OPEN ACCESS Freely available online

Journal of Depression and Anxiety

Review Article

The Potential Benefit of Cartoon Stimuli for Depression

Rowena Kong*

Department of Psychology, University of British Columbia, Canada

ABSTRACT

The possible significance of compromised exposure to positive stimuli during an individual's early childhood could contribute to impoverished positive memory development and subsequently dysregulated emotional responses to such valence of stimuli in adulthood. This could potentially explain dampened positive emotional responses of depressed individuals as reported in imaging studies of the brain's mesolimbic reward pathways. This paper provides emphasis and suggestions for a preliminary exploration of positive cartoon stimuli as a new tool in therapeutic targets for depression treatment and research that cater to a subgroup of depressive individuals who had experienced childhood trauma and stressful episodes as their primary causes of the disorder. Cartoon stimuli as a form of visual and interactive therapy may provide a compensatory and restorative component for the emotional losses and insults on an otherwise healthy childhood positivity required for normal and balanced neuropsychological development and growth. Unfortunately, such readily available resources for therapy have hardly been considered and utilized. The potential benefit of exposure to cartoon stimuli may extend beyond the method of positive mood induction and further addresses the need for both implicit and explicit comfort, understanding, emotional and situational relatedness that compensate for the lack of such stimulation during an early stressful life. Through evoking childlike positive associations, it is hypothesized that depression could reduce in severity and the threshold for activation of response to positive stimuli and themes lowered, thereby restoring negative and positive mood imbalances.

Keywords: Depression; Cartoon; Stimuli; Emotion; Therapy

INTRODUCTION

Depression is considered as a mood disorder that is characterized by symptoms such as anhedonia or a decreased ability to feel pleasure, increased frequency of negative mood and reduced interest in activities which one used to enjoy. Research findings have attributed the manifestations of such symptoms to a dysregulated neurotransmitter balance and activation in the brain, with emphasis on the serotonergic and dopaminergic pathways. In addition to the advancing knowledge of these neurobiological mechanisms, a consideration of multiple social and behavioral factors is still fundamental to achieve a more adequate understanding of the underlying etiology of depression as a multifaceted disorder. Depressive individuals tend to be more responsive towards negative themes and stimuli than the positive and neutral [1]. Depression is therefore, arguably a disorder involving an imbalance between, as opposed to an absence or presence of, opposite positive and negative valences of the mood spectrum that has been tipped over to the latter extreme, which could be attributed to an overexposure to high stress experience(s) in early life and/or a recent period. Such an imbalance in emotional state and response of depressed individuals may be worth targeting in treatment. Recent years have seen a growing popularity of positive and pleasure-stimulating animal therapy with university students and hospital patients in times of great stress and suffering, the efficacy of which may build upon aspects of childhood related memories, companionship and affection for childlike animals. In many ways, an individual's liking for and attachment towards cartoon themes, characters and stories during childhood may share similar benefits as animal therapy based on their positive mood inducing appearances and comical behavior. Nevertheless, research has yet to explore on the possible potential benefit of visual exposure to cartoon images and animation as a method of therapy that delivers positive emotional comfort and relatedness beyond mood induction, in particular to subgroups of depressed individuals with childhood trauma and stressful experiences as causal contribution to their present development of depression. It is obvious that a period of early life stress provides an overexposure and stimulation of negative experiences and neuropsychological responses during a stage of vulnerable development that has long-term consequences stretching into adulthood. While it is questionable whether the duration of effect of positive mood induction evoked by visual

Correspondence to: Rowena Kong, Department of Psychology, University of British Columbia, Canada, Tel: +6043471637; E-mail:rowena.kong@alumni.ubc.ca

Received: August 15, 2019, **Accepted:** September 03, 2019, **Published:** September 09, 2019

Citation: Kong R (2019) The Potential Benefit of Cartoon Stimuli for Depression. J Dep Anxiety 8:341. doi: 10.35248/2167-1044.19.8.341

stimuli could be long-lasting, when the provision of comfort, relevant and meaningful understanding conveyed by such visual cues is considered along with their influence on an individual's transient mood, the outcome on one's psychophysiological state may be cumulative and additive.

Studies have demonstrated that depressed individuals tended to exhibit an attentional bias towards negative stimuli and blunted responsiveness to positive stimuli and reinforcement learning [1,2]. While the research literature has not been entirely clear whether a lack of or opposing influence on prior exposure to positive stimuli and events, especially during early life experiences, have played a role in the formation of depressive symptoms, early life stress and neglect are not uncommon in the history of depressed individuals [3-5]. In a study of undergraduate students by Storch and colleagues [6], it was shown that memories of being teased at during childhood were related to depressive symptoms and loneliness in adulthood. Chapman and colleagues [7] reported that adverse childhood experiences, e.g. emotional abuse, increased the risk of depressive disorders in adulthood in their retrospective survey study of a sample of adult cohort participants. Negative experiences during a period of development and vulnerability, when retained in one's memory, and perhaps aided by negativity bias, therefore may have effect on a later stage in life through cognitive and emotional associations. These negative experiences therefore overweigh the impoverished and minimally encountered positive experiences and stimulations that could have otherwise contributed to a more balanced sensitive window in childhood development. Psychosocial and environmental past experiences in life have the ability and tendency to form consolidation of long-term memories that could shape and influence our perception and decision-making at a later point in time in which pharmacological intervention are incapable of producing, thus explaining their relapse rates. Mood-congruent memory and processing bias in depressed individuals, in which depressed mood evokes recall of experiences which are similarly sad, have been demonstrated at the level of both explicit memory and automatic responses in the absence of conscious awareness, with the brain's prefrontal and amygdala(responsible for emotional processing) connections detected to be involved [8-11]. A reason for such finding could be that similar neural regions and connections handle the processing of congruent affective information and that the brain utilizes such ease of strategy and time-saving efficiency for memory retrieval on the spot as an evolved adaptation.

In terms of memory processing, depressed participants in a study who have been diagnosed with major depressive disorder also displayed a biased heightened sensitivity toward the neural processes of encoding negatively valenced stimuli by recruiting more strongly interconnected brain regions involved in emotion and memory, thereby exhibiting better recognition of negative stimuli and information [12]. This implies a mutual influence between emotion and memory brought about by the intimate neural framework that helps define and run the course of depression. Clearly, there are different subgroups of depressive individuals who vary along the type and intensity of childhood experiences and neuropsychological vulnerability. Perhaps, it is time to focus on aspects that could have deterred the sensitivity of depressive individuals away from positively valenced stimuli and forming lasting recognition of them in memory through utilizing elements. Arguably, childhood memories and their associations, have an influence on an individual's past and present emotional states and negative memories may cause one to be more vulnerable to exhibiting and exacerbating congruent negative emotional responses.

LITERATURE REVIEW

Cartoon stimuli and depression

There have been studies which examined and associated cartoon stimuli with humor and depression. Scogin and Merbaum [13] reported no correlational relationship between Beck Depression Inventory Scores and cartoon ratings in terms of positive emotional responses such as enjoyment and laughter. An implication of this study's result is that participants who scored high on the Beck Depression Inventory did not respond significantly less positively to the cartoon stimuli type than their counterparts who scored low. On the other hand, the cartoon stimuli used for the study were categorized on the basis of aggressive and non-aggressive themes, which although are a common expressive form of humor in mainstream media, may lack relevant and meaningful associations with the baseline emotional state of depressed individuals. Humor as a measure of depressive state and/or symptom offers minimal potential in indicating beneficial therapeutic effect when the direction taken by the employed methodology is different. Freiheit, Overholser, and Lehnert [14] reported that adolescents were more likely to use humor as a means to cope with their emotional challenges in association with depression. Action-oriented aggressive connotations in cartoons for the study by Scogin and Merbaum [13] may likely provide little appeal to participants who were prone to passivity in depression. The role of humor and its responses in depression thus require to be reconsidered from a variety of attributes in terms of a cartoon's theme, its focal character background(s), and conveyed emotional, social, moral, visual artistic and aesthetic component qualities that are potentially "non-humorous" but deemed relevant and meaningful to the perceiver. The research literature, probably under the influence of mainstream cartoon media, often underestimates the rich non-humorous visual and semantic components of cartoon stimuli that extend beyond the humor boundary. As an example, the diverse artistic styles of facial expressions depicted in cartoon characters and their interactions are another potential avenue for therapeutic exploration. In the case of depression, the recognition of and response to emotional facial expressions and related aspects differ between depressed and non-depressed study participants along the dimension of valence [15,16].

As one of the basic cues of emotional information, facial expressions provide the lead in the development of interactions, relationships and social networks in humans. Depressed individuals usually have impoverished social circles and experiences of difficulties in the way of forming satisfying relationships, which in turn deprive them of the very necessary social support and benefits that could have helped with the challenges of their depression. The ability to accurately infer the emotional messages conveyed by the face of an interaction partner is important to achieve a productive and meaningful exchange. A deficit or abnormality in this area exhibited by depression-prone individuals could be a factor which helps set and run the course of recurrent social struggles and limitations posed by the disorder. Cartoons' facial expressions

may provide a useful aid and incentive for real-life perception and social cognition in the depressed, a potential demonstration of compensatory mechanism at work to enhance the impoverished emotional and social stimulation in depression. In Japan, a randomized controlled trial which assigned an intervention group of depressed participants to both antidepressants and a smartphone application based cognitive-behavioral therapy sessions utilizing animated cartoon characters' interactions had a better outcome on the Beck Depression Inventory scores, though the inclusion of cartoon characters was not considered an independent variable [17].

DISCUSSION

As research has shown that depressed individuals tend to demonstrate inaccurate and blunted responses in the process of recognizing positive emotional facial expressions, it is worthwhile examining possible affective pathways through which such responses operate. In addition to facial emotion stimuli, there is also a variation between depressed and non-depressed participants when viewing images from the International Affective Picture Set (IAPS), with the former rating greater sadness and lower arousal to positively valenced images than neutral images [18,19]. Based on such study results, Dunn and colleagues [18] offered the explanation that positive images were not able to arouse happiness in depressed participants and their ability to feel pleasure was impaired. Nevertheless, despite the small magnitude in sadness ratings, it is useful to examine possible factors that could have contributed to the contrasting reaction between the depressed and non-depressed to positive stimuli. Based on the observation that a negative mood state predominates for depressed individuals, it is worth studying how crucial a role the temporal dimension of one's life stages play in channelling the cause(s) and maintenance of the disorder. An examination of how the visual material of cartoon images, which are a significant part of children's pastimes and interest in affluent countries, affect the current mood of adult depressed individuals could aid in determining whether such images could restore the balance of positive affective responses to both positive and negative stimuli in general. It also takes a step forward in examining depression as a cognitive disorder apart from mood disturbance, encompassing attentional and early memory biases, and dysfunctional reward learning.

When participants were presented with neutral faces, there is inaccuracy in recognition and longer response time taken by depressed participants [20]. With respect to negative facial emotion processing, a review of 25 neuroimaging studies concluded that depressed participants showed increased sensitivity and response in comparison with healthy controls [21]. Mood-congruent processing bias links such heightened sensitivity to negative emotional stimuli of depressed participants to their similar valence state of mood, which explains their reduced response to positive stimuli in the absence of a congruent mood. In a study by Falkenberg and colleagues [22], the procedure of mood induction using presentation of emotionally expressive human facial and cartoon images to clinically depressed and healthy participants was attempted to examine the influence of such visual stimuli on emotional reactivity. The results demonstrate that funny and neutral cartoons could induce positive mood as successfully as samples of facial expressions posed by human photograph subjects in both groups of depressed and healthy participants. In terms of participants' facial expression and physiological measures, such stimuli also provided more insight on the variation in responses of the depressed group that implies deficit in emotional expression. However, there is currently no study which seeks to extend investigation further into a few other affective qualities of cartoon images, such as themes and explicit cartoon characters' facial expressions which touch less on humor but reflect more of human emotional needs, with the goal of exploring potential therapeutic avenues that could benefit dysfunctional positive mood and pleasure response deficit through mood enhancement in those who are clinically depressed. A study by Schneider and colleagues [23] demonstrated that healthy participants can be induced to feel happier and sadder by viewing pictures of happy and sad facial expressions respectively. Visual and/or animated stimuli therefore could enhance and alter our mood state(s) and is a good avenue for therapeutic intervention as far as depressive disorder is concerned. In addition to the strategy of decreasing mood incongruency, cartoon images which portray themes of self and social needs that offer positive attention on depressed viewers could test the potential of such effect on increasing pleasant mood level and positive cognitive associations through the degree of self-relevance in the images. On the other hand, it is worth exploring the possibility of lack of self-relevance portrayed in positive affective stimuli used in previous research by Dunn et al. [18] could have accounted for the low arousal ratings by depressed participants.

CONCLUSION

While the technique of mental visual imagery has been incorporated into therapy for depression, it can be explored whether tangible positive visual images could further aid this strategy in mood improvement by increasing the amount and frequency of visual input to work on within one's flexible perceptual space. Images and graphic stimuli tailored to one's depressive needs and personality type could promote new and previously inhibited affective and cognitive associations that potentially lead to restorative neuropsychological stimulations in the brain in response to positively valenced stimuli. Attentional needs and awareness of self-other emotional state difference of depressed individuals, along with the mood soothing effect of cartoon images through non-humorous means, are an under-studied area in clinical psychology. Through exploring such themes in cartoon images, additional personalized therapeutic strategies could be considered that better address self-relevant needs and how they could be met with the goal of achieving lasting remission from clinical depression in cases when drug intervention has not been promising. To test further the feasibility of cartoon stimuli as potential therapeutic tools, studies could compare responses of depressed individuals to closely matched cartoon and real-life image stimuli in terms of implicit and explicit affective messages conveyed and compare how each type of visual stimuli influence participants' mood and cognition in terms of similarities and differences. Be it depression or otherwise, a well-balanced early life experience is vital to the development of a healthy psychological well-being in adulthood.

REFERENCES

1. Epstein J, Pan H, Kocsis JH, Yang Y, Butler T, Chusid J, et al. Lack of ventral striatal response to positive stimuli in depressed versus normal subjects. Am J Psychiatry. 2006; 163(10):1784-1790.

2. Pizzagalli DA, Holmes AJ, Dillon DG, Goetz EL, Birk JL, Bogdan R, et al. Reduced caudate and nucleus accumbens response to rewards in unmedicated individuals with major depressive disorder. Am J Psychiatry. 2009;166(6):702-710.

3. Botros M, Hodgins G, Nemeroff CB. The long-lasting neurobiological scars of early-life stress: Implications for the neurobiology of depression. In: Neurobiology of Depression Academic Press. 2019; 111-121.

4. Heim C, Binder EB. Current research trends in early life stress and depression: Review of human studies on sensitive periods, gene–environment interactions, and epigenetics. Experimental neurology. 2012;233(1):102-111.

5. Pace TW, Mletzko TC, Alagbe O, Musselman DL, Nemeroff CB, Miller AH, et al. Increased stress-induced inflammatory responses in male patients with major depression and increased early life stress. Am J Psychiatry. 2006;163(9):1630-1633.

6. Storch EA, Roth DA, Coles ME, Heimberg RG, Bravata EA, Moser J. The measurement and impact of childhood teasing in a sample of young adults. J Affect Disord. 2004;18(5):681-94.

7. Chapman DP, Whitfield CL, Felitti VJ, Dube SR, Edwards VJ, Anda RF. Adverse childhood experiences and the risk of depressive disorders in adulthood. J Affect Disord. 2004;82(2):217-225.

8. Elliott R, Rubinsztein JS, Sahakian BJ, Dolan RJ. The neural basis of mood-congruent processing biases in depression. Arch Gen Psychiatry. 2002;59(7):597-604.

9. Gaddy MA, Ingram RE. A meta-analytic review of mood-congruent implicit memory in depressed mood. Clin Psychol Rev. 2014;34(5):402-416.

10. Suslow T, Konrad C, Kugel H, Rumstadt D, Zwitserlood P, Schöning S, et al. Automatic mood-congruent amygdala responses to masked facial expressions in major depression. Biol Psychiatry. 2010;67(2):155-160.

11. Watkins PC, Mathews A, Williamson DA, Fuller RD. Mood-congruent memory in depression: Emotional priming or elaboration?. J Abnorm Psychol. 1992;101(3):581.

12. Hamilton JP, Gotlib IH. Neural substrates of increased memory sensitivity for negative stimuli in major depression. Biol Psychiatry. 2008;63(12):1155-1162.

13. Scogin FR, Merbaum M. Humorous stimuli and depression: An examination of Beck's premise. J Clin Psychol. 1983;39(2):165-169.

14. Freiheit SR, Overholser JC, Lehnert KL. The association between humor and depression in adolescent psychiatric inpatients and high school students. J Adolesc Res. 1998;13(1):32-48.

15. Gur RC, Erwin RJ, Gur RE, Zwil AS, Heimberg C, Kraemer HC. Facial emotion discrimination: II. Behavioral findings in depression. Psychiatry Res. 1992;42(3):241-251.

16. Suslow T, Dannlowski U, Lalee-Mentzel J, Donges US, Arolt V, Kersting A. Spatial processing of facial emotion in patients with unipolar depression: a longitudinal study. J Affect Disord. 2004;83(1):59-63.

17. Mantani A, Kato T, Furukawa TA, Horikoshi M, Imai H, Hiroe T, et al. Smartphone cognitive behavioral therapy as an adjunct to pharmacotherapy for refractory depression: A randomized controlled trial. J Med Internet Res. 2017;19(11):e373.

18. Dunn BD, Dalgleish T, Lawrence AD, Cusack R, Ogilvie AD. Categorical and dimensional reports of experienced affect to emotion-inducing pictures in depression. J Abnorm Psychol. 2004;113(4):654.

19. Rottenberg J, Kasch KL, Gross JJ, Gotlib IH. Sadness and amusement reactivity differentially predict concurrent and prospective functioning in major depressive disorder. Emotion. 2002;2(2):135.

20. Leppänen JM, Milders M, Bell JS, Terriere E, Hietanen JK. Depression biases the recognition of emotionally neutral faces. Psychiatry Res. 2004;128(2):123-133.

21. Stuhrmann A, Suslow T, Dannlowski U. Facial emotion processing in major depression: a systematic review of neuroimaging findings. Biol Mood Anxiety Dis. 2011;1(1):10.

22. Falkenberg I, Kohn N, Schoepker R, Habel U. Mood induction in depressive patients: A comparative multidimensional approach. PLoS One. 2012;7(1):e30016.

23. Schneider F, Gur RC, Gur RE, Muenz LR. Standardized mood induction with happy and sad facial expressions. Psychiatry Res. 1994;51(1):19-31.