Intrusive thoughts and reality discrimination in hallucinations

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Abstract:

Hallucinations are perceptions that feel real without the presence of external stimuli. Research suggests that intrusive thoughts and weak reality discrimination make an individual susceptible to hallucinations, yet the existence of a connection between these factors is still unknown. This review examines how intrusive thoughts and weak reality discrimination independently affect susceptibility to hallucinations, and to what extent these factors are interrelated. This paper first examines the individual contributions of intrusive thoughts and weak reality discrimination to the occurrence of hallucinations. Hallucinations are externalized intrusive thoughts via cognitive dissonance, where cognitive dissonance occurs when an individual is in an uncomfortable state because of their contradicting beliefs or facets of knowledge. To reduce this dissonance, the human body may resort to hallucinating. This makes intrusive thoughts the material for hallucinations. Reality discrimination, on the other hand, is the ability to differentiate between internally generated and externally generated activity. It is proposed that during the process of reality discrimination, other skills such as reality testing and reality monitoring overlap, which results as a hallucination. Reality testing is the process in which an individual understands the connection between them and the outside world and social surroundings while reality monitoring describes the ability to discern the source of internal self-generated information from external generated information. This paper subsequently examines whether or not intrusive thoughts and weak reality discrimination interact to make an individual prone to hallucinations. It is hypothesized that, because both intrusive thoughts and weak reality discrimination are accompanied with negative emotions, they could also be enabled by them. A second proposed hypothesis is the externalization of intrusive thoughts when there is the overlap of the cognitive skills of reality testing, reality monitoring and reality discrimination, resulting in hallucinations. This paper outlines important information to better help those who suffer from hallucinations, providing them more precise diagnosis and treatment.

Introduction:

Hallucinations affect an estimated 60% to 70% of patients with schizophrenia. However, hallucinations not only affect people with disorders,but could manifest in unimpaired individuals as well[1]. It is reported that about 5% of adults, 8% of adolescents and 17% of pre-adolescents experience hallucinations in the general public[2].

Hallucinations are perceptions without the presence of external stimuli[3]. These experiences may arise from various factors, including the use of drugs and alcohol, dementia, delirium, epilepsy, and mental health disorders such as schizophrenia[4]. According to Morrison's hallucination model, hallucinations are internally generated activities that are connected with intrusive thoughts[5]. By definition, intrusive thoughts are recurrent involuntary thoughts or images that are frequently abnormal, repulsive, profane, offensive or aggressive. These intrusive thoughts are unwanted and impermissible, due to the stress they impose on the individual[6,7].These thoughts manifest themselves as hallucinations by responding to certain triggering factors such as a distressing event[5].

In a non-clinical observational study, the individuals who were reported experiencing auditory hallucinations were found to have intrusive thoughts, but also equally had weak reality discrimination[8]. Reality discrimination signifies the inner procedure to differentiate between internally generated and external generated activity. In other words, reality discrimination entails differentiating what is physically real and what is not. This study suggests that both intrusive thoughts and weak reality discrimination play a role in the susceptibility for hallucinations. However, their dependency on each other has not yet been explored in depth.

This review paper will attempt to fill this gap by first addressing the contributions of intrusive thoughts and weak reality discrimination individually to the occurrence of hallucinations. Then it will deduce whether or not they interact with each other to make an individual prone to these phenomenons. This paper seeks to improve the understanding of hallucinations, intrusive thoughts and weak reality discrimination to better help those who suffer from hallucinations, providing them more precise diagnosis and treatment.

Contributions of intrusive thoughts to hallucinations:

Though the origins of intrusive thoughts have been presumed to be mainly internal, making them unprompted, this supposition was not satisfactory to psychiatrists[9]. It was reported by Rachman, a psychologist who studied anxiety disorders as well as obsessions and intrusive thoughts, that an individual's intrusive activities could sometimes be associated with external factors[9]. Rachman also noted that unwanted intrusions are prone to be more recurrent and extreme during periods of solitude when one encounters fewer external factors. He described individuals with higher frequencies of intrusive thoughts also experiencing negative emotions, implying a connection between negative feelings and intrusive thoughts. This establishes stress and anxiety as common causes for intrusive thoughts. In other cases, mental illnesses like obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD) could also cause intrusive thoughts[6]. However, it is fair to expect that intrusions occur even for people without mental illnesses, given that humans experience about 4,000 thoughts in a 16-hour

period[10]. Therefore to differentiate between normal and unusual intrusions, one of the key aspects is their 'relative uncontrollability', or the capability of the thought to be controlled or not. It appears to be that dysphoria (a state of intense dissatisfaction or unease), stress exposure, the emotional sense of intrusive content, and the frequency in which external provocation occurs play a role in the ability of intrusive thoughts to be uncontrollable and persistent[9].

Morrison and colleagues state that the external attribution of these intrusive thoughts produces auditory hallucinations[11]. According to their proposal, when intrusive thoughts invade one's consciousness, it makes the individual experience cognitive dissonance. Cognitions are defined as aspects of knowledge that humans have regarding their actions, attitudes, and surroundings, such as thoughts, beliefs, and emotions. Cognitive dissonance, initially suggested by Festinger in 1957, occurs when an individual recognizes cognitions that contradict each other, which puts the individual in a disagreeable state of mind, compelling them to reduce it[12].The more intense the dissonance is, the more the individual wants to alleviate it. The magnitude of dissonance is calculated with the dissonance ratio (the number of conflicting cognitions divided by the number of consonant cognitions plus the number of the conflicting cognitions)[13]. An example employed by Festinger can be used to further understand this theory[13]. Say we have a repetitive smoker who just learned that smoking is bad for their health. This person would have to experience dissonance because the knowledge of 'smoking is bad for health' is conflicting with their habit of smoking. Dissonance may be reduced by many ways including eliminating one of the dissonant cognitions, introducing a new consonant cognition, or increasing or decreasing the significance of an existing cognition. Coming back to our previous example, the smoker has multiple solutions to reduce their cognitive dissonance. They could either eliminate the cognition of 'smoking regularly' by changing their habit and stopping smoking which coincides with the cognition 'smoking is bad for health', therefore ending the dissonance. They could also choose to believe that smoking is not actually harmful for their health, which also alleviates the dissonance (eliminating the cognition 'smoking is bad'). Some other options could be that they look for the positive effects of smoking (adding a constant cognition that supports the cognition 'smoking habitually'). or they believe that the danger of smoking is insignificant versus other risks like a car accident (reduction of the significance of the existing cognition 'smoking is bad').

Cognitive dissonance also relies on both a feeling of personal responsibility (internal attribution) and the anticipation of negative outcomes. Morrison states that auditory hallucinations are the result of the brain not wanting the dissonance to be felt, jumping directly to externalization without the experience of an unstable state of mind[11]. Holding metacognitive beliefs makes one prone to auditory hallucinations. These beliefs make an individual think about their own thinking, believing that their thoughts are controllable. Having such beliefs could lead to inconsistencies and cognitive dissonance. If an individual holds such metacognitive beliefs and they encounter an intrusive thought, a thought they did not control, cognitive dissonance occurs. To avoid dissonance, they attribute the thought to an external source. For instance, if an intrusive thought

manifests itself as a speech, the individual might claim that they heard it from someone else and remove the individual's perception that the thought originated from themselves (removing personal responsibility).

Contributions of weak reality discrimination to hallucinations:

Reality discrimination refers to the cognitive skill that involves distinguishing between internally generated events, such as thoughts and memories, and externally generated events. In a 2014 study, reality discrimination capabilities were calculated with signal detection tasks.[14] Individuals attempted to identify an auditory signal, which was one second of neutral speech amid five seconds of white noise. In some instances, the speech signal would be present and in other trials, it would not. Reality discrimination error in this example occurs when an individual incorrectly identified the presence of an external speech when it was actually absent. In other words, the participants think they heard the speech signal when in fact it was not there. This evidence supports that when reality discrimination errors occur, a person misinterprets their own internal speech as an actual external voice[15].

Loneliness may also affect reality discrimination[14]. The 2014 study suggested that patients with psychotic disorders often experience the feeling of being alone before auditory hallucinations. Loneliness may impact reality discrimination by increasing levels of negative affect (negative emotional states).Negative affect, however, was not found to hinder the ability to detect an auditory signal in a signal detection task, but rather made individuals misattribute internal activity to an external event.

Another cognitive skill called source monitoring deduces the source of a memory using several characters, such as contextual elements (space or time related), sensory elements (color or tone), semantic information or memory (accumulated understanding of the world[16]), emotional traits, and the internal cognitive process of the event[17]. For example, if a person recollects a news story that they heard without the presence of visual elements, the source monitoring skill would involve attributing the story's origin to be from listening to the radio rather than watching television. Whether or not the source monitoring attributes the memory to be internal or external is the cognitive skill of reality monitoring. Weakened reality discrimination might be also related to a deficiency of reality monitoring[18]. Similarly to reality discrimination, reality monitoring describes the ability to discern the source of internal self-generated information from external generated information ("outside reality")[19]. Some consider that both of these concepts are separate yet linked skills[18], while others view both of these as the same ability[14]. There is a third skill linked to these phenomenons called reality testing. Reality testing is the process in which an individual understands the connection between themself and the outside world and social surroundings[20]. It is proposed that during an auditory hallucination in schizophrenia patients,

there might be an overlap occurring between reality monitoring and reality testing during the process of attributing information to an external or internal source. More information suggests that during reality monitoring tasks, these patients have reduced neural activity in the medial anterior prefrontal cortex, the region of the brain linked with discerning internal and external information[17]. These factors make the patient fail to identify that the speech is produced by themselves.

It is also found that reality discrimination errors are more likely to externalize and mistakenly attribute the individual's internal imagined thoughts to external “real life”, rather than internalizing external information to their mind[17]. This tendency to externalize increases when their cognitive skills for reality monitoring are weak or nonexistent.

Interrelation between intrusive thoughts and weak reality discrimination:

As mentioned earlier, increased levels of intrusive thoughts and weak reality discrimination are both factors that contribute to hallucination proneness. However a study notes that these elements are in fact related[8]. In this non-clinical experimental study, 160 university students completed a questionnaire about their intrusive thoughts, auditory hallucination proneness, negative affect and cannabis use[8]. They also completed an aforementioned signal detection task[14]. Specifically, the study consisted of 60 trials, each trial having five seconds of white noise followed by three seconds of silence. In 34 of the 60 trials, one second of speech was included. Among those 34 signals, 12 had clear speech while the other 22 had been presented with speech at an auditory threshold. The auditory threshold was the volume that was established prior to the study as the threshold perceived by half of a group of ten who had similar ages as the participants. The students were asked to press a button to respond if they heard speech or not while listening to the trials in the following three seconds of silence. As explained earlier, false alarms in this case were when a participant would press the button when in reality there was no speech. These false alarms were used as the main measure to calculate reality discrimination (more false alarms meant weaker reality discrimination). They concluded that intrusive thoughts and weak reality discrimination are independent predictors in auditory hallucination-proneness. The only connection they established was that people who experience both weak reality discrimination and intrusive thoughts are particularly susceptible to hallucinations. Nonetheless, there were many limitations in the experiment. Firstly, the data were cross-sectional, meaning that the study was carried out in only one time period, which made interpreting the directionality and causality between the factors difficult. Furthermore, this experiment used a non-clinical sample which means that these findings could not be applicable for clinical patients.

No further existing literature addresses the codependency of intrusive thoughts and weak reality discrimination, or even the existence of one. As previously stated, intrusive thoughts are especially constant and intense during moments of isolation and negative emotions. Reality discrimination is also affected by negative sentiments and loneliness. This supports the idea that these unpleasant feelings are not just present with intrusive thoughts and weak reality discrimination but could perhaps also enable those phenomenons together for hallucinations. Also indicated earlier, auditory hallucinations might be the product of the overlap between the attribution process, reality monitoring and reality testing, and subsequently makes one prone to externalize their inner thoughts. This indicates that intrusive thoughts are the 'raw material' of hallucinations[21], and that intrusive thoughts get externalized by the means of a reality discrimination error. In other words, the intrusive thoughts are the 'picture' or 'voice' of the hallucination itself, but this picture only becomes an actual hallucination when there is a 'crack' in the brain's system. The 'crack' is an individual's weak reality discrimination abilities and the externalization process is called reality discrimination error, where the thoughts are perceived as an actual real life event.

Conclusion:

This review paper assessed the interplay of intrusive thoughts and weak reality discrimination and their subsequent contributions to hallucinations. Intrusive thoughts are mostly caused by negative feelings (e.g. stress, anxiety) or a mental condition (e.g. OCD, PTSD) and are uncontrollable and persistent. When intrusive thoughts enter the consciousness of a person with metacognitive beliefs, it produces a state of cognitive dissonance. Cognitive dissonance relies on both personal responsibility and the anticipation of a negative outcome. In these individuals, hallucinations are the product of the brain not wanting to experience the state of cognitive dissonance, which results in them removing personal responsibility and attributing the thought to an external source. Negative emotions also have an impact on weak reality discrimination, leading to reality discrimination errors, which is the misattribution of internal events to an external source. Furthermore, it is proposed that hallucinations occur when there is an overlap of two cognitive skills (reality monitoring and reality testing) during the process of attributions, making the individual externalize their imagined image.

These findings could lead to two hypotheses. The first is that intrusive thoughts and weak reality discrimination are not only accompanied with negative emotions but also are enabled by them to form hallucinations. The second hypothesis is the externalization of intrusive thoughts when there is a 'crack' in the brain system, which is the reality discrimination error. This could make the intrusive thoughts the material of the hallucination which agrees with other studies concluding the same[21].

Although current literature has given valuable knowledge about hallucinations, intrusive thoughts and reality discrimination, there are still a lot of gaps and unanswered questions in this field. Discovering the connection of hallucinations with reality discrimination and intrusive thoughts could help further our understanding of hallucinations, which could lead to improved treatments and proper diagnoses regarding these phenomenons. This paper should be taken into consideration in future experiments regarding this sector to test out these hypotheses, and to ultimately help to the advancement of the field and grow our understanding of the ambiguous phenomena of hallucinations

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