Exploring autistic dreamscapes: A systematic review of dream patterns in autistic people

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Summary. The social simulation theory posits that dreams provide opportunities to practice social interactions. However, given the social motivation theory of autism, which suggests that autistic individuals find social stimuli less rewarding, this review aims to investigate whether these differences extend to dream content and patterns. The purpose of this systematic review is to synthesize the existing literature on dream content and characteristics in autistic individuals compared to non-autistic (allistic) individuals. A systematic search was conducted in PsycINFO, PubMed, and Scopus using terms related to autism and dreams. Five studies met the inclusion criteria. Findings indicated several key differences in dream content. Autistic participants exhibited a reduced dream recall and reported fewer major characters and social interactions in their dreams. Specific themes, such as confusion and sexual arousal, were less common in autistic individuals. Two case studies revealed how the emotional and sensory experiences of autistic individuals, such as fears and sensitivities, manifested uniquely in their dreams. There were no significant differences in sleep onset latencies or EEG abnormalities between autistic and allistic individuals. The findings suggest that autistic individuals demonstrate distinct dream patterns characterized by reduced social content and emotional elements. This aligns with the social motivation theory and highlights the importance of understanding the relationship between waking social experiences and nocturnal cognitions in autistic individuals. Further research is needed to explore the neurobiological underpinnings and implications of these differences in dream content.

Keywords: Autism, dreams, social motivation theory, dream content, systematic review

1. Introduction

Dreams are nocturnal cognitions characterized by emotions and mental images (McNamara, 2023). Typically, dream content focuses on social interaction, with about two to four individuals present in dreams on average (Tuominen et al., 2019). Socialization is also common in the themes of dreams, the most common of which include schoolwork, teachers, or studying; seeing a person that the dreamer would like to see; and being chased or otherwise physically pursued (Yu, 2016). However, while these are the most reported dream themes, they are by no means the only dream themes, nor do they represent the wide variety of dream themes reported. Dreams are diverse, and themes can range anywhere from earthquakes to deceased relatives, and it is this very nature that makes the exact purpose of dreams difficult to pin down (Nielsen et al., 2003).

Despite this understanding of content and structure in dreams, there are a number of competing theories that attempt to capture the purpose for dreams, such as the threat simulation hypothesis, or the social simulation theory of dreams (Revonsuo et al., 2015; Valli et al., 2005). The social simulation theory states that dreams act as a simulation of social situations and a time to practice social negotiations (Revonsuo et al., 2015). According to the social simulation theory of dreams, there are three hypotheses regarding how dreams can improve social skills: 1) the strengthening hypothesis, which describes how dreams can strengthen the dreamer's relationships with other individuals; 2) the practice and preparation hypothesis, in which the dreamer is forced to practice important social bonding skills; and 3) the mindreading hypothesis, which describes the possibility of dreams simulating mindreading or mentalizing processes (Revonsuo et al., 2015). One population for whom this may not be the case is autistic people.

Autistic people have been shown to exhibit difficulties in reactions to social situations, this includes responding less frequently to their name, having a reduced level of eye contact, and possessing difficulties navigating social situations (Chevallier et al., 2012). Whereas alexithymia is a construct characterized by difficulties in naming one's own emotions, deficits in describing internal states, and thoughts and focus on external experiences rather than internal ones (Lumley et al., 2007). While not a part of the diagnostic criteria for autism, alexithymia is more common in autistic populations and is thought to be partially linked to an increase in social deficits especially in autistic individuals (Kinnaird et al., 2019).

One of the most recent and most impactful theories of autism spectrum disorder (ASD) is the social motivation theory (Chevallier et al., 2012), which has interesting implications for the dream content of autistic people. According to the social motivation theory, allistic (i.e., not autistic) individuals are motivated to engage with social stimuli (e.g., conversations, group activities, eye contact) because it is rewarding (Chevallier et al., 2012). Engaging with social stimuli is rewarding because group cohesion is important for survival (Chevallier et al., 2012). Several neuroimaging studies support the social motivation theory, demonstrating that allistic individuals are rewarded at a neurological level for engaging with social stimuli (Chevallier et al., 2012). The theory suggests that autistic individuals are less motivated to engage

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with social stimuli because it is not rewarding for them, or it is less rewarding than engaging with objects related to their fixed interests (Chevallier et al., 2012). Like allistic individuals, neuroimaging and eye-tracking studies demonstrate a significant difference in the attention to social stimuli and the reward received from engaging with social stimuli between autistic and allistic individuals (Chevallier et al., 2012; Dawson, et al., 2005).

Purpose of the Present Study

Based on the social motivation theory, it seems likely that autistic individuals would have less social content in their dreams compared to allistic people due to their lower social motivation when compared to allistic people. The purpose of the current study is to synthesize and summarize all literature examining the dream content of autistic people to come to a better understanding of the dreams of autistic people.

2. Method

The Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) statement (Page et al., 2021) informed the protocol for the current study.

2.1. Information Sources and Search Strategy

Published studies were identified by searching three electronic databases (i.e., PsycINFO, PubMed, and Scopus) where psychological and neuroscientific studies are aggregated. The search strategy consisted of two semantic groups, the Boolean operator 'OR' concatenated terms within each group, and the Boolean operator 'AND' concatenated the two groups. The first group identified the target population (e.g., autism, autistic, ASD) and the second group identified the phenomenon of interest (e.g., dream, dreaming, dreams). The search strategy was tailored for each database, with the search terms mapped to Medical

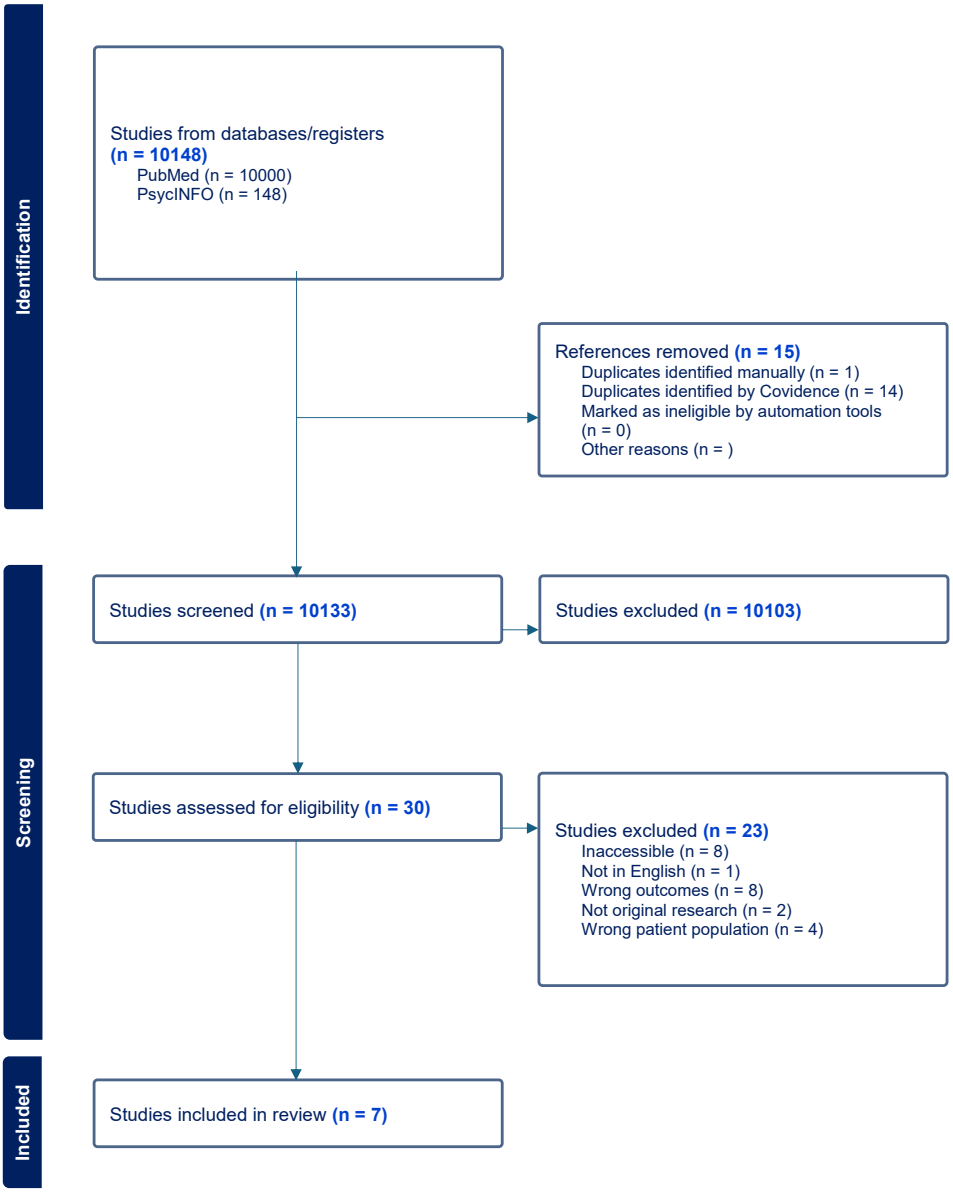

Figure 1. PRISMA Diagram.

Subject Headings whenever possible. Searches were conducted in June of 2024.

2.2. Study Selection Criteria

Studies were included in the review if they met the following criteria: (i) participants must be diagnosed with ASD or be screened for traits of ASD and (ii) the outcomes of the study must focus on dream content. Studies were included if there was a comparison between the dream content reported by participants with ASD and a control group.

2.3. Data Extraction

Data extraction was conducted independently by the two authors using an author-created form. Any noted inconsistencies were discussed between the two authors. The categories for data extraction were: (a) the study design; (b) the sample size; (c) the gender distribution of the sample; (d) any comorbidities in the sample; (e) the average age or range of ages in the sample; (f) measures used in the study; (g) the data analysis procedure; and (h) the primary findings.

3. Results

There were 10,133 total reports screened for this study, these studies were gathered through the databases PsychINFO and PubMed. The articles were selected based on the criteria mentioned above and the selection process was completed through the website Covidence. Of the search results, 10,103 reports were excluded from the selection process, 30 reports were assessed for retrieval but only five were included in the study (Figure 1).

In one of the five studies, Godbout et al. (1998) examined the sleep and dream content of an autistic individual who has been referred to as F.I. It was found that F.I. had shown no signs of abnormalities in EEG during sleep and matched the controls. In a similar fashion to the control group, the participant had shown no signs of sleep apnea. What differed is that F.I. did not report any mental activity related to dreaming upon awakening (Godbout et al., 1998). This is unlike the control group, where dream content was shown to be recalled upon awakening. This content being recalled by the controls was reported to be both energetic and vivid (Godbout et al., 1998).

Dubinsky (2001) shifted the focus from the type of dreams experienced to dream content in her case study of an autistic individual named Jeremy. In a lot of Jeremy's dreams, there was a common thread of loss as well as a noted fear of death. As Jeremy started developing and ageing, this was reflected in his dream content as his fears and common themes seemed to change over time. At the beginning of his sessions with Dubinsky, he mentioned many dreams with themes indicative of him processing and working through fear of falling apart in a metaphorical sense. His immense panic at the thought of him possibly being late indicates that this is not only a thread in his dreams but also makes its way into his waking life. More threads from his waking life were shown to have impacted his dreams, as well as Jeremy's father became a repeated dream character referred to as the bad father (Dubinsky, 2001). Even his sensitivity to noise had made an appearance in his dreams, which indicated that his waking life and his life experience had greatly impacted his dream content (2001).

In a later study focusing on the recollection of dream content, it was reported that those with ASD had significantly decreased recollection in comparison to the control group ($p = 0.05$) (Daoust et al., 2008). Those with ASD were also less likely to report the themes of confusion ($p = 0.01$), shyness ($p = 0.04$), and sexual arousal ($p = 0.005$) (Daoust et al., 2008). This study shared similar results to the study by Godbout et al. (1998), as there were no significant differences in the sleep onset latencies between the participants with ASD and the controls (Daoust et al., 2008). They also enforced a total of 31 sleep awakenings during REM sleep in those with ASD; a total of 23 dream reports were collected. Of the 31 awakenings, six white dreams were reported, and there were two instances of a reported lack of dreaming. The controls had reported only one white dream and, overall, the dream reports of the controls had more words on average in their dream reports when compared to those with ASD ($p = 0.0004$). This difference was found despite the verbal interventions from the researcher being equal (Daoust et al., 2008). Those with ASD were less likely to report major dream characters ($p = 0.01$) and a specific social interaction ($p = 0.02$) when compared to the control group (Daoust et al., 2008). These differences between the reports of those with ASD and those without ASD could be linked to certain traits common in ASD such as alexithymia.

Alexithymia is a deficit in the ability to determine one's emotional state, which is commonly seen in those with ASD. To determine the impact alexithymia has on dreams, two studies were conducted (Lumley & Bazydlo, 2000). The first tested for the frequency of dreaming but was unable to recall precise details of them, which is linked to alexithymia, as well as the participant's attitudes about the meaningfulness of dreams. They also examined the potential link between sex and differences in alexithymia and dream characteristics; however, this relationship was deemed to be insignificant (Lumley & Bazydlo, 2000). It was noted that one of the factors used to identify alexithymia, which is the difficulty in identifying one's feelings, was significantly associated with dreams with no details ($p = .21$) and the number of disturbing dreams per month ($p = .15$). The second study sought to both extend previous literature and replicate the

Table 1. Study Designs and Samples.

Study Citation	Study Design	N	% Male	Co-morbidities	Sample Age
Daoust et al., 2007	CC	28	89.20	No	M = 22.7
Daoust et al., 2008	CC	17	88.20	No	M = 21.6
Dubinsky, 1997	CS	1	100	No	11
Godbout et al., 1998	CS	1	100	No	25
Lumley & Bazydlo, 2000	CC	1006	33.49	Yes	M = 20.15

Table 2. Measures and Analyses.

Study Citation	Measures Used	Analyses
Daoust et al., 2007	Dream Habits Questionnaire; dream reports.	Content analysis (Hall and Van de Castle).
Daoust et al., 2008	Dream Habits Questionnaire; dream reports.	Content analysis (Hall and Van de Castle).
Dubinsky, 1997	Dream reports.	Dreams were not analyzed, but content was reported.
Godbout et al., 1998	Dream interviews.	Dreams were not analyzed, but content was reported.
Lumley & Bazydlo, 2000	Dream diaries.	Correlation; content analysis.

results of the previous study by employing the use of daily dream diaries over the course of one week. The second study assessed dream frequency as well as attributes such as dreaming without recollection and a lack of dreaming altogether. In both studies, it was found that those who had higher scores in alexithymia had an increased number of nights where they reported no dreams at all (Lumley & Bazydlo, 2000). The data also indicated that those who showed difficulties in articulating and describing their emotions tended to have dreams with more aggressive and eccentric content (Lumley & Bazydlo, 2000).

There were no latencies in sleep onset between those with ASD and the control group, and, similarly to Godbout et al. (1998), there were no differences or abnormalities between the two groups (Daoust et al., 2007). Those with ASD had dreams that tended to have fewer words on average when compared to the control group ($p = 0.007$) (Daoust et al., 2007). It was also noted that the group with ASD had shown a decreased frequency of emotional elements in their dream reports compared to those in the control group ($p = 0.01$) (Daoust et al., 2007). It also appeared that those with ASD were less likely to report major emotional content in their dreams when compared to the control group (Daoust et al., 2007). There was also a non-significant relationship between the number of REMs during the night and the emotional content of the dreams (Daoust et al., 2007). It was also noted that those with ASD tended to show Alpha-1 activity over the midline and parasagittal areas at a significantly lower rate than the controls (Daoust et al., 2007). When the researcher compared the two groups, it was reported that the right lateralization in the controls was significantly higher than in the ASD group (Daoust et al., 2007). These findings highlight the differences between those with ASD and the control group which allows for a greater understanding of dreams in those with ASD.

4. Discussion

The results of the current study help build the picture of what dreaming looks like in those with ASD. For example, Godbout's (1998) study revealed that there were no abnormalities in patient F.I.'s EEG scans taken during sleep. This result was echoed in other papers discussed (Daoust et al., 2007) and can lead to the implication that while those with ASD do not tend to show differences in their EEG scans, they may show differences when it comes to the content and structure of the dreams themselves. The included studies indicate that there are differences when it comes to the dream content in those with ASD, as there was a decrease in certain dream themes as compared to those without ASD (Daoust et al., 2008). Those with ASD are often underrepresented in current literature involving dream content and structure, therefore the results allow for a greater understanding of the effects of ASD on dreams.

While the selection process was quite extensive, there still may be room for bias in the studies chosen. Firstly, two studies were case studies, since they are only looking at the results of one individual and this could impact on some of the generalization of the results summarized in this review. Following this, the most recent study covered was from 2008, which can lead to some difficulties in the application of the results; however, due to the high level of significance, these results are still applicable.

The content in Jeremy's dreams is very relevant to the literature focused on the sleep of autistic people, as Jeremy showed that dreams can take on the qualities of the dreamer's life, as both his fear of death and his sensitivities to noise were present in his dreams (Dubinsky, 2001). Dubinsky had made notes at several points saying that Jeremy's life was difficult, especially with his emotionally abusive father. His father, the thing that had affected Jeremy greatly, had become a recurring character in his dreams. The character

Table 3. Main Findings.

Study Citation	Main Findings
Daoust et al., 2007	The recall of dream content in those with ASD was lower when compared to control group and there were no differences in latencies to sleep onset nor in characteristics of REM sleep.
Daoust et al., 2008	Dream reports in ASD had fewer words than the control group, there was also a decrease in expressions of emotion within the dream content in the ASD group.
Dubinsky, 1997	A common thread of loss in Jeremy's dreams, fear of death mentioned as well. One can see how Jeremy's internal world seems to be changing, and this is reflected in the dream content.
Godbout et al., 1998	For sleep, F.I. showed no abnormalities in EEG, dreaming patient did not report any mental activity upon being awakened. This was not a case of vivid impression of dreaming without recollection of dream content.
Lumley & Bazydlo, 2000	Those with alexithymia had more nights where they reported no dreams at all. This result was shown in both studies. The ability to identify one's feelings was linked to an increase in dreams without details and with the number of disturbing dreams experienced per month.

of the bad father indicates just how impactful the waking lives and experiences of dreamers can be on the content of their dreams. Jeremy's sensitivity to sound would not likely be found in the dreams of an allistic child but would make sense with the profile of an autistic child. This also has some implications, as this points to the potential for differences in the dream content of those with and without ASD.

Not only did Jeremy indicate that there may be specific content in dreams unique to those with ASD, but the results of other studies indicated that there are differences in the content of dreams in those with ASD (Daoust et al., 2008). Commonly reported themes in autistic people differed from the control group, with them reporting less confusion and sexual arousal overall. These differences in themes seem to follow across multiple avenues, which provides evidence of overall differences. As well, these themes have a fair bit of social content to them; this could imply that those with ASD show differences in either the amount or the type of socialization in their dreams. These three themes all possess a social quality to them, which could point to levels of socializing and desire to socialize playing a part in dream content. There has been evidence to show that those with ASD struggle in social situations, unlike their allistic counterparts. This can be a very common occurrence for those with ASD and could explain this difference in common dream themes reported. This ties in with previous research in which it was reported that those with ASD were less likely to report major emotional content within their dreams, which is unlike the controls, and there was an overall decrease in the frequency of reported emotional content between the two groups.

Looking at the implications of those with ASD showing a decrease in recall could point to some biological difference in the brain structure of those with ASD that could be affecting these results and causing these differences. This could also indicate the potential that those with ASD may focus on different aspects of the dream, so they may be less likely to report the emotional content of the dreams simply because that is not what they are drawn to. While there was no reported difference in the latencies of sleep between those with and without ASD, this again can provide interesting evidence that there is something else at play rather than just a difference in sleep onset. One possible aspect impacting the dreams of those with ASD is the possible presence of alexithymia. While alexithymia is simply the difficulty in articulating and describing one's internal emotions and feelings, it may be linked to the dream content of the individual. That is what this study looked at as it examined the link between alexithymia and dream recall, and since it found that those with alexithymia were less likely to recall and describe their dreams, that could be a potential explanation for why those with ASD were shown in Daoust's (2008) study as this could be one of the reasons for the difference between groups as alexithymia is more common in those with ASD.

Overall, this points to a difference in the emotional content in those with and without ASD, specifically noted to have higher differences in the themes of shyness, sexual arousal, and confusion. This can be very important for clinical practice as this could be linked to the way that ASD impacts how the brain develops and can provide a deeper look into how ASD can change even the content of the dreams on such a deep and fundamental level. The systematic review and the results are limited by the number of studies that are featured; however, this is not due to a lack of thoroughness but is linked to the fact that there is not a wealth of research in this area. However, the results shown are quite notable and when considered together, they paint a striking image of the dreams of those with ASD. This research can help further our understanding of how ASD can affect the content and structure of their dreams as compared to those without ASD.

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