The Emotion Paradox of Anhedonia in Schizophrenia: Or Is It?

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Anhedonia has long been considered a core clinical feature of schizophrenia.1–3 The most common definition of anhedonia is that it reflects a diminished capacity to experience pleasure. Although this definition clearly applies to many individuals diagnosed with major depression,4–7 recent empirical evidence suggests that it may not adequately describe the affective abnormalities characteristic of schizophrenia.8 For example, individuals with schizophrenia report levels of current (ie, in the moment) positive emotion and arousal that are comparable to healthy controls when exposed to stimuli in the laboratory (for meta-analyses, see Cohen and Minor, 2010; Llerena et al 2012),9,10 show similar increases in positive emotion when engaged in activities in their daily lives,11,12 and display comparable neural activation to controls when reporting their current positive emotions in response to pleasant stimuli (see Taylor et al 13 for a meta-analysis). Such evidence has led some to conclude that anhedonia should no longer be viewed as a diminished capacity for pleasure in this patient population.8,9,14,15

However, it is clear that not all aspects of emotional experience are normal in schizophrenia. For example, compared with healthy controls, patients typically report reductions in pleasure when queried during clinical interviews that obtain retrospective (ie, past) or prospective (ie, future) reports of pleasure,16–18 as well as questionnaires that use trait (eg, Positive and Negative Affect Scale19 or hypothetical (eg, Chapman Anhedonia Scales20 self-report formats. Experience sampling studies also indicate that schizophrenia patients have a reduced frequency of pleasurable experiences compared with controls,11,12,21,22 suggesting a diminution in pleasure-seeking behavior. At first glance, findings indicating normal in-the-moment experience of positive emotion appear to be at odds with those indicating diminished pleasure across all types of noncurrent positive emotion reports obtained via retrospective, prospective, trait, and hypothetical self-report formats. Some have even termed this apparent discrepancy the “emotion paradox” in schizophrenia to reflect a violation of the commonsense notion that reports of emotional experience obtained across different self-report formats should converge. But is this the case? Should one expect self-reports of current and noncurrent (eg, prospective, retrospective) positive emotion to be similar?

A large body of research on healthy individuals indicates that reports of current and noncurrent positive emotion typically show low correlations23,24 and that healthy individuals expect more pleasure in the future and remember more pleasure in the past compared with what they actually experience in the moment.25 Overestimation of past and future relative to current positive emotions, as well as low correlations between these types of self-reports, is thought to occur because self-reports of current and noncurrent emotion require access to different sources of emotion knowledge.26 In the field of affective science, the sources of emotion knowledge that are accessed when making prospective, retrospective, and current reports of positive emotion are well-delineated. In their seminal article on the “Accessibility Model of Emotional Self-Report,” Robinson and Clore26 review this literature and discuss how reports of current feelings require access to experiential emotion knowledge, whereas reports of noncurrent feelings (eg, retrospective, prospective, trait, and hypothetical) require access to semantic emotion knowledge. Semantic emotion knowledge includes beliefs about which types of emotions are likely to be elicited by specific situations (eg, “Social interactions are enjoyable”), as well as general beliefs that a person holds about himself or herself (“I am generally a happy person”). When viewed in relation to the accessibility model, overestimation of past and future relative to current positive emotion occurs because healthy individuals access semantic knowledge stores when making these noncurrent emotion reports, and
thus rely on beliefs about how they generally feel or how specific situations make them feel. In healthy individuals, overestimation of noncurrent positive emotion therefore at least in part reflects that most healthy individuals believe that they are generally in a moderately positive mood and that specific types of situations (eg, vacations) are pleasurable.26

The Psychological Components of Anhedonia: Low-Pleasure Beliefs and Reduced Overestimation of Past and Future Pleasure

We recently attempted to resolve the emotion paradox in schizophrenia by drawing upon insight from Robinson and Clore's model of emotional self-report and presented evidence that individuals with schizophrenia display the same pattern of low relationships among reports of current and noncurrent feelings as controls.14 Given that discrepancies among different types of emotional self-report are to be expected because they require individuals to access different sources of emotion knowledge, the emotion paradox in schizophrenia is readily understandable. When the literature on anhedonia and emotional experience in schizophrenia is viewed in relation to Robinson and Clore’s Accessibility Model,26 in fact reports of current positive emotion suggest that individuals with schizophrenia do not have reduced hedonic capacity and that diminished reports of noncurrent pleasure obtained via prospective, retrospective, trait, and hypothetical measures can be interpreted as evidence for “low-pleasure beliefs.”14 This interpretation is supported by evidence in healthy individuals indicating that all types of noncurrent emotion reports require access to semantic emotion knowledge (ie, beliefs) rather than experiential emotion knowledge.27,28 Thus, the literature on emotional experience and anhedonia in schizophrenia indicating normal current positive emotion and diminished noncurrent positive emotion can be taken as evidence for aberrant psychological rather than experiential processes.

In addition to acknowledging that reports of noncurrent feelings reflect dysfunctional psychological processes such as low-pleasure beliefs, it is important to recognize that individuals with schizophrenia also fail to overestimate past and future relative to current positive emotion to the same extent as controls. For example, Gard et al.11 demonstrated that controls anticipated more pleasure in the future than what they actually experienced in the moment when engaged in activities, whereas individuals with schizophrenia did not. Gard et al11 did not find that patients reported expecting less pleasure in the future than what they actually experienced in the moment, as the finding is sometimes interpreted in the field, but rather that patients simply did not overestimate their future relative to current pleasure to the same extent as controls. Similarly, it has been found that controls remember more pleasure in the past than what they actually experienced in the moment, but schizophrenia patients report roughly equivalent levels of retrospective and current positive emotion.29 Thus, schizophrenia is characterized by a reduction in the normative tendency to overestimate past and future relative to current positive emotions, a psychological abnormality that is more encompassing than an anticipatory pleasure deficit alone.

The Role of Cognitive Impairments in Retrospective and Prospective Emotion Reports

An important question thus remains unanswered: why do individuals with schizophrenia fail to display the prototypical pattern of overestimating past and future positive emotion? One possibility is that cognitive impairments interact with retrospective and prospective reports to prevent normal cognitive processes from promoting overestimation.

Retrospective Reports

In the affective science literature on healthy individuals, it is well documented that retrospective overestimation is predicted by greater reliance on peak experiences within the timeframe in question, as well as relying on one’s most recent experiences.30 Given the severity of long-term memory impairments in schizophrenia,31 one might expect that peak and recency mechanisms would not exert as much of an effect on retrospective reports of pleasure in patients, potentially making them less likely to overestimate pleasure retrospectively. Consistent with this notion, we recently reported data indicating that long-term memory deficits differentiated patients rated as being mild to moderately anhedonic on a retrospective clinical anhedonia rating scale32 from those patients where anhedonia was rated as being absent.14 Thus, long-term memory impairments may play a key role in diminished overestimation of past pleasure in individuals with schizophrenia.

Prospective Reports

Prospective emotion reports are also influenced by cognitive processes. Predicting one’s emotional experience in the future requires generating a mental representation of a situation that is salient enough to elicit a hedonic reaction in the present. The immediate hedonic reaction to these mental simulations is then used to generate a prospective self-report of how one would likely feel if that situation were to come to pass. Generating simulations that are salient enough to elicit an emotional reaction is heavily dependent upon working-memory capacity.25 However, there are limitations to working memory and the types of simulations we can generate. Due to these limitations, we are required to take shortcuts when simulating future events. For example, it is impossible
to create a mental representation that depicts every potential detail of an event. For this reason, mental representations tend to be essentialized, including only the most salient features of an event and omitting less essential features. Similarly, mental representations tend to be abbreviated. To prevent a mental representation from lasting as long as the actual event itself, our simulations are truncated and only include a few key features of the situation. By generating mental representations that are abbreviated and essentialized, healthy individuals are prone to overestimating their future level of positive emotion because their simulations focus only on certain peak hedonic qualities of a potential event. Were these mental representations to include a longer and more detailed account of a situation, the overall net hedonic value would be lowered and thus more consistent with what would occur in real life. It is also important to note that mental representations of the future are often influenced by our memories from the past. However, the memories that we retrieve are typically unrepresentative of how an event usually occurs. They are based upon peak emotional reactions we have had in such situations, as well as our most recent experiences. As such, we tend to overestimate our future positive emotions relative to what actually occurs in the moment because we draw upon unrepresentative memories when forming our simulations. Cognitive deficits in working memory and long-term memory may cause schizophrenia patients to produce mental representations that lack the salience needed to produce a strong hedonic reaction in the present. Their simulations may be too abbreviated or lack the detail needed to elicit feelings in the present, and they may be less likely to retrieve the types of unrepresentative peak intensity moments that result in overestimation of future pleasure.

The Behavioral Component of Anhedonia

As previously mentioned, it is also clear that there is a behavioral component to anhedonia. Experience sampling studies and clinical interviews indicate that patients engage in fewer pleasurable activities than controls even though they enjoy the activities they do engage in just as much as controls.11,12 There is some evidence that cognitive impairments contribute to this behavioral deficit. In healthy individuals, the motivation to pursue rewards is highly dependent upon how well simulations of future pleasure spur action.13,14 It may be that working-memory impairments prevent patients from generating mental representations of value that are salient enough to activate the decision-making processes needed to engage in goal-directed behavior. Consistent with this possibility, several studies have reported that patients have deficits in generating and maintaining mental representations of value and that these abnormalities are associated with impaired decision-making and reduced goal-directed behavior.13–15 Thus, cognitive deficits may be critically involved with patients’ failures to engage in motivated behaviors aimed at obtaining reward.

Conclusions

Although anhedonia has long been considered an experiential deficit in schizophrenia, recent research suggests that there is no diminished capacity for pleasure in schizophrenia. Rather, the self-reports typically interpreted as anhedonia reflect abnormal psychological processes, such as low-pleasure beliefs and reduced overestimation of past and future pleasure, as well as dysfunctional behavioral processes such as reduced pleasure-seeking behavior. Cognitive impairments may play a critical role in these psychological and behavioral components of anhedonia. Despite this updated understanding of anhedonia, the important question still remains: how do we treat these abnormalities? As I will review in a future issue of Schizophrenia in Translation, cognitive behavioral therapy and positive emotion enhancement techniques from the field of affective science may offer some new avenues for the treatment of anhedonia as it occurs in individuals with schizophrenia.

References


