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Research Article

Integrating behavioural immunity into substance-use disorder growth-related research: Insights from a qualitative approach

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Abstract

Substance use disorders (SUDs) have occupied the attention of scholars and practitioners for years and continue to do so, especially as the issues that pervade the literature are not only multiple but growing in complexity. However, one of the issues that requires mediating survival and growth as part of the proactive and reactive responses is behavioural immunity (BI), but it has not been explored beyond its traditional research context. In this research, we used a qualitative approach to explore the concept within the context of treatment for SUDs and related behaviour dynamics. We targeted people receiving treatment for SUDs, and mental health workers providing the treatments in three rehabilitation facilities in Jos, the capital of Plateau State, Central Nigeria. The data was analysed using QSR NVivo 20, based on the thematic analysis technique. Key findings emerged, suggesting that BI is part of the dynamics of certain avoidance behaviours and SUD-related depreciation and growth outcomes, leading to four pointers: growth pointers, depreciation pointers, depreciation-related growth, and growth-related depreciation. The findings contribute to the knowledge base of pathogen avoidance psychology by extending BI research to the SUDs and trauma-related avoidance paradigm.

Keywords: Behavioural immunity, post-traumatic growth, post-traumatic depreciation, pathogen avoidance, substance use disorder.

Introduction and Conceptualisation

All living organisms have been exposed to diverse contexts that may provoke pleasant and unpleasant experiences, depicting survival. This is part of the inevitable struggle of navigating the course of existence, which all life forms attempt as a normal part of development (LeDoux, 2022). Research in this type of behaviour response system exists both among ants and animals, but especially as the motivation to avoid infestation by life-threatening agents and avoid contact with any environmental and social context of fellow organisms (De Roode & Lefèvre, 2012; Eleftherianos et al., 2023; Schaller, 2006). When extended to human behaviour, this is concerned with the behavioural attempts to deal with perceived threats to their health, well-being, and the stability of the self (McKay et al., 2020; Schaller, 2011; Schaller & Duncan, 2011; Schaller & Park, 2011; Shakhar, 2019). In other words, it signifies the first and continuing line of defence to manage the perceived cues that are threatening self-existence and life functioning in the social, psychological, cognitive, and emotional domains. This defence system is indicated as a survival mechanism to motivate the organism toward taking proactive, reactive, and aversive actions known as avoidance behaviours (Masterson & Crawford, 1982). This is captured in the concept of behavioural immunity (BI), which is highlighted as a motivational variable in disease avoidance (Nunner et al., 2023).

Original research in this area evolved to study an individual's response to pathogen or parasite threats, and therefore, their motivation to manage these by mobilising a suite of cognitive, affective, and behavioural resources. Early formulations and applications of BI in disease-avoidant psychology (Cremer et al., 2007; Hart, 1990; Meunier, 2015) have reported that anti-parasite behavioural defences are widespread across the animal kingdom. Animals employ these behaviours as defensive responses to existing parasitic infections, thus promoting behavioural avoidance and recovery in the long term.

Furthermore, this behavioural defence among humans motivates them towards self-protection and adaptation (Schaller, 2011). It helps them avoid risks due to infections or parasitic infestation by taking necessary steps to deploy psychological resources or skills to deal with the threats (Murray et al., 2013; Murray & Schaller, 2012, 2016). BI has come to be associated more with the human context of social interaction and the risks of infection, infestation, or distress, which occupied diverse contexts of scholarly discussion and research, especially during the global COVID-19 pandemic (Bacon & Corr, 2020; Schaller et al., 2022; Van Diepenbeek & Kessler, 2023). The sum of events and accompanying actions that take place when an individual perceives a threat to their state of health and safety constitutes the behavioural immune system (BIS) which builds readiness for an intervention process to be set up (Ackerman et al., 2021) and represents the framework for enhancing the sensory and motivational systems' preparedness to avoid disease, infection and or parasite infestation (Oaten et al., 2011; Schaller, 2011). The defence and avoidance system may include fear and avoidance behaviour, tolerance, and resistance (Stockmeier et al., 2023).

Problem Statement

Although the classical position of BI research has been sustained over time, it has been shown that the psychological mechanism that mediates responses to potential infection is equally involved in active infection and illness behaviours (Schaller & Park, 2011). This facilitates recovery, conserves resources, and avoids further infection (Adelman & Martin, 2009; Maes et al., 2012), suggesting that BIS research can be extended beyond disease avoidance behaviour to experiences that are elicited when a disease has set in and there is an attempt to prevent and resist re-exposure (Fincher & Thornhill, 2012). This need becomes very crucial in the context of lifestyle-attenuated behaviours in substance use disorders (SUDs), which are

becoming more and more complex and critical, with multifaceted treatment, research, and recovery approaches (Kimball et al., 2020). It provides the potential for a transition of this work from disease-avoidant behaviour to actions and reactions toward avoidance of re-traumatisation, and further addiction. This is very crucial in the context of SUDs, which deal with multiple risky cues and struggles to disengage from psychoactive substances and the behaviours that sustain the experience. Although it is a motivational factor in the prevention of infection and infestation (Murray et al., 2013; Murray & Schaller, 2012), BI has not been explored within the purview of trauma related to SUDs.

Moreover, there is a dearth of literature involving BI within the context of trauma response research, which involves a different level of goal-directed behaviour compared to the prevailing infection-avoidance approach (Ziemssen, 2012). Thus, people respond in psychologically distinct ways to infection-avoidance stimuli, compared to those stimuli that connote other forms of threat (Krusemark & Li, 2011; Murray & Schaller, 2016; Van Hooff et al., 2013), such as trauma related to SUDs, and how these are negotiated to produce post-traumatic growth outcomes. Consequently, it is imperative to explore BI as a trauma-relevant motivational system in addiction settings and re-contextualise it within a multidisciplinary and integrative research paradigm (Clark & Fessler, 2014). Hopefully, this could become a precursor to research in trauma sensitivity and avoidance in substance use experiences. More importantly, it is crucial to explore the complementary value of BI to the growth course of individuals who are struggling with SUDs in a treatment context. Therefore, the research aim that guided this research study was to explore whether BI would function as a complementary defensive response mechanism within the context of rehabilitation for SUDs and associated behavioural outcomes.

Objectives

In this research study, we examined the relevance of BI within the context of treatment for SUDs. Specifically, we explored whether BI could be a complementary defensive response mechanism and whether it could fit within the outcome system of SUDs (post-traumatic growth and depreciation). The third objective inquired whether BI could be translated from a disease to a trauma and SUD avoidance construct.

Methods

Research Approach

We employed a qualitative research approach based on the constructivist paradigm, which emphasises the construction and interpretation of meaning based on individuals' sensory and experiential frames of reference, which acknowledges that individuals construct meaning as they interact with their environment, social and contextual settings (Carter & Fuller, 2015; Charmaz, 2006). We explored BI as a relatively novel concept in SUD research to gain a deeper understanding of participants' rich and complex experiences while undergoing rehabilitation, and that of mental health workers providing treatments for SUDs.

Sample

We targeted people receiving treatment for SUDs, and mental health workers providing the treatments in three rehabilitation facilities in Jos, the capital of Plateau State, Central Nigeria. The participants receiving treatments were addicted to any or a combination of substances such as alcohol, pharmaceutical opioids (tramadol, codeine, and morphine), heroin, cocaine, and

cannabis. In addition, they had a history of exhibiting addictive behaviour for not less than one year, undergoing treatment as inpatients, and consisted of 3 females and 21 males (Mean, 30.7 years; SD, 6.16) with an age range of 20 to 45 years.

Data Collection

Three semi-structured interview protocols were used to collect data. The post-traumatic growth interview protocol was used as the guide for collecting data from participants concerning their exposure to life events, their adverse experiences while growing up, and their struggles with substance use addiction. Information was also elicited about any lessons and growth experiences attributable to SUDs. In addition, the BI interview protocol was used to obtain information about how participants utilised avoidance and fears as adaptation experiences to SUDs.

Similar protocols were adopted for the focus group discussion sessions among participants and mental health professionals (therapists). We organised two focus group discussions in two different facilities. The first group consisted of seven participants who were in treatment at one of the approved facilities. The second group consisted of eight mental health workers, consisting of nurses, psychiatrists, physical health therapists, medical social workers, clinical psychologists, and a medical chaplain, drawn from another treatment centre approved for the research study. We used the convenience sampling procedure to recruit participants for the semi-structured interviews and focus group discussions. An average of 40 minutes was spent during the semi-structured interviews per person, and 60 minutes each for the focus group discussions. All semi-structured interview and focus group sessions were transcribed into text and analysed thematically using QSR NVivo 20 (Lumivero, 2022).

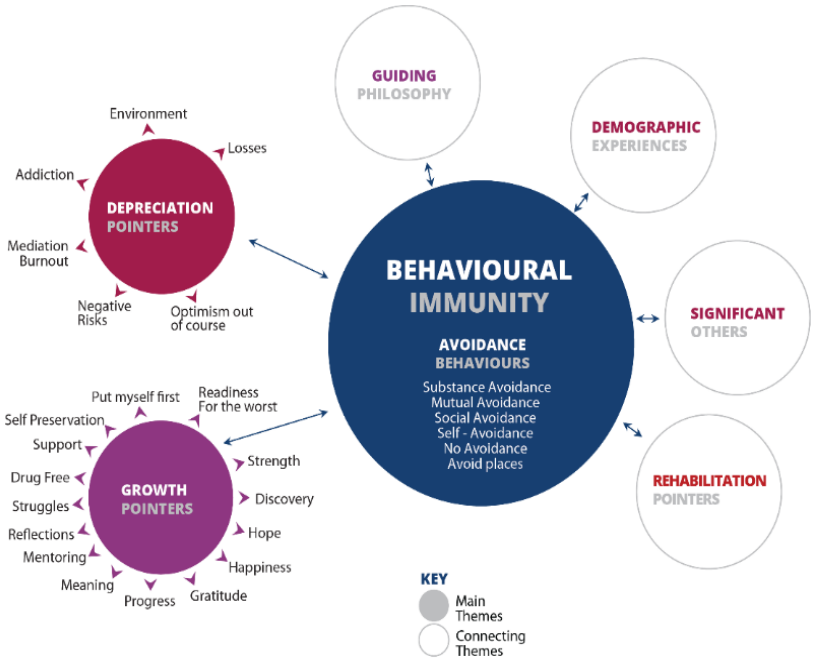
Data Analysis

We present the findings of the research study, consistent with the revised thematic outline of reflexive thematic analysis (Braun & Clarke, 2019a, 2019b; Braun & Clarke, 2022), emphasising data engagement, coding, and theme development through a six-phase process. These consist of data familiarisation, systematic data coding, generating initial themes from collated data, developing and revising the initial themes, refining, defining, and naming the themes, and report writing.

Specifically, we skimmed through the semi-structured interview and focus group discussion transcripts to get the initial impressions and become familiar with the textual data. This set the stage for analytic reflections. At the second phase, we employed the open, line-by-line coding and inductive analysis technique without using any pre-set or theoretical coding format. This process produced in vivo and descriptive codes, which were modified progressively, giving rise to preliminary themes at the third phase. The themes were formed by organising and matching related codes to fit into initial meaningful units of explanation, such as fears, avoidance, and growth, among others. At the fourth phase of the thematic analysis, we revised the units of behaviour previously identified as initial themes and matched them into larger themes and sub-themes, as deemed necessary. The process of constant comparison was useful at the third and fourth stages. We kept comparing codes to codes, codes to themes, and themes to themes, until we arrived at the delineated themes. In phase five of the analysis, we developed the final list and output of themes that emerged from the semi-structured interviews and focus group discussions, consisting of core, definitive, and distinctive themes and sub-themes. This is shown in Figure 1 of the thematic map of the analysis. This is what has produced the final phase of the write-up of the report, as summarised in this research study.

Figure 1

Thematic Map of Analysis



Trustworthiness

Steps were taken to enhance the trustworthiness of the data collected (Lincoln & Guba, 1985). Specifically, we applied peer debriefing to share information about the initial data collected during the pretest. This helped us adjust our research expectations to fit to participants' constructions of realities. Furthermore, thick descriptions of participants' responses and written memos were written to improve the transferability of findings. Hopefully, these tasks will provide clear guidance for other researchers to replicate this research study in similar contexts. Regarding reflexivity, as researchers with a background in psychology, knowledge of SUDs, and previous internship experiences in psychiatric facilities, we are well-acquainted with the experiences of the participants. We recognise that this may influence our interaction with participants and overemphasise our interpretation of data narratives to suit our pre-emptive beliefs. In addition, our value judgments may be skewed towards being unduly critical of participant experiences. Consequently, we took steps to ameliorate these potential biases. For example, we kept journals and memos about data collection and analysis, and reflected on personal characteristics, beliefs, and attitudes that could bias the research processes. Furthermore, dependability as a quality check in this research was enhanced through audit inquiry, involving the supervisory responsibility of academic supervisors. During the research process, data collection, analysis, and interpretation of findings were submitted as audit trails to supervisors who monitored the step-by-step process to ensure research quality compliance.

Ethical Considerations

Ethical clearance from the institutional review board was approved and submitted to the authorities of each treatment facility, who granted permission for data collection. The authors (researchers) worked with research assistants from each facility to select and recruit participants who were willing and available to participate, which included the informed consent of

participants before data collection, explaining the purpose of the research study and any potential harm or distress. Others involved a statement of confidentiality and respect for human dignity. These were based on the ethical principles of psychologists when working with human participants (Young, 2017).

Findings

Three main themes were derived, indicating avoidance behaviours, depreciation pointers, and growth pointers. From the depictions, BI interacts with other connecting themes in a two-way response system (see Figure 1). It reacts to the cues emanated from diverse sources of the connecting themes and subthemes, and in turn, responds proactively to the continuous cycle of stimulation. This back-and-forth transaction and engagement represent the motivational system of BI in the entire process.

Avoidance Behaviours

As shown in the figure, this is the overarching theme of the research study, consisting of sub-themes of avoidance behaviours. It is closely tied to the concept of BI, which we explored within the domain of SUD experiences of participants. Avoidance behaviours consisted of six sub-themes (self-avoidance, avoidance of substances, social avoidance, mutual avoidance, no avoidance, and avoidance of places), which represent proactive and reactive defence actions to cues associated with SUDs, which posed a real or perceived threat to well-being. These avoidance behaviours may trigger a relapse to substance use. Some of the participants' statements representing these avoidance behaviours are contained in words such as: "*I told myself I won't use; I won't use drugs. I stood by my words, and I had to run away from friends*", "*I started hating everything about me, trying to see how I can fix myself, back*," and "*Yes, definitely places I have to avoid*".

Depreciation Pointers

Depreciation pointers consisted of a set of behaviours that contributed to experiences that were distressful to the participants. They ranged (sub-themes) from events that negatively impacted the behaviours of the participants, thereby sustaining and facilitating their SUD lifestyles, to other factors such as losses, substance use, and environmental factors. Some of the statements that were captured include: "*But there are challenges, there must be challenges, of course. Challenges I have faced, like when I was small, growing up, I didn't even have any self-esteem again because of the negative things they were telling me. I felt I was useless, I felt I was a failure*!" Other statements are: "*I've lost everything again; that's when it hit me that I felt pain that I have to start again for the third time*." And "*My dad, when he wants to pray, he will go like, 'God, this devil that came in human flesh as a human being, you gave us, please take him away from us*,'" while another one said: "*My family was dysfunctional. I discovered at a point that my mom was smoking weed. It's when I'm kind to myself, and the only loss I think about is just my family (that I win), their trust again, that is the loss*".

Growth Pointers

Growth pointers consisted of positive behaviours and experiences that participants acquired despite their struggles with the substance-induced lifestyles. It has a pool of sub-themes based on the experiences of participants in their attempts to deal with the distress of living and struggling with SUDs. Fear and avoidance represent the threat management system, which tends towards trauma aversion and avoiding its consequences, giving rise to growth pointers, as suggested in statements such as, "*Most clients don't want to be patient with the process; they believe they have done enough, and nothing is working. Relapse is*

part of a process of growth, and not a signature of failure. It is a growth attempt that must be supported." Another statement is: "*The lesson I've learned is that don't you don't trust people 100% because if you do, they are all human beings. They are not perfect. At a point, they're going to break your heart, and because you are not expecting it, you will be devastated. But if you prepare your mind, this person may do this or they may do that, or even if it happens, you are not surprised because already you have prepared your mind that this thing may happen. So even if it happens to you, you are not surprised, it will not pain you that much, though it will still pain you. And because of that, you will quickly overcome it. That is one lesson I have learned*!"

Connecting Themes

Additionally, the appraisal and defence system of BI was a response to cues from the other connecting thematic components in the focus group discussions with participants and therapists. Some of them were participants' challenges, such as issues in the family, the individual, friends, the environment, and the substances that were used. These were captured as the main things they must deal with in their struggle with addiction. According to the participants, society was judgmental towards them and labelled them as the worst people on earth who did not need attention. They were also unduly judged as instruments of criminality. Furthermore, focus group discussions with the experts indicated that their clients struggled with several fear objects, such as fear of the environment, fear of medications, fear of integration after discharge, and fear of the unknown. Others included avoidance behaviours associated with these fears and treatment, such as avoidance of discharge plans, avoidance of making personal resolves, and of taking prescribed medications. All these were depictions of typical avoidance behaviours displayed by clients, suggesting their preferences for alternative actions presumed helpful to deal with their fears and challenges of living with SUDs.

Overall, BI was instrumental in initiating and executing the motivational responses, which vary between growth and depreciation pointers. The growth outcomes have positive connotations, while the depreciative pointers possess negative valence states. Thus, it provided a defensive appraisal of participants' experiences and struggles with SUDs, giving rise to dimensions of recovery capital from growth to depreciation (recovery barriers).

Discussion

The findings of this research study were consistent with three objectives. First, we noted that the elements of BI in avoidance behaviours were found within the context of treatment for SUDs and associated trauma. BI produced complementary and motivational responses to the challenges of treatment and living with SUDs. Although this was not explored in previous studies, it suggests the implications of BI as an avoidance negotiation strategy to deal with negative experiences in treatment for participants struggling with SUDs. Thus, when applied to this population, BI may be used as a self-protective factor and behavioural intention to avoid relapse and addiction (Latt et al., 2024), especially while undergoing rehabilitation.

Moreover, our findings noted the complementary values of behavioural avoidance as elements linked to the behavioural dynamics between the behaviour outcomes in SUDs (post-traumatic growth and post-traumatic depreciation) and other themes. This is contrary to previous research, which conceptualised BI within the domain of disease-causing parasites, where human beings mobilise their motivation systems (BIS), as a defence to avoid or minimise threats associated with infection or infestations (Murray et al., 2013; Murray & Schaller, 2012, 2016). However, our findings situated BI as a self-protective mechanism with an overarching goal to prevent and minimise the untoward effects of living with SUDs and improve recovery capital toward restoration of well-being (Best & Hennessy, 2021; Cloud & Granfield, 2001, 2008). This serves to mobilise the

behavioural, cognitive, interpersonal, and emotional resources to deal with the threats (Ackerman et al., 2018; Boggs et al., 2022; Murray & Schaller, 2016; Schaller et al., 2015).

Furthermore, we focused on the dynamics of threat within substance use and addiction by studying how the behavioural defence system interfaced with positive and negative cues that pervade the course of substance use and addiction. The cues are derived from the outcomes of interaction between the participants and significant others, their demographic background experiences, recovery capital, barriers to recovery, or depreciation (Cloud & Granfield, 2008), and societal perceptions.

Another functional benefit of fear and avoidance in this research study was that it served as a threat management system, translating from disease avoidance to a trauma and SUD avoidance construct. This can potentially facilitate behavioural hygiene and prevent cognitive, affective, interpersonal, and behavioural disequilibrium or destabilisation (Wormley & Varnum, 2023). It can also help the participants cope with the impressions, labels, hurts, and struggles associated with substance-use disorders, and build a proposal to mobilise cognitive, interpersonal, and emotional resources toward perceived optimal function. The main goal of the system is to prime up the individual's suite of behavioural resources towards maximal outcomes, through a behavioural risk compensation mechanism (Kacelnik & Kacelnik, 2022). Consequently, the adaptation may produce a 'functional shield', which seeks to ameliorate the stress exacerbated by depreciation, and to restore the disequilibrium created by the depreciation shield. This marks the inter-relationship between post-traumatic growth, post-traumatic depreciation, and BI.

Thus, the interaction among the three factors produces a paradox of strength and depreciation possibilities, such as depreciation-related growth, growth-related depreciation, growth pointers, and depreciation pointers, respectively. The former two concepts are the subjects of paradox in this research study. They represent the cautious interpretations of strength or growth and depreciation as emphasised (Aspinwall & Staudinger, 2003; Berridge, 1999), cautioning against the mistake of outright reductionism of growth and depreciation as strength and weakness or dysfunctional behaviour, respectively. It is part of the struggle by participants to offset the states of cognitive dissonance and threat to the self.

Aspinwall and Staudinger (2003) state that not every growth outlook connotes strength, progress, and attainment of well-being, but a pointer, rather than an end to growth. Similarly, the same point is made regarding depreciation, as not every behaviour suggests a lack of growth, weakness, and dysfunctional outcome, but is part of a struggle to maintain equilibrium in vital levels of cognitive, emotional, and perceptual function. Additionally, this growth spurt, which is represented as recovery capital, is dynamic and flexible due to varying factors of the complex substance use environment over time (Bellaert et al., 2025). Thus, BI, which is defined by avoidance behaviours, mediates the behavioural dynamics among the growth and depreciation pointers, the demographic background, experiences with significant others, and treatment.

Recommendations and Limitations

In this research study, we were limited to the application of the qualitative approach, which explored the experiences of participants experiencing SUDs while undergoing inpatient treatment. The findings may, however, be transferable to those who are receiving intervention as part of outpatient care, or to diverse settings of trauma related to experiences of SUDs. Therefore, quantitative research is necessary to test the proposal of this research study by developing standardised instruments to improve the generalisability of the research outcomes. This can be done by testing the utility of BI as a threat management and or motivational and mediation system, and as an SUD and trauma-relevant avoidance paradigm. In addition,

we recommend further studies to evaluate comprehensive recovery capital covering the individual, family, and community domains of individuals struggling with SUDs and integrate these within the threat management system to underpin the resourcefulness of BI.

Conclusion

In this research study, we qualitatively explored the concept of BI within the context of SUDs and related dynamics, especially the variants of growth behaviour outcomes within the context of treatment. We extended research from a predominant position of disease avoidance to SUD-related trauma avoidance by examining the complementary value of such behaviours to substance use addiction research, suggesting that BI is part of the dynamics of SUD-related growth and depreciation outcomes, leading to four possible pointers: growth pointers, depreciation pointers, depreciation-related growth, and growth-related depreciation. Moreover, it is part of the discussion involving the threat management system that is implicated in the struggle to deal with the trauma of SUDs. Furthermore, the experiences of participants indicated that BI complements part of the motivation system toward facilitating abstinence from addiction and or mitigating the effects of trauma and re-traumatisation. It contributes to the knowledge base of pathogen avoidance psychology by extending research to trauma and SUD, the behaviour avoidance paradigm.

Conflict of Interest

The authors of this article declare that there are no activities, responsibilities, or services in connection with this work that pose as sources of conflict capable of compromising integrity.

Author Contributions

The authors of this work state that the functions of co-authorship were duly facilitated by all members. The corresponding author is a graduate student under the supervision of other authors, who supervised every aspect of the work, from proposal writing to data collection, and the write-up of the whole thesis and article.

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