 0933-1719
Creators	Gardner, Kathryn Jane, Jabs, Nicola-Maria, Drabble, Jennifer and Akram, Umair

It is advisable to refer to the publisher's version if you intend to cite from the work.
https://doi.org/10.1515/humor-2021-0045

For information about Research at UCLan please go to http://www.uclan.ac.uk/research/

Kathryn J Gardner, Nicola-Maria Jabs, Jennifer Drabble and Umair Akram*

Humor styles influence the perception of depression-related internet memes in depression

Abstract: Previous research highlights the potential benefits of engaging with depressive Internet memes for those experiencing symptoms of depression, a phenomenon that can be explained by the humorous interpretation of depressive stimuli and perceived social support through symptom normalization. We examined whether individuals experiencing depressive symptoms would differ from controls in their interpretation of Internet memes related to depression, whilst incorporating the mediating role of humor style. *N*=78 individuals with self-reported depressive symptoms (≥24 on CES-D) and 67 controls (≤23) rated the emotional valance, humor, relatability, shareability, and mood-improving potential of 32 depressive and control memes (depicting neutral/positive social commentaries). Measures of depression and humor style were also completed. Perceived humor, relatability, shareability and mood-improving potential of depressive, but not control, memes were greater amongst individuals displaying depressive symptoms. However, differential ratings of humor, shareability and relatability were mediated by the extent of ones self-defeating humor style. These outcomes further evidence benefits of interacting with depression-related Internet memes for those with depression.

Keywords: depression; depression memes; humor style; internet memes; social media

*Corresponding author: Dr Umair Akram, Department of Psychology, Sociology and Politics, Sheffield Hallam University, S10 2BP, Sheffield, UK, E-mail: u.akram@shu.ac.uk
Kathryn J Gardner and Nicola-Maria Jabs, University of Central Lancashire, Preston, Lancashire, UK
Jennifer Drabble, Sheffield Hallam University, Sheffield, UK; and MEMELab Sheffield Hallam University, Sheffield, UK

1 Introduction

The experience of depression is largely characterized by sustained negative affect (American Psychiatric Association 2013) and co-occurs with significant emotional (e.g. emotion dysregulation; Abravanel and Sinha 2015; Bradley et al. 2011), cognitive (e.g. impaired memory and executive control; Rock et al. 2014; Kizilbash et al. 2002) and behavioral (e.g. social and inter-personal function; Youngren and Lewinsohn 1980) impairments. In the general population, recent meta-analytic data evidences symptoms of depression to be highly prevalent, affecting up to 27% of individuals worldwide (Wang et al. 2017). Various predisposing, precipitating, and perpetuating factors are proposed to influence the onset of depression which may be behavioral, biological, environmental, or psychological in nature. Stress-diathesis models, one's vulnerability to depression and the experience of negative and stressful life events interact to promote the onset of a depressive episode, whereas cognitive models of depression emphasize the role of disorder consistent cognitive biases of information processing (i.e. attention, interpretation and memory) in the development and maintenance of the disorder (e.g. Beck 1979). Understanding how individuals with depressive symptoms interpret information online is particularly important given the amount of time most adults spend on the Internet (approximately 4 h per day in the UK; Ofcom UK 2020) and social media (approximately 40 min per day in the UK; Ofcom UK 2020), and the potential impact of these on mental and physical well-being (Frost and Rickwood 2017; Gkotsis et al. 2017; Kelly et al. 2018). Individuals' experiencing depressive symptoms may differentially interpret the various forms of online information, including humorous stimuli such as Internet memes.

1.1 Depression and humor

The experience of humor is considered to be fundamental in maintaining adequate physical and psychological wellbeing (Martin 2001). Indeed, the use of humor is consistently related to wellbeing (Martin et al. 2003; Martinez-Marti and Ruch 2014; Ruch and Hofmann 2017), serves to regulate emotions (Kugler and Kuhbandner 2015; Samson and Gross 2012; Strick et al. 2009) and is considered an effective coping mechanism in the face of negative and stressful life events (Labott and Martin 1987; Martin and Lefcourt 1983; Overholser 1992; Sliter et al. 2014). Martin et al. (2003) identified four humor styles, two considered beneficial for wellbeing (affiliative and self-enhancing) and two which may be detrimental (self-defeating and aggressive: see Table 1 for definitions). In studies sampling healthy

subjects, the positive humor styles (affiliative and self-enhancing) appear more effective in down-regulating negative and up-regulating positive emotion relative to negatively oriented humor (aggressive and self-defeating: Crawford et al. 2011). Considering this, positive humor may enhance emotion regulation whereby the accompanying positive emotion serves to facilitate the reappraisal of negative emotions (Vaillant 2000). However, it remains unclear whether individuals with depression react to positive humor in the same way (Table 2).

The experience of depression appears to negatively influence the cognitive and affective understanding of humor, positive responses to humorous stimuli, and the capacity to use humor as a coping strategy. Martin et al. (2003) evidenced a negative relationship between positive use of humor and symptoms of depression, whereas self-defeating humor emerged to be positively related to depressive symptoms. Furthermore, Uekermann et al. (2007) examined cognitive and affec-tive humor processing in depression by comparing valance ratings and the ability to accurately determine punchlines for presented jokes amongst depressed pa-tients and healthy controls. Here, deficits in social cognition were present in depressed patients, specifically in affective (i.e., blunted humor ratings) and cognitive (i.e. impaired accuracy) aspects of humor processing. That said, it is

Table 1: Definitions of humor styles according to the Humour Styles Questionnaire*.

	Definition
Positive:	
Affiliative	Affiliative humor involves the elicitation of. spontaneous humorous comments, jokes and humorous anecdotes which aim to: provide amusement for other people; facilitate and improve relationships; and reduce interpersonal tension.
Self-enhancing	Self-enhancing humor encompasses a generally comical attitude towards negative and stressful life events. Its focus is intrapsychic, and this style includes using humor as a coping strategy to regulate emotions and to reduce stress.
Negative:	
Aggressive	Aggressive humor involves downgrading other people. It is characterized by use of sarcasm and ridicule and contains manipulative elements which include implied threat of ridicule where the primary aim is to harm or expose other people.
Self-defeating	Self-defeating humor is characterized by: excessive self-disparaging humor; amusing others at one's own expense to facilitate integration or gain approval; allowing oneself to be the focus of others' humor; and using humor to avoid constructive solutions to one's problems. Whilst self-defeating humor is related to low self-esteem, it is conceptually distinct from 'self-deprecation (i.e. not taking oneself too seriously, making light of one's faults and mistakes in an accepting way). Here, the latter is considered a healthier approach and is a component of affiliative humor.

*Conceptualization of humor styles as outlined by Martin et al. (2003).

Table 2: Ratings of memes for the control and depression symptoms groups whilst observing depressive and control memes (means ± standard deviation).

	Depression-related Memes		*t*	P	Cohens' *d*
	Depression Symptoms (*n*=78)	Control Group (*n*=67)			
Ratings:					
Valence	2.22 ± 0.99	2.13 ± 0.67	−0.61	0.544	0.11
Humor	3.81 ± 0.95	3.02 ± 0.94	−5.05	0.001**	0.84
Relatability	4.13 ± 0.75	2.99 ± 0.89	−8.31	0.001**	1.39
Shareability	3.01 ± 1.21	2.28 ± 1.02	−3.87	0.001**	0.65
DEPFEEL	3.06 ± 1.02	2.48 ± 0.93	−3.57	0.001**	0.60
	Control memes				
Valence	3.57 ± 0.63	3.66 ± 0.52	0.90	0.368	0.16
Humor	3.83 ± 0.83	3.53 ± 0.74	1.09	0.280	0.40
Relatability	3.07 ± 0.75	3.19 ± 0.72	0.97	0.333	0.16
Shareability	2.77 ± 1.00	2.75 ± 1.00	−0.07	0.947	0.02
DEPFEEL	2.98 ± 0.85	3.10 ± 0.68	0.94	0.350	0.16
CES-D	33.05 ± 5.34	16.88 ± 4.34	−19.80		3.29
HSQ:					
Affiliative	20.48 ± 8.53	21.15 ± 9.07	0.45	0.652	0.08
Self-enhancing	31.35 ± 9.20	26.67 ± 8.82	−3.11	0.002*	0.52
Aggressive	32.51 ± 6.61	33.85 ± 4.99	1.36	0.177	0.23
Self-defeating	25.37 ± 11.04	33.19 ± 1.14	4.32	0.001**	1.00

DEPFEEL, ratings of the extent to which memes would make someone with depression feel good; PHQ-9, Patient Health Questionnaire Depression Scale; DERS-SF, Difficulties in Emotion Regulation Scale Short Form. *Significance at < 0.01, **< 0.001.

possible that individuals with depression react to positive humor in a different way, as compared to non-depressed individuals (Akram et al. 2020). Certainly, in the context of emotion regulation, individuals presenting with depressive symptoms appear to favor the comparative approach, where situational threat is compared with a more threatening event (i.e. it could be worse: Perchtold et al. 2019). Whereas non-depressed individuals place greater attention on positive situational factors, detached from threat (e.g. appreciating the surroundings or accomplishments of the day: Perchtold et al. 2019). More crucially, a culmination of research tentatively suggests that efficient use of humor may serve to attenuate predictors of depression which include: blunting of positive emotion; worry, rumination and deficits in cognitive withdrawal from negative information and adverse experiences (Joormann and D'Avanzato 2015).

Unfortunately, most studies fail to use humor stimuli directly tied to the experience of depression, relying on questionnaire measures of humor and positively valanced stimuli (i.e. amusing photographs and films). With is in mind, negatively oriented (rather than positive) humor may have greater appeal to depressed individuals when considering its salience to their specific symptom experience. In this context, Internet memes related to the individual experience of depression (i.e. depressive memes) may offer a more proximal and ecological stimuli set.

1.2 Depression and internet memes

Internet memes are generally simulacratic in nature, visually depicting an element of a culture or behavioral system, usually in a humorous way that contextually relates to a particular demographic (see Figure 1 for example). The term *meme* is based on the notion that individuals utilize creativity to conceptually manipulate an idea to the extent where it is mutated and subsequently spread through derivatives (Shifman 2013). With that in mind, Internet memes have become a crucial aspect of digital culture that are well established in the media by consistently maintaining current references that often step into cultural and political domains (Shifman 2013).

Internet memes related to depression (previously termed depressive memes: Akram et al. 2020, 2021) are typically comprised of an image and short caption

When you sneeze so hard, your
moustache changes lips:
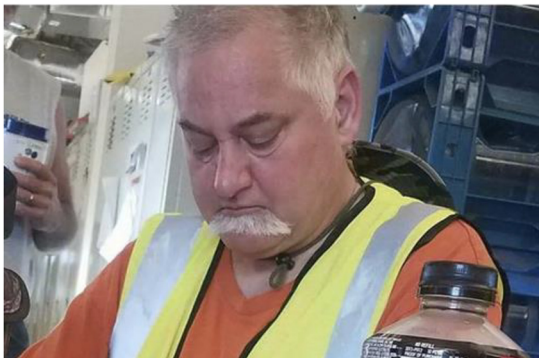
Figure 1: Example of an Internet meme.
The image used were gathered from the public domain each marked with either the Public Domain Mark 1.0 or CC0 1.0 Universal licence. No alterations were made. Title & Artist: Unknown. Image Source: Snappygoat.

directly related to the symptom experience of depression. More specifically, these memes are predominately negative and emotional in nature, often depicting themes pertaining to death, suicide and social isolation (see Figure 2). That said, depression-related memes are typically poised in a self-defeating and humorous way, with the intent of eliciting a degree of relatability in the target audience. Recent research found perceptual differences between subclinical depressed and non-depressed individuals in their interpretation of depression-related memes (Akram et al. 2020). Here, depressed individuals reported increased perceptual ratings of humor, relatability, shareability (i.e., something they would share with others) and mood improvement potential of depression-related when compared with non-depressed controls. These differences were mediated by deficits in the ability to deploy adaptive emotion regulation strategies. This work tentatively suggests that depression-related memes promote: a humorous take on negative experiences; and perceived support by connecting with others experiencing related symptoms (Akram et al. 2020). Indeed, as people may feel uncomfortable disclosing the nature of their mental health difficulties, yet also feel the need to be understood and related to, depression-related memes provide a wide reaching and alternate means of outlet.

Online self-disclosure is theorized to enhance relationships to a greater extent than face-to-face disclosures (Valkenburg and Peter 2009). The prevalence of online self-disclosure remains lower than offline, potentially leading to the experience of loneliness and social isolation, both risk factors for depressive
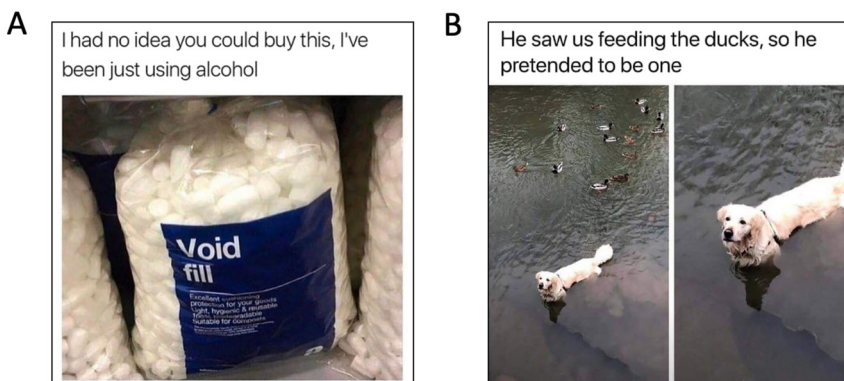
Figure 2: (A) Example of depression-related meme; (B) example of control meme. All images used were gathered from the public domain each marked with either the Public Domain Mark 1.0 or CC0 1.0 Universal licence. No alterations were made. Title & Artist: Unknown. Image Source: Snappygoat.

symptoms (Nguyen, Bin and Campbell 2012). Moreover, previous work demonstrates that sharing relatable online content facilitates perceived social support, resulting in enhanced life satisfaction and self-esteem (Ellison, Steinfield and Lampe 2007; Bessière, Pressman, Kiesler and Kraut 2010). Therefore, those engaging in online self-disclosure of personal hardships via the sharing depression-related memes, for example, may be able to establish a contextual social support system. Indeed, Internet forums dedicated to the sharing of depression-related memes are often comprised of a large user base. For example, the online forum known as Reddit hosts a subreddit named *depression memes* which is followed by approximately one hundred and 36 thousand individuals.

These disparaging ideas on whether online self-disclosure is helpful or potentially damaging call for further examination and have thus far not been thoroughly investigated in the literature. The current study, therefore, examines how individuals perceive images which may be shared as a proxy of disclosure of problems or emotions commonly experienced in depressive symptoms.

1.3 Aims of the present work

Previous work highlights the role of emotion dysregulation in mediating perceptual differences in the observation of depression-related Internet memes (Akram et al. 2020). As the key function of Internet memes is the elicitation of humor, the next logical step in this line of work is to examine the role of individual differences in humor styles. As such, the present research further examined the relationship between symptoms of depression and the interpretation of depressive and control memes, whilst incorporating the potential mediating role of humor style. Specifically, in partial replication of our previous work we examined group differences (high vs. low depressive symptoms) in perceptual ratings of emotional valance, humor, relatability, shareability and mood improving potential of depressive and control Internet memes (depicting general neutral or positive social commentaries). Expanding on previous work, we also examined the extent to which particular humor styles (affiliative, self-enhancing, aggressive, self-defeating) would mediate the relationship between depression and any confirmed perceptual differences. In line with previous work (Akram et al. 2020), we expected increased ratings of humor, relatability, shareability and mood improvement potential of depression-related memes amongst those presenting symptoms of depression. Replication of these outcomes would confirm the reliability of these previous observations in two independent samples of the general population.

2 Method

2.1 Participants

A cross-sectional online questionnaire-based survey was implemented comprising of questions designed to examine humor styles, symptoms of depression and the perception of depressive and control Internet memes. The survey was advertised to: members of the general population through social media, 'call for participants' (website), and 'reddit' (online forum); and students through course credit schemes. This resulted in a sample of N=250 individuals who began the survey, and 155 respondents (mean age = 26.96 ± 9.53, range 18–60, 63.4% female) providing complete data.

2.2 Materials

2.2.1 The centre for epidemiology scale for depression

The Centre for Epidemiology Scale for Depression (CES-D) was used to measure symptoms of depression. The measure is comprised of 20-self-report items which determine the frequency of depressive symptoms over the past two weeks. Each item is rated on a 4-point Likert-scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time). The summation of each item creates a total score indicative of depression symptomatology ranging between 0 and 60, where higher scores indicate greater levels of depressive symptoms. Following previous work using the CES-D (Julian et al. 2011; McDowell 2006), a score >23 indicates a significant level of depressive symptomatology. Internal consistency (Cronbach's α) of the scale in this study was 0.79.

2.2.2 The Humour styles questionnaire

The Humour Styles Questionnaire (HSQ: Martin et al. 2003) was used to examine the presence of four different humor styles: affiliative (e.g. 'I laugh and joke a lot with my friends'); self-enhancing (e.g. 'My humorous outlook on life keeps me from getting overly upset or depressed about things'); aggressive (e.g. 'If someone makes a mistake, I will often tease them about it'); and self-defeating (e.g. 'I let people laugh at me or make fun at my expense more than I should'). The HSQ is comprised of 32 items, where each style of humor is determined by eight items. Respondents indicate the degree to which they agree or disagree with each item using a seven-point Likert scale (where 1 = totally disagree and 7 = totally agree). For each subscale, total scores range between 8 and 56. Higher scores indicate a stronger tendency of the respective humor style. Internal consistency (Cronbach's α) for each subscale in this study were as follows: 0.87 for

affiliative; 0.82 for self-enhancing; 0.50 for aggressive; and 0.89 for self-defeating. The subscale examining the presence of an aggressive humor style was not analyzed when considering the poor internal consistency observed amongst this sample.

2.2.3 Pictorial stimuli

We used a previously validated image set comprised of 16 control and 16 depression-related memes (see Akram et al. 2020). The depression-related memes contained affective content directly related to key features of depression (e.g. suicide, isolation, hopelessness, hypersomnia) indicated by the DSM-5 criteria for Major Depressive Disorder (American Psychiatric Association 2013). In contrast, control memes reflected generally humorous social commentaries that were unrelated to depression (see Figure 1 for example). Image size was standardized for presentation (640 × 640px).

2.3 Procedure

Ethical approval was granted by the [Masked_for_Review] Research Ethics Committee. This experiment was conducted in accordance with the Declaration of Helsinki, and all participants gave their written informed consent before participation. Participants completed the online questionnaire, in which they were presented the series of 32 pictorial memes in randomized order. Using a 5-point likert scale ranging from strongly disagree (=1) to agree (=5), participants reported the extent to which each meme was considered to be: positive; relatable; funny; something they would share with other people; and something that would make a person with depression feel good. In addition, participants categorically indicated whether each meme was perceived to be more related to anxiety, depression, or neither. Following the pictorial meme ratings, the CES-D and HSQ was administered. Once complete, participants were debriefed about the nature of the study.

2.4 Statistical analyses

2.4.1 Participant grouping

Participants were first grouped based on the severity of reported depression symptoms. Using the CES-D, individuals with a score of: ≤23 (Mean = 16.88 ± 4.33; Range = 7–23) were placed into the control group (*n*=67: mean age = 28.55 ± 9.09; 71% female); and ≥24 (Mean = 33.05 ± 5.34; Range = 24–45) into the depression symptoms group (*n*=78: mean age = 25.60 ± 9.75; 65% female). Following, mean

perception ratings for depressive and control memes were calculated for the whole sample and each individual group. This was conducted for each parameter assessed. Specifically: (a) valance, as assessed by asking the extent to which each meme was considered to be positive (i.e. valance); (b) humor (or funniness); (c) relatability; (d) shareability; and (e) something that would make a person with depression feel good (DEPFEEL).

2.4.2 Analysis

Jamovi was used to conduct statistical analyses of the data. Independent samples *t*-tests examined group differences in meme ratings and humor styles. Next, a series of 2 (group: control vs. depression symptoms) × 2 (meme type: depressive vs. control) mixed measures AANOVAs were employed, with rating scores for each parameter as dependent variables. This was conducted to assess the main effects of group and meme type, as well as the group x meme type interaction. Moreover, simple effects analyses were performed to determine any significant interactions as appropriate. This was followed by a series of hierarchical linear regression analyses to determine the extent to which group (control vs. depression symptoms) differences in the perception of depression-related memes were influenced by humor style. For example, group status (step 1), and humor style subscales (affiliative, aggressive, self-enhancing, self-defeating: step 2) were entered as predictor variables. Finally, mediational analyses were performed using the MEDMOD plugin for Jamovi to explore potential direct (c') and indirect (c) effects of depressive symptoms on meme ratings via humor styles. Significance was considered at the p<0.05 level.

3 Results

Mean scores on the CES-D and HSQ, as well as meme ratings, are displayed in Table 1. As expected, those in the depression group displayed significantly greater symptoms of depression $t(1,143) = -19.80$, p<0.001. However, groups did not differ in age $t(1,143) = 1.80$, p=0.074 nor sex $X^2 = 0.273$, p=0.601. Group comparisons evidenced that, relative to controls, the depression symptoms group rated depression-related memes as significantly more humorous, relatable, sharable, and likely to improve the mood of someone with depression (see Table 1). Whilst no group differences in aggressive or affiliative humor styles were observed, depressed individuals reported greater use of positive self-enhancing humor (31.35 ± 9.20) and less use of self-defeating (25.37 ± 11.04) humor when compared to controls (self-enhancing: 26.67 ± 8.82; self-defeating: 33.19 ± 1.14).

3.1 Valance

The results revealed a significant main effect of meme type (F(1,143) = 394.22, p=0.001) on ratings of valence. However, no main effects of group (F(1,143) = 0.00, p=0.998) or group x meme type interactions (F(1,143) = 1.45, p=0.230) were determined.

3.2 Humor

The results demonstrated a significant main effect of group (F(1,143) = 8.39, p=0.004), but not meme-type (F(1,143) = 0.20, p=0.654) on humor ratings. Moreover, a significant group × meme type interaction demonstrated that, compared to control participants (3.02 ± 0.94), individuals experiencing symptoms of depression (3.81 ± 0.95) rated the depressive memes as significantly more humorous, F(1,143) = 26.06, p=0.001. Individual analysis of humor ratings for each meme type revealed a significant difference between individuals experiencing symptoms of depression and control participants for depressive memes only (t(143) = −5.05, p=0.001). No group differences were observed for neutral memes (t(143) = −1.09, p=0.280).

3.3 Relatability

The results revealed a significant main effect of group (F(1,143) = 27.07, p=0.001) and meme type F(1,143) = 26.18, p=0.001) on ratings of relatability. Moreover, a significant group × meme type interaction demonstrated that, compared to control participants (2.99 ± 0.89), the depression symptoms group (4.13 ± 0.75) rated depressive memes as significantly more relatable, F(1,143) = 53.37, p=0.001. Individual analysis of relatability ratings for each meme type revealed a significant difference between individuals experiencing symptoms of depression and control participants for depressive memes only (t(143) = −8.31, p=0.001). No group differences were observed for neutral memes (t(143) = 0.97, p=0.333).

3.4 Shareability

The results demonstrated a significant main effect of group (F(1,143) = 6.34, p=0.013), but not meme-type (F(1,143) = 1.36, p=0.245) on the likelihood of sharing memes with other people. Moreover, a significant group × meme type interaction demonstrated

that, compared to control participants (2.28 ± 1.02), the depression symptoms group (3.01 ± 1.21) rated depression-related memes as significantly more sharable, $F_{(1,143)} = 12.60$, p=0.001. Individual analysis of shareability ratings for each meme type revealed a significant difference between individuals experiencing symptoms of depression and control participants for depressive memes only ($t(143) = -3.87$, p=0.001). No group differences were observed for neutral memes ($t(143) = -0.07$, p=0.947).

3.5 DEPFEEL

The results revealed significant main effects of group ($F_{(1,143)} = 4.00$, p=0.047) and meme-type, $F_{(1,143)} = 8.56$ p=0.004. Moreover, a significant group × meme type interaction demonstrated that, compared to control participants (2.19 ± 1.02), the depression symptoms group (2.79 ± 0.98) rated depressive memes as significantly more likely to improve the mood of someone with depression, $F_{(1,143)} = 14.74$, p=0.001. Individual analysis of ratings for each meme type revealed a significant difference between individuals experiencing symptoms of depression and control participants for depressive memes only ($t(143) = -3.57$ p=0.001). No group differences were observed for neutral memes ($t(143) = -0.94$, p=0.350).

3.6 Mediating role of humor style

Hierarchical linear regression analysis demonstrated that the group status (control vs. depression symptoms) significantly predicted the extent of humor ratings whilst observing depression-related memes (step 1: 15% variance explained; see Table 3 panel a). However, after accounting for each humor style (affiliative, aggressive, self-enhancing, self-defeating), group status and self-defeating humor remained the only significant predictor of increased humor ratings of in the following step (step 2: 25% variance). Interestingly, this pattern of results was mirrored for individual analysis of relatability, shareability and DEPFEEL, whereby symptoms of depression (group status) and self-defeating humor remained the only significant predictor of increased ratings (see Table 3 panels b–d respectively). No significant effects were observed in relation to valance ratings (see Table 3 panel e).

The mediating effects of humor styles were examined using the MEDMOD plugin for Jamovi. Bootstrapping with 1,000 bias-corrected and accelerate resamples and 95% confidence intervals were used, and the Sobel test (z) was used to indicate the hypothesized mediation effects. As demonstrated in Table 4 (and Figure 3), the results demonstrated significant direct effects between group status

Table 3: Hierarchical linear regression analyses with group status (control vs. depression symptoms) and humor styles as the predictor variables; meme ratings as the dependent variable.

Predictors [DV]	R^2	β	t	Sig.
[A: Humor]				
Step 1	0.15			
Group status		0.795	5.084	0.001***
Step 2	0.25			
Group status		0.533	3.155	0.008**
Self-enhancing		0.001	0.133	0.889
Self-defeating		−0.030	−4.062	0.001***
Affiliative		−0.005	−0.517	0.602
Aggressive		−0.015	−1.114	0.290
[B: Relatable]				
Step 1	0.33			
Group status		1.132	8.302	0.001***
Step 2	0.40			
Group status		0.892	6.096	0.001***
Self-enhancing		0.002	0.210	0.819
Self-defeating		−0.028	−4.449	0.001***
Affiliative		0.003	0.400	0.675
Aggressive		−0.009	−0.818	0.357
[C: Shareable]				
Step 1	0.09			
Group status		0.727	3.868	0.001***
Step 2	0.22			
Group status		0.479	2.411	0.021*
Self-enhancing		−0.011	−0.982	0.372
Self-defeating		−0.033	−3.795	0.001***
Affiliative		0.010	0.879	0.361
Aggressive		−0.037	−2.354	0.051
[D: DEPFEEL]				
Step 1	0.08			
Group status		0.584	3.568	0.002**
Step 2	0.13			
Group status		0.520	2.855	0.012*
Self-enhancing		−0.017	−1.697	0.077
Self-defeating		−0.017	−2.152	0.040*
Affiliative		0.008	0.767	0.436
Aggressive		−0.012	−0.866	0.417
[E: Valance]				
Step 1	0.00			
Group status		0.087	0.608	0.375

Table 3: (continued)

Predictors [DV]	R^2	β	t	Sig.
Step 2	0.03			
Group status		0.055	0.339	0.731
Self-enhancing		0.002	0.250	0.811
Self-defeating		0.001	0.123	0.910
Affiliative		0.010	1.085	0.275
Aggressive		−0.026	−1.998	0.135

Bootstrapped at 1,000 BCa samples. DEPFEEL, ratings of the extent to which memes would make someone with depression feel good. *Sig at < 0.05, **< 0.01, ***< 0.001.

and ratings of humor, relatability, shareability, and the likely to improve the mood of someone with depression, but not valance. However, a series of indirect effects of group-status via depression for three types of meme rating (humor, relatability, shareability) were only observed for self-defeating humor. No indirect effects between group status and ratings of valance and DEPFEEL were observed. In summary, compared to non-depressed controls, individuals experiencing symptoms of depression perceive depressive memes as more humorous, relatable, and shareable with the potential of improving the mood of a person with depression. However, these differences in interpretation (humor, relatability, shareability) appear to be mediated by one's level of self-defeating humor style.

Table 4: Examination of the mediating effect of humor style, with and meme ratings as the independent variables (IV) and group status (control vs. depression symptoms) as the dependent variable (DV).

DV	Mediator	Z: Total effect (c path)	Z: Direct effect (c' path)	Total indirect effect		β	P
				Point est.	95% CI		
[A]							
Humor	Self-enhancing	0.12		0.048	−0.08, 0.12	0.003	0.903
	Self-defeating	3.06		0.076	0.11, 0.43	0.115	0.002**
	Affiliative	0.22		0.003	−0.02, 0.07	0.002	0.829
	Aggressive	0.70		0.020	−0.01, 0.11	0.010	0.486
	Direct:		5.07	0.533	0.17, 0.90	0.263	0.003**
[B]							
Relatable	Self-enhancing	0.21		0.008	−0.06, 0.10	0.004	0.838
	Self-defeating	2.91		0.221	0.09, 0.40	0.112	0.004**
	Affiliative	−0.15		−0.002	−0.05, 0.02	−0.001	0.880
	Aggressive	0.63		0.013	−0.01, 0.08	0.006	0.526
	Direct:		5.45	0.892	0.59, 1.22	0.449	0.001***

Table 4: (continued)

| DV	Mediator	Z: Total effect (c path)	Z: Direct effect (c' path)	Total indirect effect		β	P
				Point est.	95% CI		
[C]							
Sharable	Self-enhancing	−0.81		−0.007	−0.21, 0.04	−0.022	0.419
	Self-defeating	3.02		0.049	0.16, 0.47	0.011	0.003**
	Affiliative	−0.33		−0.006	−0.10, 0.01	−0.003	0.743
	Aggressive	0.99		−0.049	−0.01, 0.21	0.021	0.321
	Direct:		2.36	0.479	0.08, 0.90	0.205	0.018*
[D]							
DEPFEEL	Self-enhancing	−1.54		−0.081	−0.22, −0.00	−0.040	0.124
	Self-defeating	1.84		0.133	0.01, 0.31	0.066	0.066
	Affiliative	−0.27		−0.005	−0.08, 0.02	−0.003	0.786
	Aggressive	0.57		0.017	−0.01, 0.19	0.008	0.568
	Direct:		2.75	0.520	0.15, 0.89	0.256	0.006**
[E]							
Valance	Self-enhancing	0.23		0.011	−0.07, 0.11	0.006	0.819
	Self-defeating	−0.11		−0.007	−0.13, 0.12	−0.003	0.912
	Affiliative	−0.33		−0.006	−0.08, 0.02	0.004	0.742
	Aggressive	0.80		0.035	−0.01, 0.18	0.020	0.423
	Direct:		0.34	0.055	−0.27, 0.37	0.032	0.732

P, Sobel test; Mediation model, 1,000 bootstrap BCa samples; Confidence that do not include zero are significant at the 0.05 level. *Sig at < 0.05, **< 0.01, ***< 0.001.

4 Discussion

The present research examined the relationship between symptoms of depression and the interpretation of depression-related and control memes, whilst incorporating the potential mediating role of humor style. In line with previous work, with the exception of valence ratings, groups differed in their interpretation of depressive memes (Akram et al. 2020). More specifically, the perception of humor, relatability, shareability and mood improving potential of depression-related, but not control, memes were all greater amongst individuals with symptoms of depression relative to non-depressed controls. However, for ratings of humor, shareability and relatability, these differences were mediated by the extent of ones self-defeating humor style.

Humor which is positively orientated appears to reduce emotional distress and emotion dysregulation in non-depressed individuals (Martin et al. 1983; Newman et al. 1996; Samson et al. 2012; Vaillnet et al. 2000). However, the current outcomes
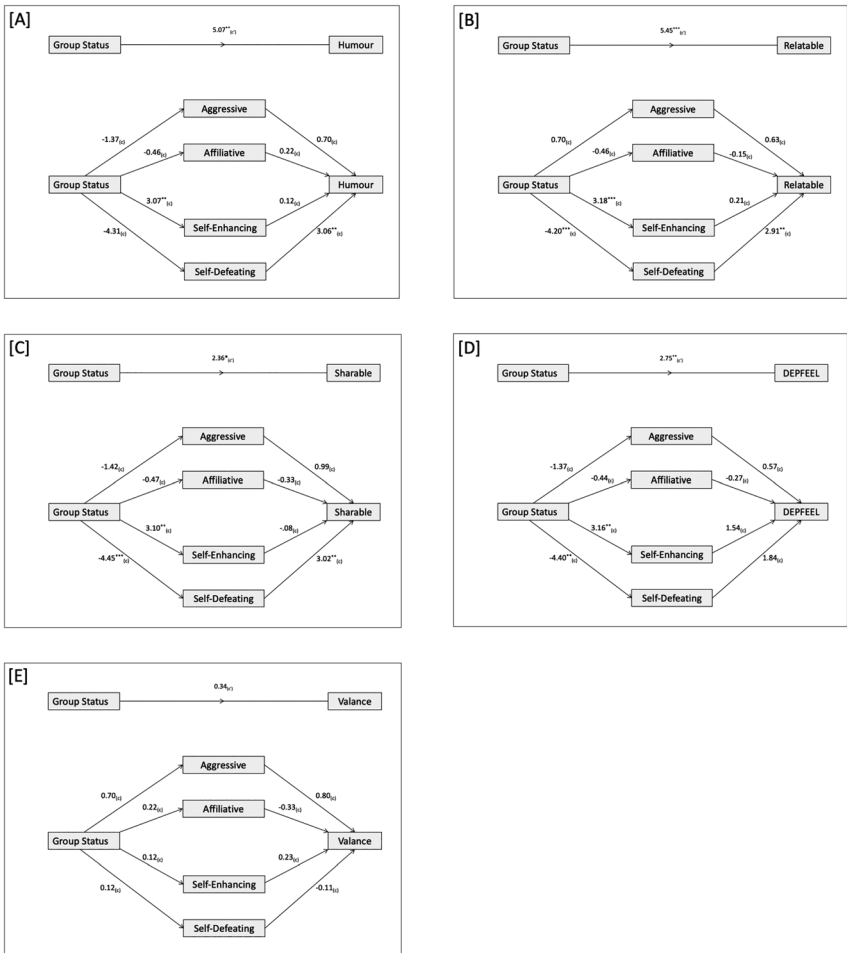
Figure 3: Visual representation of both direct (c') and indirect effects (c) yielded from the mediational analyses. [A] humor ratings; [B] relatability ratings; [C] shareability ratings; [D] DEPFEEL ratings; and [E] valance ratings.

highlight benefits of negative humor for those experiencing depressive symptoms. Despite the negative and self-defeating scenarios presented in depressive memes, their contextual salience to depressed individuals may be considered somewhat positive. Certainly, by definition, Internet memes provide humorous social commentaries which contextually relate to their target demographic. With that in mind, recent work evidenced perceived benefits related to online interaction with affective Internet memes (Akram et al. 2020; Kariko and Anasih 2019). In a survey

of 133 college students, 47% of individuals reported engaging with memes as a way of alleviating psychiatric symptoms (Kariko and Anasih 2019). In this study, humor and relatability associated with dark and self-deprecating memes were reported to function as a coping mechanism, allowing individuals to laugh at their problems whilst connecting with others in the same situation. Moreover, comparison of depressed individuals and controls found perceptual differences in the interpretation of Internet memes illustrating the experience of depression (e.g., death, suicide, isolation, hopelessness, hyper/insomnia: Akram et al. 2020). Here, the perception of humor, relatability, shareability and mood improving potential of these memes were significantly higher amongst those presenting with depressive symptoms. Engaging with Internet memes related to one's specific difficulties may potentially come with beneficial consequences by theoretically accentuating a humorous take on a negative experience, and a perceived sense of social support through the normalization of depressive symptoms. Internet memes visually portray the debilitating nature of depression, which verbally, may be difficult to describe. Considering depressed individuals benefit from social support through online interaction, by engaging with depression-related memes (e.g., sharing, liking) depressed individuals may possibly form social and emotional bonds with others that are perceived as socially supportive (Akram et al. 2020).

With regards to the role of humor styles, generally, positive affiliative and self-enhancing humor are considered beneficial for wellbeing, whereas negative self-defeating and aggressive styles are and considered detrimental (Martin 2001). According to recent meta-analytic data, depressed individuals display an increased propensity to engage in negative (i.e., aggressive and self-defeating) rather than positive (affiliative, self-enhancing) humor (Schneider et al. 2018). However, the present outcomes found the presentation of humor styles to be somewhat mixed across groups. Here, those experiencing symptoms of depression reported greater use of positive self-enhancing humor and less use of self-defeating humor when compared with controls. More crucially, our data suggests perceptual differences in the observation of depressive memes were largely mediated by the extent to which individuals presented self-defeating humor styles. Here, depressive memes were more favorable in those displaying depressive symptoms and reduced reports of self-defeating humor. These outcomes make sense when considering the nature of this style of humor. Indeed, depressive memes present a humorous take on negative and stressful life events and may serve as an outlet for those who would otherwise fail to use self-enhancing humor in day-to-day life. In the context of self-defeating humor, depressive memes substantially differ in nature (i.e., self-disparaging behavior to gain approval of others, allowing one-self to be the focus of others' humor). Rather, as aforementioned, depressive memes allow a mutual socially supportive understanding to form with other people who share the same experience.

Several limitations of the current study should be noted. It is possible that some individuals observe depressive memes rather frequently and exposure to this type of content may lead to de-sensitization and self-trivialization as a depressive state is portrayed in a less meaningful way. The present study used a previously validated set of depressive memes (Akram et al. 2020), but future work should replicate these findings using an alternative culturally and topically current set of memes and in a sample meeting the diagnostic criteria for major depressive disorder where deficits in cognitive biases may be more pronounced.

In line with previous work, the perception of humor, relatability, shareability and mood improving potential of depression-related memes were all greater in individuals displaying depressive symptoms when compared with controls. These differences, for ratings of humor, shareability and relatability, were however mediated by the extent of one's self-defeating humor style. These findings suggest that Internet memes related to depression may potentially be beneficial for individuals experiencing subclinical depressive symptoms in the community, particularly in those presenting lower levels of self-defeating humor. Previous work suggests perceptual differences in the observation of depression-related memes to be mediated by deficits in the ability to deploy adaptive emotion regulation strategies (Akram et al. 2020). Here, we expand on this work by highlighting the mediating role of self-oriented humor. Further experimental and longitudinal investigations are however required to substantiate these claims. Here, observing longitudinal alterations in depressive symptomology in those who frequently observe depressive memes would be of particular interest to determine any benefits or detriments of Internet meme use. Whereas, in depressed individuals who do not engage with Internet memes, experimental exposure to depression-related or control memes may be explored in the context of symptom severity.

Author contribution: Study was designed and conceived by NMJ, KJG, UA. Data was collected by UA, NMJ. Data was analysed and reported by UA. Initial version of manuscript was written by UA. Following, Input was sought from NMJ, KJG, JD, who approved the final version of the manuscript.

References

Abravanel, Benjamin T. & Rajita Sinha. 2015. Emotion dysregulation mediates the relationship between lifetime cumulative adversity and depressive symptomatology. *Journal of Psychiatric Research* 61. 89–96.

Akram, Umair, Jennifer Drabble, Glhenda Cau, Frayer Hershaw, Frayer Rajenthran, Mollie Lowe, Carissa Trommelen & Jason G. Ellis. 2020. Exploratory study on the role of emotion regulation in perceived valence, humour, and beneficial use of depressive internet memes in depression. *Scientific Reports* 10(1). 1–8.

Akram, Umair, Jason G. Ellis, Glhenda Cau, Frayer Hershaw, Ashlieen Rajenthran, Mollie Lowe, Carissa Trommelen & Jennifer Drabble. 2021. Eye tracking and attentional bias for depressive internet memes in depression. *Experimental Brain Research*. 1–7. https://doi.org/10.1007/s00221-020-06001-8.

American Psychiatric Association. 2013. *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.

Beck, Aaron T. 1979. *Cognitive therapy and the emotional disorders*. Penguin.

Bessiere, Katherine, Sara Kiesler, Robert Kraut & Bonka S. Boneva. 2008. Effects of Internet use and social resources on changes in depression. *Information, Community & Society* 11(1). 47–70.

Bradley, Bekh, Jared A. DeFife, Clifford Guarnaccia, Justine Phifer, Negar Fani, Kerry J. Ressler & Drew Westen. 2011. Emotion dysregulation and negative affect: Association with psychiatric symptoms. *Journal of Clinical Psychiatry* 72(5). 685.

Crawford, Shelley A. & Nerina J. Caltabiano. 2011. Promoting emotional well-being through the use of humour. *The Journal of Positive Psychology* 6(3). 237–252.

Ellison, Nicole B., Charles Steinfield & Cliff Lampe. 2007. The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication* 12(4). 1143–1168.

Frost, Rachel L. & Debra J. Rickwood. 2017. A systematic review of the mental health outcomes associated with Facebook use. *Computers in Human Behavior* 76. 576–600.

Gkotsis, George, Anika Oellrich, Sumithra Velupillai, Maria Liakata, Tim J. P. Hubbard, Richard J. B. Dobson & Rina Dutta. 2017. Characterisation of mental health conditions in social media using informed deep learning. *Scientific Reports* 7. 45141.

Joormann, Jutta, Christian E. Waugh & Ian H. Gotlib. 2015. Cognitive bias modification for interpretation in major depression: Effects on memory and stress reactivity. *Clinical Psychological Science* 3(1). 126–139.

Julian, Laura J., Steven E. Gregorich, Chris Tonner, Jinoos Yazdany, Laura Trupin, Lindsey A. Criswell, Ed Yelin & Patricia P. Katz. 2011. Using the center for epidemiologic studies depression scale to screen for depression in systemic lupus erythematosus. *Arthritis Care & Research* 63(6). 884–890.

Kariko, Abdul Aziz Turhan & Nonny Anasih. 2019. Laughing at one's self: A study of self-reflective internet memes. *Journal of Physics: Conference Series* 1175(1). 012250.

Kelly, Yvonne, Afshin Zilanawala, Cara Booker & Amanda Sacker. 2018. Social media use and adolescent mental health: Findings from the UK Millennium Cohort Study. *EClinicalMedicine* 6. 59–68.

Kizilbash, Ali H, Rodney D Vanderploeg & Glenn Curtiss. 2002. The effects of depression and anxiety on memory performance. *Archives of Clinical Neuropsychology* 17(1). 57–67.

Kugler, Lisa & Christof Kuhbandner. 2015. That's not funny!–but it should be: Effects of humorous emotion regulation on emotional experience and memory. *Frontiers in Psychology* 6. 1296.

Labott, Susan M. & Randall B. Martin. 1987. The stress-moderating effects of weeping and humor. *Journal of Human Stress* 13(4). 159–164.

Martin, Rod A. 2001. Humor, laughter, and physical health: Methodological issues and research findings. *Psychological Bulletin* 127(4). 504.

Martin, Rod A. & Herbert M. Lefcourt. 1983. Sense of humor as a moderator of the relation between stressors and moods. *Journal of Personality and Social Psychology* 45(6). 1313.

Martin, Rod A., Patricia Puhlik-Doris, Gwen Larsen, Jeanette Gray & Kelly Weir. 2003. Individual differences in uses of humor and their relation to psychological well-being: Development of the humor styles questionnaire. *Journal of Research in Personality* 37(1). 48–75.

Martínez-Martí, María L. & Willibald Ruch. 2014. Character strengths and well-being across the life span: Data from a representative sample of German-speaking adults living in Switzerland. *Frontiers in Psychology* 5. 1253.

McDowell, Ian. 2006. *Measuring health: a guide to rating scales and questionnaires*. USA: Oxford University Press.

Newman, Michelle G. & Arthur A. Stone. 1996. Does humor moderate the effects of experimentally-induced stress? *Annals of Behavioral Medicine* 18(2). 101–109.

Nguyen, Melanie, Yu Sun Bin & Andrew Campbell. 2012. Comparing online and offline self-disclosure: A systematic review. *Cyberpsychology, Behavior, and Social Networking* 15(2). 103–111.

Ofcom UK. 2020. *Online Nation 2020 Report*. Available at: https://www.ofcom.org.uk/research-and-data/internet-and-on-demand-research/online-nation.

Overholser, James C. 1992. Sense of humor when coping with life stress. *Personality and Individual Differences* 13(7). 799–804.

Perchtold, Corinna M., Elisabeth M. Weiss, Christian Rominger, Kurt Feyaerts, Willibald Ruch, Andreas Fink & Ilona Papousek. 2019. Humorous cognitive reappraisal: More benign humour and less" dark" humour is affiliated with more adaptive cognitive reappraisal strategies. *PLoS One* 14(1). e0211618.

Rock, Phillipa L., Jonathan Roiser, Wim J. Riedel & Andrew Blackwell. 2014. Cognitive impairment in depression: A systematic review and meta-analysis. *Psychological Medicine* 44(10). 2029.

Ruch, Willibald & Jennifer Hofmann. 2017. Fostering humour. In C Proctor (ed.), *Positive psychology interventions in practice*, 65–80. Cham: Springer International Publishing.

Samson, Andrea C. & James J. Gross. 2012. Humour as emotion regulation: The differential consequences of negative versus positive humour. *Cognition & Emotion* 26(2). 375–384.

Samson, C Andrea & James J Gross. 2014. The dark and light sides of humor. An Emotion-Regulation Perspective. In J. Gruber & J. T. Moskowitz (eds.), *Positive emotion. Integrating the light sides and dark sides*, 169–182. New York, NY: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199926725.003.0010.

Schneider, Martha, Martin Voracek & Ulrich S. Tran. 2018. "A joke a day keeps the doctor away?" Meta-analytical evidence of differential associations of habitual humor styles with mental health. *Scandinavian Journal of Psychology* 59(3). 289–300.

Shifman, Limor. 2013. Memes in a digital world: Reconciling with a conceptual troublemaker. *Journal of Computer-Mediated Communication* 18(3). 362–377.

Sliter, Michael, Aron Kale & Zhenyu Yuan. 2014. Is humor the best medicine? The buffering effect of coping humor on traumatic stressors in firefighters. *Journal of Organizational Behavior* 35(2). 257–272.

Strick, Madelijn, Rob W. Holland, Rick B. Van Baaren & Ad D. Van Knippenberg. 2009. Finding comfort in a joke: Consolatory effects of humor through cognitive distraction. *Emotion* 9(4). 574.

Vaillant, George E. 2000. Adaptive mental mechanisms: Their role in a positive psychology. *American Psychologist* 55(1). 89.

Valkenburg, Patti M. & Jochen Peter. 2009. Social consequences of the internet for adolescents: A decade of research. *Current Directions in Psychological Science* 18(1). 1–5.

Wang, Jinghui, Xiaohang Wu, Weiyi Lai, Erping Long, Xiayin Zhang, Wangting Li & Yi Zhu. 2017. Prevalence of depression and depressive symptoms among outpatients: A systematic review and meta-analysis. *BMJ Open* 7(8). e017173.

Youngren, Mary A. & Peter M. Lewinsohn. 1980. The functional relation between depression and problematic interpersonal behavior. *Journal of Abnormal Psychology* 89(3). 333.

Bionotes

Kathryn J Gardner
University of Central Lancashire, Preston, Lancashire, UK

Kathryn J Gardner completed her PhD in Psychology at the University of Central Lancashire (UClan) where she is now a Senior Lecturer in Psychology. Kathryn is Programme Director for UCLan's MSc Applied Clinical Psychology, and Postgraduate Diploma Associate Psychological Practitioner. In addition to Kathryn's educational leadership Kathryn is co-founder of Suicide and Self-Harm Research North West. Kathryn's research specialisms include personality and individual differences, emotional and social cognition, psychometrics, emotion dysregulation, personality disorder, and self-harm.

Nicola-Maria Jabs
University of Central Lancashire, Preston, Lancashire, UK

Nicola-Maria Jabs completed her BSc in Neuropsychology at the University of Central Lancashire (UClan) where she also completed her Master's degree in Applied Clinical Psychology.

Jennifer Drabble
Sheffield Hallam University, Sheffield, UK
MEMELab Sheffield Hallam University, Sheffield, UK

Jennifer Drabble completed her PhD at Sheffield Hallam University (SHU), which focused on mediators and moderators of self-harm (NSSI) in individuals with borderline personality disorder (BPD) features. Prior, she completed her MSc Forensic Psychology and BSc (Hons) Psychology at Sheffield Hallam. Currently a senior lecturer & researcher in forensic psychology at SHU. Jennifer's primary research focus is mental health, her side hustle is how Internet memes might serve as a coping mechanism for individuals experiencing mental health problems.

Umair Akram
MEMELab Sheffield Hallam University, Sheffield, UK
u.akram@shu.ac.uk

Umair Akram completed his PhD at Northumbria University, examining cognition in insomnia. Following, he completed his PDip in Sleep Medicine at the University of Oxford. Prior, he completed his BSc Psychology at the University of Hull. Currently a Psychology Lecturer at SHU. Umair's primary research examines cognitive and behavioural factors underlying insomnia. However, his side interest is focused on understanding how Internet memes might serve as a coping mechanism for individuals experiencing psychiatric symptoms.