Multimodal hallucinations: a transcultural perspective

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Multi–*modal* hallucinations

– *a* transcultural perspective

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ISBN: 978-90-77877-32-6

Publisher:
Parnassia Groep, 's-Gravenhage

 Part of the research described in this thesis was financially supported by the Parnassia Academy, part of Parnassia Psychiatric Institute (The Hague, the Netherlands). Financial support for the publication and distribution of this thesis by the Parnassia Academy is gratefully acknowledged.

Universiteit
Leiden
The Netherlands

parnassia
groep
Specialist in geestelijke gezondheid

Multimodal hallucinations

A transcultural perspective

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op *donderdag 12 december 2024,*
klokke 11.30 uur

door
Anastasia Lim

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Voor mijn ouders

&

Voor mw. Joanitha van Nes

*(*9 december 1930 – †30 maart 2011)*

“Met water als basis wordt de geest als water. Water neemt de vorm aan van het voorwerp waar het in zit; soms is het vloeiend, soms een wilde zee”

Miyamoto Musashi (c. 1584–1645)

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01

General introduction

Vignette

B., a young Muslim woman, discloses to her psychiatrist that for a very long time she has been hearing unknown male and female voices that simultaneously keep commenting her actions and urging her to take her own life. B. also hears knocking, squeaking and beeping sounds, which members of her family do not hear. She attributes all these phenomena to jinn and claims she also occasionally sees them around the house in groups of three or five, mostly appearing in a small circle in the living room all dressed in white sporting long hair. One day she was so scared that she ran into the bathroom, locking the door behind her in the hope that the jinn would not be able to come after her. B. also divulged to have fits of anger, depressive feelings, and suicidal thoughts, and that she cleans the house frequently and meticulously. Lately, she has also been showering more often to reduce her anxiety.

What to do when worlds collide? When hallucinations are experienced in more than one sensory modality, in the Western biomedical world, these are considered as multimodal hallucinations. In the Muslim world, they may evoke associations with jinn, voodoo and the evil eye, which have their roots in the cultural-religious context of the Muslim world. In encounters between biomedical health professionals and their Muslim patients, these ontologically and epistemologically diverging systems may collide, warranting a better, mutual understanding in order to be able to connect the two worlds. The present thesis explores the phenomenology of multimodal hallucinations in individuals diagnosed with schizophrenia spectrum disorders, with a special focus on Muslim patients who attribute the phenomena they experience to jinn. Throughout the thesis, the emphasis will be on the clinical presentation of these hallucinations, on the question of how multimodal hallucinations can be defined, and on the roles they play in the lives of people coping with a schizophrenia spectrum disorder. The following sections provide a context to the issues and questions addressed in the various studies collected in this thesis.

1.1 Recognizing hallucinations in different sensory modalities

Multimodal hallucinations are known under several names, such as polymodal hallucinations, polysensual hallucinations, polysensory hallucinations, intersensorial hallucinations, and fantastic hallucinations (Blom, 2010). From the 19th century onwards the literature on these hallucinations has been scarce, with the landmark work by Chesterman and Boast not appearing until 1994 and - after a gap of another 20 years - a second milestone by Waters et al. (2014). In the past, hallucinations involving more than one perceptual modality were not always taken as clinically significant phenomena (Chesterman & Boast, 1994) or, worse, were seen as an indication of malingering (Resnick & Knoll, 2008). Their clinical importance as possible indicators of the severity of schizophrenia spectrum disorders finally gained more attention in recent years. Other contexts in which they were paid due attention were studies on early-onset (childhood) hallucinations (David et al., 2011; Jardri et al., 2014), MRI studies investigating the involvement of multiple sensory modalities in psychosis (Cachia et al., 2015), and, most notably, in the research on hallucinations in non-Western populations (Al-Issa, 1977; Bauer et al., 2011 Ndetei & Singh, 1983; Zarroug, 1975).

In essence, multimodal hallucinations have long remained relatively unknown and were hence overlooked in patients with schizophrenia spectrum disorders even though the burden these hallucinations cause tends to be high. Traditionally, the focus in schizophrenia research has been on patients reporting auditory hallucinations (60-80%) and less on those with other unimodal phenomena, such as hallucinations in the visual or tactile modalities (Waters et al., 2014). Hallucinations in the other sensory modalities have long been considered characteristic of neuropsychiatric disorders, where visual hallucinations were, for instance, interpreted as signs of delirium (Webster & Holroyd, 2000), Parkinson's disease (Zahodne & Fernandez, 2008), or Lewy body dementia (Eversfield & Orton, 2019), and olfactory hallucinations of epilepsy (Chen et al., 2003) or olfactory reference syndrome (Pryse-Phillips, 1971).

During their interactions with psychotic patients, clinical practitioners have thus habitually been focusing on auditory hallucinations - hearing voices in particular - thereby largely ignoring the possible presence and role of other hallucinated sensory perceptions their patients might be experiencing. Scientific research in this area has likewise mainly focused on exploring and explaining 'voices' and other hallucinated sounds, resulting in a respectable number of articles on auditory hallucinations, especially in comparison to those on other unimodal, let alone multimodal, hallucinations (Toh et al., 2019). Together, this reinforced the idea that patients with schizophrenia spectrum disorders mainly experience auditory hallucinations.

Because of this incomplete clinical and scientific focus, the need for a clear definition and classification of multimodal hallucinations has only lately been felt. As recent as 30 years ago, Chesterman and Boast published their definition of 'multi-modal hallucinations': "hallucinations occurring simultaneously in more than one modality that are experienced as emanating from a single source" and started advocating its use and awareness of the phenomenon, stating that the clinical significance of these hallucinations should not be ignored and that they should be viewed as transdiagnostic symptoms.

1.2 Overcoming the challenge of diverging attributional styles

Biomedically trained health professionals may feel ill at ease in addressing (cultural-) religious and other metaphysical issues, not to mention in initiating or approbating treatment approaches that align with their patients' attributional system, especially when these significantly deviate from their customary biomedi-

cal regimen (Sims, 2009). Confronted with Muslim patients who seek help for their harrowing experiences involving jinn, it is hence likely that the interpretations of the attending health professionals will, as outlined above, collide with those of their patients, creating a seemingly insurmountable barrier.

According to the Qur'an, jinn are invisible beings created by Allah (Qur'an; 15:26-27) who, accordingly, form an integral part of the lives of Muslims. In Arabic, the root of the word ('j-n-n' or 'janna') means 'to conceal' (Ameen, 2005), a fitting indication for creatures believed to be living impalpably among us humans. In Muslim folk belief, various classifications of jinn exist, for example categorizations from the vantage point of their gender (male, female), their religion (Muslim, Christian, Jewish, pagan) (Crapanzano, 1973; Hermans, 2007; Hoffer, 2000), or their geographic origins (e.g. Moroccan, Israeli, Dutch) (Lebling, 2010). Even though they are considered part of Allah's creation and therefore do not necessarily have a negative connotation, many experiences involving or attributed to jinn are valued as adverse. Muslim patients tend to describe jinn as living entities that can make themselves visible - or evoke visions that suggest they are visible - and disrupt one's inner peace and thus substantially affect one's mental and physical wellbeing.

Over the past few decades, clinicians working in Western psychiatric settings have consistently reported on the obstacles they come across while addressing symptoms and treatment options with Muslim patients who associate their hallucinations and other mental symptoms with jinn (Dein et al., 2008; Blom et al., 2010a). In this clinical body of work, diagnosing and treating these patients is unfailingly depicted as challenging, with colliding belief and expectation patterns frustrating the patient-physician relationship. Several basic factors can contribute to such collisions, including language problems and cultural-religious differences and biases (Dein et al., 2008), but also a reluctance of non-Western patients to rely on biomedicine, as well as anxiety and shame associated with being branded a psychiatric patient. Clinical reports note that these various factors can cause substantial delays in treatment, less favorable prognoses, and more patients leaving treatment programs prematurely. In most Western countries few mental health professionals were aware of the challenges posed by such mismatched beliefs and expectations up until the 1970s (Crapanzano, 1973; Colaço Belmonte, 1976), even though far earlier French psychiatrists already had had similar experiences with their Muslim patients during France's colonial rule in the Maghreb (Keller, 2007). In Colonial Madness, Keller

(2007) describes the dynamics between these French psychiatrists and their patients in North Africa, who, from the 1930s through to the 1960s, had been admitted to newly founded psychiatric hospitals where they, according to the then prevailing view, could profit from cutting-edge Western treatment methods. Instead, most of these patients were faced with a wide divide between their beliefs and experiences and those of their treating physicians, preventing any such benefit from being derived. With many Muslims migrating from North-Africa to Western Europe during the 1960s and 1970s, this mismatch must then have occurred in many a European consulting room, continuing to this day.

1.3. Multimodal hallucinations and cultural influences

In the Netherlands, only a handful of authors initially reported on multimodal hallucinations in mental health patients with a Muslim background (Blom et al., 2010a; Colaço Belmonte, 1976; Hoffer, 2000). Besides describing the hallucinations of distinct cases, the authors also found that, before consulting a psychiatrist, many patients had sought to solve their distressing symptoms with the help of traditional healing methods or generic treatments from general Western medicine. Blom et al., (2010a) even described a patient who had suffered greatly for years before he reached out for specialist help, which delay led to a prolonged psychiatric treatment.

As alluded to above, the diverging patient-clinician dynamics and differences in attributional styles still play an important and prohibitive role in today's consulting rooms, even in specialized transcultural settings, with a lack of knowledge of the patients' attributional styles lying at the root of the problems, perhaps aggravated by (subconscious) feelings of inadequacy among practitioners. In addition, the fear that Western, biomedically trained consultants may dismiss their attributions as 'unscientific' may drive patients to break off contact, leaving both patient and clinician empty-handed.

1.4 Research questions and scope of the present thesis

With the ultimate goal of optimizing the diagnosis and treatment of Muslim patients suffering from ill mental health in Western, biomedical practice, the present thesis focuses on the following research questions. What are the explanatory models for Muslim patients experiencing psychotic symptoms, especially concerning those attributing their symptoms to jinn? What is the prevalence of multimodal hallucinations in patients with schizophrenia spectrum disorders? Are there any differences in prevalence between

Western and non-Western (notably Muslim) patients? What are the phenomenological characteristics of the multimodal hallucinations described by Muslim patients? Can certain patterns be discerned in the occurrence of these hallucinations in different sensory modalities and, if so, what could explain these patterns?

In an attempt to answer these questions, *Chapter 2* offers a systematic review of the literature on psychotic symptoms attributed to jinn, the evil eye, and voodoo, while *Chapter 3* discusses the results of a large-scale prevalence study of hallucinations in multiple sensory modalities in schizophrenia spectrum disorders while also offering a classification of the different types of multimodal hallucinations known. *Chapter 4* summarizes the results of a field study on the prevalence of psychotic symptoms attributed to jinn carried out at an outpatient clinic in the Netherlands. *Chapter 5* zooms in on the role and clinical importance of tactile and somatic hallucinations, based on an analysis of these hallucinations in a group of psychotic Muslim patients. C*hapter 6* provides more details on the phenomenology of multimodal hallucinations in Muslim inpatients and zooms in on entity experiences among this group. *Chapter 7* presents a summary of the findings reported and a general discussion that places them into the broader research context of multimodal hallucinations in transcultural psychiatry while offering a hypothesis on the mechanisms underlying these hallucinations, followed by suggestions for future research. Finally, *Chapter 8* and *9* provide a summary in Dutch and Indonesian respectively.


02

Psychotic symptoms and jinn

Published as:
Lim, A., Hoek. H. W., Blom, J. D. (2015) The attribution of psychotic symptoms to jinn in Islamic patients. *Transcultural Psychiatry*, *52*(1), 18-32. https://doi.org/10.1177/1363461514543146

Abstract

Patients with an Islamic background who suffer from hallucinations or other psychotic symptoms may attribute these experiences to jinn (i.e., invisible spirits). In this paper, we review the medical literature on jinn as an explanatory model in the context of psychotic disorders. We conducted a systematic search for papers on jinn and psychosis in Pubmed, EMBASE, Ovid Medline, PsycINFO, and Google Scholar databases. Our search yielded 105 scientific texts on jinn and their relationship with mental disorders, including 47 case reports. Among the case reports a definite biomedical diagnosis was provided in 66% of the cases, of which 45.2% involved a schizophrenia spectrum disorder. Fully 10 of 16 hallucinating patients experienced multimodal hallucinations. Although infrequently documented in the biomedical literature, the attribution of psychiatric symptoms to jinn appears to be quite common among Islamic patients, and to have significant impact on the diagnosis, treatment, and course of mental disorders, particularly psychotic disorders.

Keywords
explanatory models, migration, Muslims, psychiatric symptoms, psychosis

Introduction

Western biomedical practice and traditional Islamic healing methods are based on divergent value systems, which, as a corollary of their respective ontological and epistemological idiosyncrasies, may feel uneasy conflicting approaches to illness in clinical practice. Biomedical practitioners tend to feel uneasy addressing religious and other metaphysical issues (Sims, 2009), and may tend to label claims of contact with invisible living entities as hallucinatory or delusional in nature. Patients have their own ways of explaining such experiences. This conflict of interpretations is evident in clinical work with Islamic patients consulting Western health professionals for help with experiences that they attribute to jinn.

According to the Qur'an, jinn are invisible beings created by Allah (Qur'an; 15:26-27). Islamic patients who fall ill or experience any other types of misfortune may attribute those complaints and life events to jinn. Although the attribution to jinn is certainly not the only way in which Muslims conceptualize the causes of disease, some clinicians working in European settings have reported that a majority of Muslim patients with hallucinations and other psychotic symptoms associate their experiences with jinn (Blom et al., 2010a; Bose, 1997). Since Western health professionals tend to be unfamiliar with this attribution style, diagnosis may prove quite challenging – especially when the patient-physician encounter is already impeded by language problems and cultural differences or biases (Dein et al., 2008). Conversely, a reluctance to rely on biomedicine and its science-based healing methods in the face of allegedly metaphysical problems – as well as feelings of shame and anxiety about the problems themselves – may prevent some Islamic patients from expressing their concerns and from accepting the help of biomedically trained mental health professionals, thus contributing to delays in obtaining treatment. Even when such patients agree to participate in a biomedical treatment program, the mismatch in explanatory models (Kleinman, 1980) prompts many to drop out. As the prognosis of psychotic symptoms tends to deteriorate the longer the symptoms remain untreated, this is a clinical concern (Blom & Hoffer, 2012; Dein et al., 2008). Moreover, given that the incidence of psychotic disorders among certain subgroups of immigrants can be up to 6 times higher than among native Western populations – as was found to be the case among second-generation Moroccan males in the Netherlands (Selten et al., 2010; Veling et al., 2006), there

is a pressing need for mental health professionals to gain insight into barriers to treatment for immigrant patients.

To this end, the present paper provides a review of the scientific literature dealing with psychotic symptoms attributed to jinn and seeks to understand this attribution style from the vantage point of biomedical as well as religious and anthropological discourses. We first outline some basic cultural, religious, and anthropological notions pertaining to jinn, and then summarize the scientific literature.

Cultural-religious context

According to the Qur'an, jinn constitute an integral part of Allah's creation. The root of the word "jinn" is *"j-n-n"* or *"janna"*, which is Arabic for "to conceal" (Ameen, 2005). According to the Qur'an, humans are made out of dust or clay, angels out of light, and jinn out of smokeless fire. Sometimes that fire is depicted as a brilliant, intense flame "mixed with a smouldering wind" (El-Zein, 2009). While the Qur'an constitutes the ultimate religious source for the existence of jinn, much of what is said about them stems from the body of folk beliefs prevalent in Muslim societies (Hoffer, 2000). Thus jinn are said to have a life cycle comparable to that of humans – although much longer – and to possess remarkable powers, such as the ability to fly with an astonishing speed over long distances, to move large objects such as rocks or mountains, and to overhear and convey messages from humans and metaphysical beings. Jinn are also deemed capable of making themselves visible if they so wish, or at least to conjuring up images, that suggest they are visible. When they do so, they reportedly present themselves in the shape of an animal such as a cat, a (black) dog, a donkey, a scorpion, a bird, a goat or a snake. A notable exception would seem to be the wolf, as in most Islamic countries jinn are believed to fear wolves (Ameen, 2005; Lebling, 2010). Other features considered characteristic of jinn are hooves like a goat's, a black tail, an extraordinarily tall build, and vertically set eyes (Drieskens, 2008). Jinn have also been described as taking the shape of a dragon, a human form, a cloud or a shadow. But however different their outward appearance may be from that of humans, they are believed to live quite similar lives, in the sense that they eat, talk, sleep, urinate, defecate, have sex, form marriages, have children, build societies, engage in politics, wage war, love, hate, and die (Al-Ashqar, 2005; Sakr, 2001). It is also said that they live among humans, in our very houses or out in the open, and that they prefer foul, damp or otherwise unhygienic places such as bathrooms, graveyards, slaughterhouses, ruins, rivers,

and ponds as their dwelling places. In addition, it is said that they interact with humans in numerous unknown – but often passionate – ways. A well-known example is their alleged inclination to marry human bachelors, and to keep those humans attached to themselves to prevent them from having any romantic or sexual relations with fellow humans.

In Islamic folk belief jinn have been classified in numerous ways. Thus references to Muslim, Christian, Jewish, and pagan jinn (Crapanzano, 1973; Hermans, 2007; Hoffer, 2000), to male and female jinn (Crapanzano, 1975; Hermans, 2007), and, with reference to their geographic origin (Lebling, 2010), to Moroccan, Turkish, European, American, and other jinn, can be found throughout the religious and ethnographic literature. Jinn living in people's houses are appropriately called *Aamir* (dwellers), while those interacting with children are called *Arwaah* (spirits). Malignant ones are often referred to as *Shaytaan* or devils, and those who are considered even worse as *Maarid* or demons. The strongest and most malevolent ones are called *Ifreet* (Ameen, 2005). Sometimes individual jinn are known by name. Aisha Quandisha, for example, is a well-known female jinn from Morocco, notoriously beautiful, but also capable of appearing in the shape of an older woman with reversed hooves. Folk belief holds that she has intercourse with men during their sleep (Crapanzano, 1973). It also holds that every person has a jinn-companion, called a *qarin* or *qarinah*, which may or may not try to lure a person towards the evil side (Lebling, 2010).

According to folk belief, people who are particularly vulnerable to jinn include those who are going through transitional phases in life such as circumcision, menstruation, pregnancy, young motherhood, recent marriage, or simply while travelling; in these situations individuals may fall prey more easily to the attacks of jinn on their health, social relationships, and material possessions (Ameen, 2005). Although stories about jinn tend to focus on the malignant ones – who are easily angered when treated with disrespect –, other sources relate how benign jinn can help humans to attain valuable goals in life (Blom & Hoffer 2012; Bravmann, 1977), and how Allah holds them just as accountable for their deeds as humans (Drieskens, 2008). Nevertheless, jinn are often held responsible for afflictions such as back pain, anxiety, depression, mood swings, hallucinations, delusions, gynaecological and sexual problems, which can be brought about by the mere touch of jinn. A jinn's transgression of the body's boundaries is said to entail possession and may be identified as the cause of what biomedically trained physicians regard as epilepsy or

paresis (Andermann, 1995). Jinn possession has also been conceptualized as a form of culture-bound dissociation (Ross, 2011; Somer, 2006).

Anthropological context

The word "jinn" and the associated concepts are usually traced to the Qur'an (Al-Ashqar, 2005), although Albright (1940) argues that both may well derive from Aramaic, and therefore stem from a pre-Islamic period. Scholars have also debated the term's possible derivation from the word "genius", probably borrowed from the Aramaic word used to denote degraded pagan gods (Waardenburg, 2002). In ancient Egypt, Babylon, Greece, and Assyria, the belief in possession and magic was widespread, and some specific elements – such as the belief in the ancient Mesopotamian wind demon Pazuzu – may have shaped the concept of jinn and its incorporation into Islam (Lebling, 2010).

Today, the belief in jinn continues to be deeply embedded in everyday life in many Islamic communities. In some contexts, if a Muslim denies the existence of jinn, he or she may be branded as *kaafir*, that is, rejecting the contents of the Qur'an and the Sunnah (Ameen, 2005). This may occur for Muslims residing in Western countries as well as in primarily Muslim countries. As indicated by surveys carried out by Mullick et al. (2012) in Bangladesh, and by Khalifa et al. (2011) in the United Kingdom, many Muslims believe firmly in the existence of jinn, black magic, and the evil eye.

The fact that non-Muslims seldom hear about those beliefs is directly connected with the reluctance of Muslims to share their thoughts on this subject, and especially to confide about any first-hand experiences of jinn. Some fear that such encounters may be taken as proof that they have not been faithful to Allah or to the Qur'an's teachings. Another reason why Muslims are reluctant to mention their belief in jinn is that merely mentioning these beings is sometimes considered sufficient cause for them to reappear (Drieskens, 2008). A third reason for relative silence on this matter is fear for stigmatization and social exclusion due to the label of being mentally ill, which is often applied to those suffering from jinn possession.

In some cases, Islamic patients may seek help from an imam or traditional healer before entering the Western (mental) health care system. With regard to treatments for ailments attributed to jinn, Islamic scholars often advise healers to restrict themselves to methods sanctioned by the Qur'an such as *ruqyah* (i.e. reciting Qur'anic verses while touching the patient's head), applying or drinking mixtures of honey and herbs, and giving information

and advice about ways to avoid dangerous situations. Traditional Sufi healing methods include *azima* (blowing one's breath while one hand rests on the patient's head), *mihaya* (written Qur'an texts are dissolved in water, and either ingested by the patient or used for lavages), and *bahkara* (the writing of Qur'an texts on a piece of paper which is then burned) (Eldam, 2004). In actual practice however, many methods are employed which extend beyond the Qur'an's teachings into the realm of folk medicine and folk belief. Often relying on pre-Islamic notions such as *sihr* (magic) and the evil eye (*al-'ayn*; Hoffer, 2000), typical folk healing methods include the recital of prayers, amulets, incantations, and Zar ceremonies (i.e. public healing performances). Physical healing methods include the infliction of pain (in an attempt to oust jinn) and confinement (Barker, 2008). Moreover, it is not unusual for migrant patients to be referred to their country of origin for elaborate rituals or a pilgrimage.

Although many of these healing methods and rituals are designed to oust jinn, healers may also seek to establish a state of peaceful coexistence with them. In other cases such allegiances are sought to scare away more malevolent jinn (Hoffer, 2000). The latter method has been described in Malaysia, for example, where *bomohs* (traditional healers) claim to exercise their practices aided by jinn (Razali et al., 1996). During Zar ceremonies in Egypt, Somalia, Ethiopia, and Sudan (Drieskens, 2008; El Guindy & Schmais, 1994), as well as some non-Islamic countries (Endrawes et al., 2007), the aim is to pacify jinn rather than exorcise them. The basic assumption here is that jinn cannot be ousted from the victim's body, and therefore can only be appeased (Nelson, 1971; Salama, 1988). In Israel, Jewish-Tunisian immigrants perform somewhat similar sessions under the name of *Stambali* (Somer & Saadon, 2000), and both West (Bravmann, 1977) and East Africa (Kim, 2010) offer closely related variants.

Although such methods may seem inconsistent with biomedical practices, it is not unusual for traditional healers to refer their patients to biomedical health professionals when they judge this appropriate. Borrowing from religious as well as secular discourses, they may also seek to fuse elements from Islamic folk medicine with biomedical approaches. Conceptually, this has led to various interesting hypotheses. For example, Jawaid (1997) attempts to describe jinn at once in scientific terms and with reference to the Qur'an. Starting from their alleged creation out of smokeless fire, and their ability to fly to an altitude of 60 or 70 miles, he suggests that their basic structure must consist of carbon dioxide. Elaborating on this thesis, he seeks to explain many of their remarkable

features – including their alleged invisibility, speed, size, shape, and dietary habits – and offers the ability of gases to penetrate solid and liquid materials as an explanation for their capacity to transgress the boundaries of animal and human bodies (Jawaid, 1997).

Given that the belief in jinn is still widely held in many Islamic countries, as well as among Islamic patients who have migrated to Western countries, we undertook a review of the biomedical literature to identify issues relevant to mental health services and psychoses.

Methods

We carried out a systematic search for literature on jinn in Pubmed and the Ovid database, which included EMBASE (1980 through December 2012), Ovid Medline (1948 through December 2012), and PsycINFO (1806 through December 2012). In each database, the search terms *djinn, jinn, jin, jinni, jinnee, genie, jnun, djnoun, djenoun, sedim, cin,* and *cinler* were used separately. Each of these terms was used in combination with *psychosis* and with *schizophrenia*. Additionally, the search terms were combined with *Maghreb*, *Islam*, and *transcultural psychiatry*, and whenever relevant cross-references were checked. We included the term *Maghreb* based on our own experiences; in the Netherlands, many Islamic patients are from the Maghreb region. Finally, we performed a search through Google Scholar using the aforementioned search terms. Only references to papers in English, French, German, and Dutch were included.

Results

Scientific literature

Our search yielded 105 scientific texts referencing jinn in the context of psychiatric disorders, comprising 90 papers, nine books, two doctoral theses, two master theses, and two book chapters. Twenty-eight of those texts provided case descriptions, adding up to a total of 47 cases (see supplemental Table 1 available online with this article, for an overview). The remaining texts addressed conceptual and other theoretical issues pertaining to jinn in relation to mental disorder. Remarkably, no prior scientific reviews on this topic were found.

Case reports

Fifty-one percent (n=24) of the 47 published cases were male, with a mean age of 30.5 years (range: 15-54 years; in six cases no age was given). Forty-nine percent (n=23) of the cases were female,

with a mean age of 32.4 years (range 16-56 years; in three cases no age was given). The psychiatric symptoms listed were hallucinations, delusions, anxiety, aggression, mutism, anorexia, sleep disturbances, catatonic posturing, and self-mutilation. The somatic symptoms comprised epileptic seizures, alcohol withdrawal, knee injury, paralysis of a limb, personality changes after a trauma capitis, and typhoid fever.

Unimodal hallucinations were auditory (*n*=4), visual (*n*=1) or unspecified (*n*=1) in nature, but the majority was multimodal, with additional olfactory, gustatory, and tactile components in 21.3% of the cases (*n*=10). In all cases, the patient and/or a family member, friend, or traditional healer identified jinn as the cause of the ailment. A definite diagnosis was provided in 66% of all cases (*n*=31). Four patients were diagnosed with schizophrenia and eight patients with psychosis. Two patients were diagnosed with schizoaffective disorder, 11 patients had a mood disorder. Two other patients had obsessive-compulsive disorder. Six patients were diagnosed with a somatic disease. Forty-five per cent of those cases (*n*=14) were schizophrenia spectrum disorders. In four additional cases (8.5% of all cases) only a differential diagnosis was mentioned (Blom & Hoffer, 2012; Boubeci, 1985; Diop & Collomb, 1965; Guenedi et al., 2009). In 21.3% of all cases (*n*=10) no definite medical diagnosis was made.

With regard to geographic origin, 51% of the case descriptions originated in countries where the Islam is the dominant religion (*n*=24, Bangladesh and Indonesia included), whereas 40% originated from western countries (*n*=19), and 9% (*n*=4) from non-Muslim African countries.

Although the majority of the patients showed a favourable initial response to treatment, only a few papers specified the duration of follow-up (Al-Krenawi & Graham, 1997; Broch, 2001; Colaço Belmonte, 1976; Qureshi et al., 2001; Salvatore et al., 2008). In some of those cases the results of medical treatment were quite striking. For example, a patient diagnosed with schizophrenia was treated with 30 mg of haloperidol per day and failed to respond to this high dosage. He only recovered after six psychotherapy-like sessions with a social worker and an exorcism ritual involving physical methods (i.e., hitting the feet with a stick). In this case the diagnosis of schizophrenia was dismissed afterwards in favour of 'neurosis' (Al-Krenawi & Graham, 1997). In another noteworthy case, partial recovery was only achieved after a switch from classic antipsychotics to clozapine (Blom et al., 2010a). Four other noteworthy cases involved delusions of pregnancy, in three of which pharmacological treatment was efficacious (Qureshi et al., 2001).

One patient diagnosed with mood disorder received electroconvulsive therapy without any favourable response. She did recover, however, after traditional Islamic treatment with the aid of *dkhir* (i.e., worshipping Allah through recitations from the Qur'an) and *ruqyah* (i.e., a patient is lying down and an iman places a hand on the patient's head while reciting verses from the Qur'an; Khalifa & Hardie, 2005).

The second-largest diagnostic group, that of patients suffering from mood disorder, showed even more variable responses to treatment. One female patient was treated by a traditional healer who gave her a talisman, applied oil, and performed readings from the Qur'an, after which a favourable initial response was obtained (Bose, 1997). She relapsed a few weeks later, at which time a hypomanic episode was diagnosed. Three cases of mood disorder treated with pharmacotherapy showed an equally favourable initial response (Qureshi et al., 2001; Studer, 2010; Younis, 2000). One of the patients had a relapse after cessation of the medication (Studer, 2010). In another case, group therapy failed to yield any favourable results, whereas the subsequent combination of individual therapy and paroxetine turned out to be successful (Streit et al., 1998). Yet another patient with depression failed to respond to pharmacotherapy (Zouari et al., 2010).

In seven cases a somatic rather than a psychiatric diagnosis was established. Three patients from that group responded well to pharmacological treatment, namely a case of delirium tremens in alcohol withdrawal (Al-Sinawi et al., 2008), a case with a differential diagnosis of epilepsy, catatonia or personality disorder (Diop & Collomb, 1965), and a case of epilepsy (Good & Del Vecchio Good, 1994). In another case of epilepsy the outcome was not described (Studer, 2010). The fifth patient, described by Broch (2001), suffered from a "fit" followed by a head trauma, and achieved remission after several years of participating in traditional rituals. The sixth one, who suffered from delirium tremens, was initially treated with a traditional emetic – to no avail – and then with an unknown medical intervention, the results of which are not documented (Stein, 2000). The seventh patient, described by Blom et al. (2010), was diagnosed with temporal lobe epilepsy and treated accordingly, with favourable results.

Conceptual and other descriptive texts

The remaining literature comprises conceptual and medical anthropological texts that on the whole also suggest that the historical belief in jinn as a cause of what biomedicine conceives

as psychiatric disorder is still current in many Islamic countries (Al-Issa, 1989; Al-Riyami et al. 2009; Broch, 2001; El-Islam, 1982, 2008; El-Islam & Abu-Dagga, 1992; Okasha, 1999; Stein, 2000). The same holds true for epilepsy and other somatic diseases (Bamogaddam & El Mubarak, 2009; Obeid, 2012). As related by El-Islam (2008), that belief has persisted, despite the sometimes profound cultural and political changes that have taken place in some Islamic countries in recent decades. In a similar vein, Al-Habeeb (2003) indicates that the concept of jinn continues to serve as an idiom of distress and as an explanatory model for many somatic ailments among Muslims, while Ally and Laher (2008) add that this is also true for many Muslims living in non-Islamic countries.

Other texts provide general descriptions of jinn and their alleged influences upon mental health (Carnevali & Masillo, 2007; El-Islam & Abu-Dagga, 1992; Racy, 1977) or emphasize subtle differences in the way they are named and conceptualized across various countries and cultures (Al-Issa, 1989; Beneduce, 1996; Dubovsky, 1983; El-Islam, 1982; Stein, 2000). In the Malay Peninsula, for example, jinn are called *hantu* (Broch, 2001; Chen, 1970; Razali & Yassin, 2008) whereas Moroccan Jews in Israel call them *shedim* (Bilu, 1980). We suspect that these regional differences are reflections of a continuum of concepts of jinn and their precursors. In this light, it is noteworthy to reference Léon (1975), according to whom the origin of *el duende*, the male spirit with inverse hooves described in Spanish and Latin-American mythology, can possibly be traced to the same Islamic sources that brought forth the concept of jinn. That said, it should be noted that an exact delineation of the concept of jinn may prove difficult, and that the conceptualization of seemingly similar metaphysical entities may in fact be widely divergent.

Some papers also describe how Muslims residing in non-Islamic countries tend to deal with jinn as agents of mental complaints. In the Netherlands, a number of papers describe first- and second-generation psychiatric patients from Morocco remain undiagnosed and undertreated due to their reluctance to seek help from biomedically trained health professionals (Blom et al., 2010a; Colaço Belmonte, 1976). Papers from Germany (Assion et al., 1999), Great Britain (Bose, 1997; Dein et al., 2008; Khalifa & Hardie, 2005; Leavey et al., 2007), Italy (Spensieri et al., 2010), Sweden (Wedel, 2012) and Finland (Mölsä et al., 2010; Tiilikainen, 2007) provide more or less similar accounts of Turkish, Bangladeshi, and Somali migrants. In New Zealand the explanatory models of Somali migrants have been thoroughly described (Ryan, 2007).

Only a few papers – on Somali and Pakistani patients – are from the United States (Carroll, 2004; McGraw Schuchmann & McDonald, 2004) and Canada (Gadit & Callanan, 2006).

Saeed et al. (2000) published a thought-provoking study on the comparison of diagnostic labels used by faith healers in Pakistan versus those used by health professionals using biomedical standards. According to authors, what the mental health professionals designated as psychosis or epilepsy tended to be designated by faith healers as originating from jinn. Moreover, *churail* (i.e. possession by a female spirit with hooves) was mentioned as a rough equivalent of psychosis.

We were unable to find any systematic assessments of the results of indigenous modalities of healing, but two patients, described by Nelson (1971), both of whom suffered from hallucinations and various somatic complaints (without any formal psychiatric diagnosis), responded well to a Zar ceremony. Likewise, another patient, described as "psychotic", recovered after a traditional treatment (Wintrob & Wittkower, 1966).

In addition to the biomedical work reviewed here, issures such as spirit possession and spirit attacks have been the focus of much work in other disciplines, including religion, anthropology, sociology, and cultural studies. This body of work throws light on the social contexts in which possession takes place and raises significant issues about agency relevant to any discussion of possession and psychosis (Dawson, 2011).

Discussion

Despite the limited number of scientific publications, and the unknown biases affecting the types of cases reported, the available literature suggests that the attribution of psychiatric symptoms to jinn is common in some Muslim populations. Hallucinations and other psychotic symptoms may be particularly likely to be attributed to jinn, although jinn have also been reported as explanations in cases involving mood disorders, obsessive-compulsive disorder (OCD), Capgras syndrome, epilepsy, and other conditions. Of note, a number of cases featured multimodal hallucinations (n=10), and these were more common among patients who were diagnosed by biomedical practitioners as having a schizophrenia spectrum disorder. This is in concordance with prior findings by Al-Issa (1977) and with our own clinical experience (Blom & Hoffer, 2012). With regard to treatment outcome, the small number of cases does not allow any conclusions. Careful empirical research is needed for any comparisons between the results of traditional Islamic and biomedical treatment methods.

To promote clinical engagement, it would seem advisable to tailor interviewing techniques to obtain more specific information about symptomatology, coping mechanisms, and the socio-cultural context of patients' complaints. Biomedically trained health practitioners may seek the collaboration of religious health care workers (Blom et al., 2010a; Khalifa et al., 2011). In our practice in The Hague, an imam in the service of our psychiatric hospital is available for consultation and advice. An important advantage of this collaboration with our mental health professionals is that patients feel more comfortable sharing their concerns and accepting treatments in the knowledge that an esteemed representative of their own religion endorses them. Such religious counsellors also are able to point the way to competent practitioners if the patient wishes to seek a traditional treatment alongside – or instead of – biomedical treatment (Blom & Hoffer, 2012).

In addition to contributing to a reluctance to consult mental health professionals, with consequent delays in treatment, the attribution of psychotic symptoms to jinn may play a role in the course of psychosis. As suggested by Birchwood et al. (2000), the power and omnipotence attributed to hallucinated agencies may be detrimental to feelings of well-being, and may lead to emotions such as entrapment and helplessness. Systematic research is needed to test the hypothesis that attributions of psychotic symptoms to jinn may contribute to the severity and persistence of psychosis

Conclusions

Although scarcely documented in the scientific literature, the attribution of psychiatric symptoms to jinn appears to be quite common among Islamic patients and to have a significant impact on the diagnosis, treatment, and course of what biomedical practitioners consider psychiatric disorders, notably in the case of psychotic disorders. The present review underscores the need for systematic empirical and medical anthropological research into the transcultural and transdiagnostic aspects of psychotic symptoms experienced by Islamic patients. Establishing working alliances between biomedically trained mental health professionals and religious counsellors may improve the care for Muslim patients.

Funding

Dr. Lim received a grant from the Parnassia Academy, Parnassia Psychiatric Institute, for her research on psychiatric symptoms in Islamic patients.


03

Multimodal hallucinations in schizophrenia spectrum disorders

Published as:
Lim, A., Hoek, H. W., Deen, M. L, Blom, J. D., GROUP Investigators (2016). Prevalence and classification of multimodal hallucinations in schizophrenia spectrum disorders. *Schizophrenia Research*, *176*(2-3), 493-499. https://dx.doi.org/10.1016/j.schres.2016.06.010

Abstract

Background: Auditory hallucinations are experienced by 60-80% of all patients diagnosed with a schizophrenia spectrum disorder. However, in this patient group, the prevalence of hallucinations in multiple sensory modalities, i.e. multimodal hallucinations (MMHs), is unknown. *Aims:* To assess the prevalence of multimodal hallucinations (MMHs) in patients diagnosed with a schizophrenia spectrum disorder, data were analyzed from 750 patients who participated in the Dutch Genetic Risk and Outcome of Psychosis (GROUP) study. *Method:* We drew on the section of the CASH (Comprehensive Assessment of Symptoms and History) that probes into the lifetime presence of auditory, visual, somatic/tactile, and olfactory hallucinations. *Results:* A lifetime prevalence of 80% was found in this group for any of these hallucinations. Within the whole group, 27% of the participants reported unimodal hallucinations and 53% MMHs. There were no significant differences in prevalence rate for Dutch versus migrant participants from Morocco, Turkey, Surinam or the (former) Dutch Antilles. *Conclusion:* We conclude that MMHs, rather than auditory hallucinations, are the most frequent perceptual symptom of patients diagnosed with a schizophrenia spectrum disorder. Our data also suggest that hallucinations experienced in a single sensory modality (notably auditory ones) stochastically increase the risk for more sensory modalities to join in. We recommend that future studies take into account all 14 sensory modalities in which hallucinations can be experienced. For this we provide a classification of MMHs that allows characterization of their serial versus simultaneous occurrence and their congruent versus incongruent nature.

Keywords
compound hallucination, panoramic hallucination, polymodal hallucination, multimodal hallucination, stochastic process, unimodel hallucination

Introduction

Of all patients diagnosed with a schizophrenia spectrum disorder, 60-80% experience auditory hallucinations (Waters et al., 2014) and a smaller proportion visual or other unimodal hallucinations. However, in this patient group, little is known hallucinations in multiple sensory modalities, also known as multimodal hallucinations (MMHs). Below, we will explain that the term multimodal hallucinations is used for both serial and simultaneous hallucinations, occurring in different sensory modalities. As noted in a review (Waters et al., 2014), the nature of the relationship between hallucinations of different sensory modalities has hardly been examined. Although this situation is not unique for schizophrenia spectrum disorders (Waters et al., 2014), some studies indicate that the prevalence of multimodal hallucinations may be severely underestimated in this group (Goodwin et al., 1971) while others indicate that the presence of MMHs may be indicative of an underlying organic etiology (Roberts, 1984; Albert, 1987), or, in children and adolescents, of a more severe expression of schizophrenia (David et al., 2011; Jardri et al., 2014; Cachia et al., 2015).

MMHs are also known as polymodal hallucinations, polysensual hallucinations, polysensory hallucinations, polysensorial hallucinations, intersensorial hallucinations, and fantastic hallucinations (Blom, 2010). In the literature these terms tend to be used interchangeably; however, in some cases they refer to hallucinations experienced in various sensory modalities simultaneously, while in others they refer to those experienced serially (Chesterman & Boast, 1994).

Whatever the reason, the literature on MMHs is scarce. The most extensive review to date was published by Chesterman and Boast in 1994 and the most recent review prior to that is a chapter in Specht's 1914 German textbook *Wahrnehmung und Halluzination* (Specht, 1914). During the 80-year intervening period, as well as during the 20 years since the publication of Chesterman and Boast, MMHs have mainly been referenced in case reports (Alroe & McIntyre, 1983; Scher & Neppe, 1989; Benatar et al., 2000; Lim, 2003; Szücs et al., 2003; Yee et al., 2005; Mollet et al., 2007; Guzelcan et al., 2008; Vita et al., 2008; Bhat et al., 2012; Dogan et al., 2013), in the field of neuropsychiatry (Aarsland et al., 2001), and in studies in the field of transcultural psychiatry (Zarroug, 1975; Al-Issa, 1977; Ndetei & Singh, 1983; Kent & Wahass, 1996; Johns et al., 2002; Blom et al, 2010a; Bauer et al., 2011; Hussein et al., 2012; Larøi et al., 2014; Lim et al., 2015; Luhrmann et al., 2015),

see **Table 1**. Even classic authors such as Parish (1894), Bleuler (1911) and Jaspers (1965), who wrote extensively on hallucinations in various sensory modalities, treated the subject only cursorily. **Table 1** provides an overview of studies we retrieved on MMHs experienced in the context of psychiatric *and* somatic conditions.

Table 1 Overview of studies describing multimodal hallucinations in the context of various psychiatric and somatic conditions

Type of disorder	Diagnosis	Study	Sensory modalities	Serially/ simultaneously occurring hallucinations
Psychiatric disorders	Schizophrenia	Goodwin et al., (1971)	Auditory and visual	Serially and simultaneously
	Late onset schizophrenia	Hussein et al., (2012)	Not mentioned	Not mentioned
	Late onset schizophrenia	Pearlson et al., (1989)	Not mentioned	Not mentioned
	Late onset schizophrenia	Eissa et al., (2013)	Not mentioned	Not mentioned
	Schizophrenia in Saudi Arabia	Zarroug et al., (1975)	Auditory, visual, tactile	Simultaneously
	Schizophrenia in Kenya	Ndetei & Singh, (1983)	Not mentioned	Not mentioned
	Borderline personality disorder	Yee et al., (2005)	Visual and olfactory	Not mentioned
Neurological disorders	Temporal lobe epilepsy	Penfield & Perot, (1963)	Auditory and visual, sometimes tactile and olfactory	Serially and simultaneously
	Narcolepsy	Szűcs et al., (2003)	Hypnagogic hallucinations; tactile and visual	Not mentioned
	Right temporo-basal tumor	Güzelcan et al., (2007)	Visual and tactile	Simultaneously
	Right thalamic stroke	Mollet et al., (2007)	Auditory and visual	Simultaneously
	Cerebrovascular accident presenting with peduncular hallucinosis	Dogan et al., (2013)	Auditory and visual	Simultaneously
	Charles Bonnet syndrome	Alroe & McIntyre, (1983)	Visual and olfactory	Simultaneously
	Delirium tremens	Deahl, (1987)	Auditory and visual	Simultaneously
Infectious disease	Penducular hallucinosis	Vita et al., (2008)	Auditory and visual	Simultaneously
Neuropsychiatry	Lewy body disease	Aarsland et al., (2001)	Auditory and visual	Not mentioned
Substance abuse	Ketamine use	Lim, (2003)	Auditory and olfactory	Not mentioned
	Alcohol hallucinosis	Bhat et al., (2012)	Auditory, visual, and tactile	Not mentioned
	Drug and alcohol abuse	Scher & Neppe, (1989)	Auditory, visual, and gustatory	Not mentioned
Iatrogenic cause	Carbamazepine use	Benatar et al., (2000)	Auditory, visual, and tactile	Auditory and visual simultaneously

To further our understanding of MMHs and their prevalence rate in patients diagnosed with a schizophrenia spectrum disorder, we drew on data from the *Genetic Risk and Outcome of Psychosis* (GROUP) study, conducted in the Netherlands from 2004 through 2013 (Korver et al., 2012). Below, we present data from this study on hallucinations in various sensory modalities, address various conceptual issues pertaining to MMHs, and propose a classification of this neglected group of phenomena to serve both clinical and research purposes.

Method

Study design

A longitudinal cohort study on gene-environment vulnerability and resilience in patients diagnosed with a schizophrenia spectrum disorder (DSM IV classification), their unaffected family members, and non-related controls, was performed by the GROUP project. Individuals were recruited to elucidate etiological and pathogenetic factors influencing the onset and course of psychotic disorders. The study was conducted in the Netherlands within a consortium of four university psychiatric centers and 30 of their affiliated mental healthcare institutions. One of the instruments used was the CASH (*Comprehensive Assessment of Symptoms and History*) (Andreasen et al., 1992), which contains sections on the lifetime presence and the present state (i.e., past month) of hallucinations experienced in the auditory, visual, somatic/tactile, and olfactory modalities.

Subjects

Ethnicity was determined in the GROUP project by country of birth of grandfather and grandmother on the fathers' and mothers' sides. Thus, a subject was considered to be of Dutch ethnicity when three or more grandparents were born in the Netherlands. Mutatis mutandis, this rule applied to all ethnicities. Whenever less than three grandparents were born in the same country, the subject was said to have a mixed ethnicity. We selected all patients who had completed the study's baseline measurements and excluded those whose data were incomplete.

Outcome measures were (1) the number of patients who had ever experienced any of the aforementioned types of hallucination, (2) the types of hallucination, and (3) their distribution.

Data analysis

Analyses comprised a calculation of odds ratios (ORs) from cross tabulations and multivariate logistic regression. A confidence

interval (CI) of 95% was considered to indicate statistical significance for the ORs. Akaike's Information Criterion (AIC) (Aikake, 1974) was used for model-selection purposes regarding the logistic regression. For the statistical analyses, SPSS version 23 and Excel 2010 were used.

Results

For the present study, complete data on hallucinations in patients diagnosed with a schizophrenia spectrum disorder were available from 750 patients who had participated in the GROUP study. Their mean age was 27 (range 15-57, SD 7.424) years, and 77.3% were men. Of all these patients, 603 (80%) had experienced one or more types of hallucination throughout their lives. Hallucinations in a single sensory modality were reported by 204 of them, yielding a lifetime prevalence for unimodal hallucinations of 27%, whereas hallucinations in two or more sensory modalities were reported by 399 patients, yielding a lifetime prevalence for MMHs of 53% in the total group. Twenty-nine percent of the patients experienced hallucinations in two sensory modalities, 17% experienced them in three sensory modalities 8% experienced them in four sensory modalities. **Table 2** shows that auditory hallucinations were the most prevalent type of hallucination in the unimodal hallucination group (68%) as well as in the MMH group (88%), followed by visual, somatic/tactile, and olfactory hallucinations. **Figure 1** presents the distribution of the various types of hallucination.

Present-state scores on hallucinations showed that 285 patients (38%) experienced one or more hallucinations during the month preceding the CASH interview. Hallucinations in a single sensory modality were reported by 162 patients (22%) on the present-state scale, whereas hallucinations in two or more sensory modalities were reported by 123 patients, yielding a present-state prevalence for MMHs of 16% **(Table 2)**. **Figure 2** displays the distribution of the present hallucinations (i.e. one month). The lifetime ORs for MMHs in two sensory modalities for patients who already experienced unimodal hallucinations were, respectively, 2.312 [1.454-3.676; from auditory]; 11.320 [7.121-17.997; from visual]; 4.311 [2.447-7.594; from somatic/tactile]; and 3.664 [1.759-7.632; from olfactory]. The ORs for MMHs in three sensory modalities in patients who already experienced bimodal hallucinations were also increased, respectively 2.715 [1.640-4.494; from auditory-visual]; 7.013 [4.275-11.507; from auditory-somatic]; 11.111 [5.83167-21.170; from auditory-olfactory]; 15.911 [8.579-29.507; from visual-somatic]; 9.590 [4.934-18.640; from visual-olfactory]; and 7.905 [3.330-18.769; from somatic-olfactory].

Table 2 Distribution of unimodal and multimodal hallucinations among 750 patients diagnosed with a schizophrenia spectrum disorder

No. of sensory modalities	Lifetime						Total no. of patients
0							147
1	Auditory 139	Visual 37	Somatic/ tactile 18	Olfactory 10			204
2	Auditory-visual 124	Auditory-somatic/ tactile 40	Auditory-olfactory 12	Visual-somatic/ tactile 16	Visual-olfactory 13	Somatic/ tactile-olfactory 7	212
3	Auditory-visual-somatic/ tactlle 62	Auditory-visual-olfactory 39	Auditory-olfactory-somatic/ tactile 17	Visual-olfactory-somatic/ tactile 10			128
4	Auditory-visual-somatic/ tactile olfactory 57						57
Total							**750**

No. of sensory modalities	Present-state						Total no. of patients
0							465
1	Auditory 127	Visual 12	Somatic/ tactile 17	Olfactory 6			162
2	Auditory-visual 47	Auditory-somatic/ tactile 20	Auditory-olfactory 11	Visual-somatic/ tactile 4	Visual-olfactory 6	Somatic/ tactile-olfactory 2	90
3	Auditory-visual-somatic/ tactlle 11	Auditory-visual-olfactory 6	Auditory-olfactory-somatic/ tactile 7	Visual-olfactory-somatic/ tactile 2			26
4	Auditory-visual-somatic/ tactile olfactory 7						7
Total							**750**

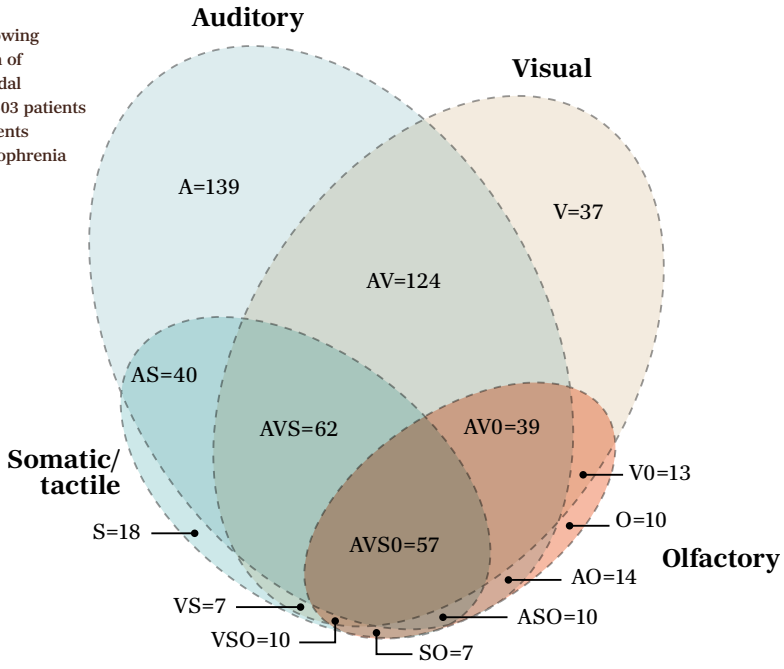


Figure 1
Schematic diagram showing the lifetime distribution of unimodal and multimodal hallucinations among 603 patients from a total of 750 patients diagnosed with a schizophrenia spectrum disorder.

Abbreviations (figure 1 and 2):
A= auditory; V= visual; S= somatic/tactile; O= olfactory; AV= auditory-visual; AS= auditory-somatic/tactile; AO= auditory-olfactory; VS= visual-somatic/tactile; VO= visual-olfactory; SO= somatic/tactile-olfactory; AVS= auditory-visual-somatic/tactile; ASO= auditory-somatic/tactile-olfactory; AVO= auditory-visual-olfactory; VSO= visual-somatic/tactile-olfactory; AVSO= auditory-visual-somatic/tactile-olfactory

We also calculated ORs for the lifetime prevalence of MMHs in Dutch patients versus the combined groups of patients from Morocco (*n*=23), Turkey (*n*=15), Surinam (*n*=18), and the (former) Dutch Antilles (*n*=4), but found no significant differences (OR 0.768, [0.433-1.363]) between these latter groups and the Dutch group.

Discussion

Our findings indicate that the lifetime prevalence of MMHs in patients diagnosed with a schizophrenia spectrum disorder is almost twice as high as that of all unimodal hallucinations taken together (53% vs. 27%). As unimodal auditory hallucinations (notably of the ver-

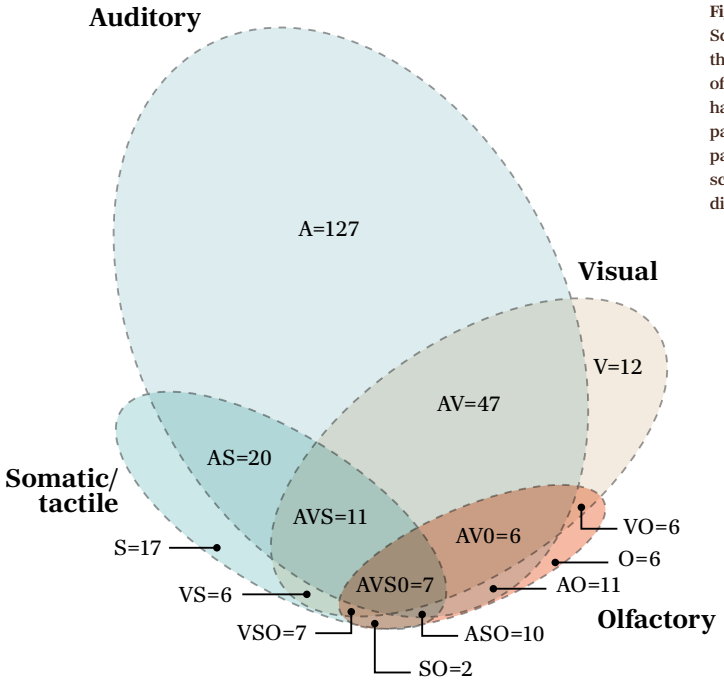


Figure 2
Schematic diagram showing the one month distribution of unimodal and multimodal hallucinations among 285 patients from a total of 750 patients diagnosed with a schizophrenia spectrum disorder.

bal-auditory type) are traditionally considered the most prevalent type of hallucination in this patient group, this raises the question why this high prevalence of MMHs has rarely been reported. Or, to rephrase the question, why studies that did find elevated prevalence rates for MMHs are rarely cited. For example, **Table 1** lists several studies that, retrospectively, appear to have anticipated our findings. In the general population, probably the most extensive prevalence study of MMHs is the 19th century Census of Hallucinations, carried out by the Society for Psychical Research (SPR). This study aimed to chart the prevalence of death-related visions and, to that end, collected data from 27,329 individuals in the UK, the USA, Germany, and France, among whom 11.96% had experienced one or more hallucinatory episodes (Parish, 1894; Sidgwick et al., 1894). Within the hallucinating group, MMHs in the auditory, visual and tactile modalities were reported by 12.3% of all hallucinating individuals. In a study by Goodwin et al. (1971), among 117 patients diagnosed variously with affective disorder, schizophrenia, alcoholism, organic brain syndrome, and hysteria, about 75% experienced hallucinations in two or more sensory modalities. Among the few prevalence studies of MMHs among patients diagnosed with a schizophrenia spectrum disorder, a re-

latively large study (Mueser et al., 1990) stands out, describing 117 patients with a DSM-III-R diagnosis of schizophrenia or schizoaffective disorder, among whom auditory hallucinations were the most common, followed by visual, and then tactile, olfactory, and gustatory hallucinations. Interestingly, the authors also found that hallucinations in two sensory modalities were experienced more frequently in their group than isolated auditory hallucinations. A retrospective study comparing adults with early-onset schizophrenia and with late-onset schizophrenia, as well as elderly patients with early-onset schizophrenia, found that the number of types of hallucination for the late-onset group was significantly higher than in the early-onset groups (Pearlson et al., 1989). In a smaller study conducted in the Middle East, patients with late-onset schizophrenia experienced MMHs more often than those with early-onset schizophrenia; however, their distribution and prevalence rate were not extensively discussed (Eissa et al., 2013). In another small study from the Middle East, elderly patients with late-onset schizophrenia experienced MMHs more often than psychotic patients who were not diagnosed with schizophrenia (Hussein et al., 2017). Zarroug (1975) examined 69 Saudi-Arabian patients diagnosed with schizophrenia and found that 51% experienced MMHs. In a cross-cultural comparative study, Ndetei and Vadher (1984) found that MMHs in the auditory and visual sensory modalities were more prevalent in African, West-Indian, and Asian patients than in British patients, most of whom experienced unimodal auditory hallucinations (Ndetei & Vadher, 1984).

Our analysis of the GROUP data largely confirms the above-mentioned prevalence data for the various types of unimodal hallucination in patients diagnosed with a schizophrenia spectrum disorder (Goodwin et al., 1971; Mueser et al., 1990). A reason why other studies failed to replicate the findings of these authors may be that they did not broaden their scope to include other types of hallucination (Waters and Jardri, 2014) and that the prevalence of MMHs has therefore been systematically underestimated. Secondly, the presence of hallucinations in other sensory modalities has traditionally led to non-psychiatric diagnoses (Waters et al., 2014), such as organic or neurological ones (Roberts, 1984; Albert, 1987). Another explanation may be that the CASH, apart from providing a systematic screening of hallucinations in four sensory modalities, has the advantage of describing their present-state occurrence as well as their lifetime presence. As verbal auditory hallucinations experienced by psychotic patients are probably more frequent and more persistent than those experienced in any of the other sensory modalities (Goodwin et al.,

1971), MMHs may be missed by studies that focus exclusively on their present-state occurrence. This also holds true for clinical practice, in which the focus tends to lie quite exclusively on present-state symptoms. Altogether, these observations may also explain why our analysis failed to replicate the findings from earlier transcultural studies showing that MMHs seem more prevalent in non-Western than in Western patient groups diagnosed with a schizophrenia spectrum disorder.

Table 3 Sensory modalities and corresponding unimodal types of hallucination. Adapted from Blom (2013)

Sensory modality	Type of hallucination
1. Visual modality	Visual hallucination
2. Auditory modality	Auditory (acoustic) hallucination
3. Olfactory modality	Olfactory hallucination
4. Gustatory modality	Gustatory hallucination
5. Exteroceptive modality	Tactile (haptic) hallucination
6. Interoceptive modality	Somatic hallucination
7. Proprioceptive modality	Proprioceptive hallucination
8. Kinesthetic modality	Kinesthetic hallucination
9. Vestibular modality	Vestibular hallucination
10. Cenesthetic modality	Cenesthetic hallucination
11. Pain modality	Algesic hallucination (hallucinated pain, central pain)
12. Sexual modality	Sexual hallucination
13. Temperature modality	Thermal (thermic) hallucination
14. Temporal modality	Time distortion

Sensory modalities

The high prevalence rate of MMHs found in our patient group as a whole is all the more remarkable when considering that the CASH allows to chart hallucinations experienced in four sensory modalities (i.e., auditory, visual, olfactory, and somatic/tactile), whereas some classifications distinguish up to 14 sensory modalities (Gibson, 1966; Blom, 2013), and equally many main groups of hallucinations **(Table 3)**. In **Table 3**, although the category 'somatic/tactile' is split into two separate categories (with tactile hallucinations referring to hallucinations of touch, and somatic ones to hallucinations experienced inside the body), it still leaves nine more types of unimodal hallucination that can be explored. Many of those types have not yet been systematically studied and still have unknown prevalence rates; however, even if these rates prove to be low, the prevalence rate of MMHs found in the present study may be considered a conservative estimate of the actual rate.

Another important finding from our analysis is that the number of patients reporting MMHs in three or four sensory modalities is relatively high. Although the GROUP data do not allow for a reconstruction of the temporal order in which various unimodal hallucinations add up to MMHs, this suggests that the threshold for developing auditory hallucinations in this group is relatively low (given their high distribution rate) and that, in turn, the presence of auditory hallucinations lowers the threshold for developing any additional types of hallucination, notably visual ones. When hallucinations are present in these two sensory modalities, the chance for even more sensory modalities to become involved seems to increase further. This peculiar stochastic process was noted as early as 1900 by Störring (1900), whose observations prompted him to remark that when one sensory modality is involved in hallucinatory activity, another one may easily join in (Störring, 1900). This process was also mentioned by David et al. (2011), who speak of "an additive progression of hallucination categories in order of descending frequency" to explain the considerable overall overlap between various types of hallucination, and the finding that somatic/tactile and olfactory hallucinations did not appear in their subjects without the appearance of hallucinations in the auditory and visual modalities.This seems to suggest that the networks involved in the mediation of verbal auditory hallucinations may serve as hubs in the perceptual network which promote the recruitment of subsequent sensory modalities to mediate MMHs (Looijestein et al., 2015).

Nomenclature and classification

An issue that cannot be solved on the basis of our data, is whether the MMHs, as reported by the participants of the GROUP study, combine to constitute compound hallucinations, or even whether they are experienced serially or simultaneously. In the literature, MMHs are sometimes designated in terms of combinations of the sensory modalities involved, e.g. audiovisual hallucination, audioalgesic hallucination, and so on (Jacome & Gumnit, 1979). Terms such as these have the advantage of describing the sensory modalities involved, but fail to indicate whether the hallucinations in these sensory modalities are experienced simultaneously or serially. As noted previously (Chesterman and Boast, 1994) the literature on MMHs suffers from a lack of information on these phenomenological characteristics, and even from the lack of a precise nomenclature with which to address this problem. A proper nomenclature of MMHs should allow us to identify the exact number and nature of the sensory modalities involved, to differentiate

Table 4 Classification of unimodal and multimodal hallucinations

Type of hallucination	Characterization
Unimodal hallucination	Hallucination experienced in a single sensory modality
Multimodal hallucination	Hallucinations experienced in two or more sensory modalities
Serial multimodal hallucination	Hallucinations experienced in two or more sensory modalities at different moments in time
Simultaneous multimodal hallucination	Hallucinations experienced in two or more sensory modalities simultaneously
Incongruent multimodal hallucination	Hallucinations experienced in two or more sensory modalities simultaneously which do not add up to a coherent whole
Congruent multimodal hallucination (compound hallucination)	Hallucinations experienced in two or more sensory modalities simultaneously which add up to a coherent whole

between hallucinations in various sensory modalities which are experienced serially or simultaneously, and, in the latter case, to differentiate between incongruent and congruent (i.e., compound) ones. Here, the adjective 'incongruent' refers to phenomena such as a visually hallucinated face experienced simultaneously with the sound of a barking dog, and the adjective 'congruent' refers to a visually hallucinated face that is seen talking, with verbal auditory hallucinations to match. **Table 4** presents a classification of MMHs that allows for such a uniform and systematic characterization of MMHs, provided that the sensory modalities involved are also carefully listed.

Pathophysiology

Apart from its clinical usefulness, a proper nomenclature of MMHs is also a prerequisite for studies on the pathophysiology of MMHs. Systematic studies in this area are lacking, and even case reports are rare. In his 1914 book chapter, Specht posed the cardinal question: whether MMHs are mediated by various sensory brain areas showing separate but simultaneous hallucinatory activity, or by a single higher integrative center (Störring, 1900). As recently indicated by ffytche and Wible (2014), that question has gone unanswered throughout the intervening century and is even more pressing today than it was then. Classical cortical probing experiments, such as those performed by Penfield, suggest that MMHs (notably perceptions that take the form of panoramic hallucinations) may be mediated by circumscript brain areas in relative isolation (Penfield & Perot, 1963), whereas Liddle et al. (2000) consider the left hippocampus, ventral striatum, and various disseminated cortico-striato-thalamic feedback loops to be responsible for their mediation (Liddle et al., 2000). With the aid of functional magnetic resonance imaging (fMRI) and other

imaging techniques it is now possible to test hypotheses such as these, in a way similar to the many studies that helped to chart the neuropathological correlates of verbal auditory hallucinations over the past decade (Blom, 2015). However, the success of studies such as these relies on the adequate coupling of activation maps and phenomenological descriptions as outlined above, including the use of a uniform nomenclature.

Limitations

As in previous studies on MMHs, the present study has several limitations. First, the number of sensory modalities under study comprised only four (or five, if we take tactile and somatic as separate sensory modalities) whereas some authors distinguish up to 14 sensory modalities. Secondly, the CASH was designed to probe the (lifetime) presence of hallucinations in these four sensory modalities without attempting to reconstruct the temporal order in which they are experienced, and without addressing the questions whether they are experienced serially or simultaneously and whether they are congruent or incongruent in nature. As a result, these questions remain unanswered in the present study. Thirdly, the GROUP study excluded patients who were insufficiently fluent in Dutch, but whose inclusion might have yielded a larger proportion of migrants and, hence, a shift in the prevalence rates of MMHs as found in our study. Fourth, women with schizophrenia spectrum disorders are underrepresented. Last but not least, our study does not allow to answer the question from previous studies, as to whether MMHs are indicative of any underlying organic etiology. Starting from the general premise that hallucinations are mediated by the perceptual system, their etiology may be considered invariably organic in nature. Nevertheless, whether or not MMHs are more often associated with non-psychiatric etiologies, such as epilepsy or demonstrable intracranial lesions, remains unknown.

Conclusion and recommendations

Multimodal hallucinations (MMHs) are twice as prevalent in patients diagnosed with a schizophrenia spectrum disorder than unimodal ones. Based on the present study we conclude that MMHs, rather than auditory hallucinations, are a characteristic feature of this patient group and that hallucinations experienced in a single sensory modality stochastically increase the chance of more sensory modalities to join in. Future studies need to assess the full range of sensory modalities in which hallucinations can be experienced; these studies need to carefully recon-

struct i) the temporal order in which these modalities become involved, ii) whether the hallucinations are experienced serially or simultaneously, and iii) whether they are congruent or incongruent in nature. Such analyses of the phenomenology together with research on the prognostic value of MMHs may further elucidate these phenomena. To facilitate this process, we recommend the development of dedicated measurement tools that address all three issues mentioned above.

Conflict of interest

All authors declare that they have no conflicts of interest

Role of the funding source

The present study was supported by the Parnassia Academy, Parnassia Psychiatric Institute, The Hague, the Netherlands (grant number SF-2013-23/SF-ns). The infrastructure for the GROUP study is funded through the Geestkracht programme of the Dutch Health Research Council (ZON-MW, grant number 10-000-1001),and matching funds from participating pharmaceutical companies (Lundbeck, AstraZeneca, Eli Lilly, Janssen Cilag) and universities and mental health care organizations (Amsterdam: Academic Psychiatric Centre of the Academic Medical Centre and the mental health institutions: GGZ Ingeest, Arkin, Dijk en Duin, Rivierduinen, Erasmus Medical Centre, GGZ Noord Holland Noord. Maastricht: Maastricht University Medical Centre and the mental health institutions: GGZ Eindhoven, GGZ Midden-Brabant, GGZ Oost-Brabant, GGZ Noord- Midden Limburg, Mondriaan Zorggroep, Prins Clauscentrum Sittard, RIAGG Roermond, Universitair Centrum Sint-Jozef Kortenberg, CAPRI University of Antwerp, PC Ziekeren Sint-Truiden, PZ Sancta Maria Sint-Truiden, GGZ Overpelt, OPZ Rekem. Groningen: University Medical Center Groningen and the mental health institutions: Lentis, GGZ Friesland,GGZ Drenthe, Dimence, GGNet, Mediant, Yulius and Parnassia Psychiatric Institute (The Hague). Utrecht: University Medical Centre Utrecht and the mental health institutions Altrecht, Symfora, Meerkanten, Riagg Amersfoort and Delta.) ZonMw had no further role in the study design, in the collection, analysis and interpretation of data, in the writing of the report, and in the decision to submit the paper for publication.

Acknowledgments

We are grateful for the generosity of time and effort by the patients and their families, healthy participants, and all researchers who made the GROUP project possible.


04

Mental health problems and jinn

Published as:
Lim, A., Hoek, H. W., Ghane S., Deen, M., Blom, J. D. (2018). The attribution of mental health problems to jinn: An explorative study in a transcultural psychiatric outpatient clinic. *Frontiers in Psychiatry*, *9*, 89. https://doi.org/10.3389/fpsyt.2018.00089

Abstract

Background: Among Muslim patients, a common cultural concept of distress is the notion that jinn may be the cause of mental health problems, especially in the presence of hallucinations. *Objective:* This present study examines the frequency with which this attribution style is manifest in a specific psychiatric outpatient population with a Muslim background. *Methods:* Of all patients registered at an outpatient clinic specialized in transcultural psychiatry, data were collected on folk belief, religion, ha- llucinations (if present), and medical diagnosis. Through a search in the electronic medical files, the notes made during the first contact and first psychiatric examination were screened for the keywords "evil eye", "magic", "voodoo", and "jinn". In addition, new eligible cases were accepted. *Results:* From all 551 patients thus screened, 118 were eligible for participation. Of these, 49 (41.5%) were interviewed using a semi-structured questionnaire. Among them, 21 (43%) were positive that their psychiatric symptoms were caused by jinn, whereas 13 (27%) thought not, and 15 (31%) were in doubt. No less than 87.2% had experienced hallucinations during their lives. Among the relatively large proportion of eligible patients who did not participate (58.5%), many expressed a fear for stigmatization or metaphysical repercussions if they spoke about jinn. *Conclusion:* The phenomenon of attributing mental health symptoms to jinn was much more common in this population of Muslim patients than previously assumed. This underscores the need for proper knowledge of Muslim explanatory models of disease, and for the use of culturally sensitive interviewing techniques in this population.

Keywords
cultural concept of distress, hallucination, idiom of distress, Islam, Muslim

Introduction

The quality of mental health care for patients with a Muslim background is a timely issue for Western practitioners, researchers, and policymakers (Lim et al., 2015; Hassan et al., 2016; Khan & Sanober, 2016; Kuittinen et al., 2017). Faced with an explanatory model that often differs markedly from that of other patients, biomedically trained health professionals may encounter difficulties with this group when trying to establish a diagnosis and making an appropriate treatment proposal. Therefore, it is essential to have adequate background knowledge of the attribution styles frequently used by Muslim patients (Al-Adawi et al., 2002; Al-Habeeb et al., 2003; Blom & Hoffer, 2012). Although many of these patients may strongly endorse Western biomedical thinking, others may more readily attribute their symptoms to the evil eye, magic (voodoo), or jinn (Al-Riyami et al., 2009); Lim et al., 2015; Guthrie et al., 2016). Many of these beliefs are rooted in pre-Islamic traditions and folk belief (Hoffer, 2000), and for jinn, it is partly rooted in the official Islam. In daily life, the majority of non-orthodox Muslims can adhere to either of these discourses or to an idiosyncratic mixture of beliefs, whether or not in combination with a belief in spirit possession, yet another important (and partially overlapping) discourse (van Duijl et al., 2010).

As biomedically trained health professionals tend to use a conceptual framework that precludes explanations in culturo-religious terms, patients may feel misunderstood or misrepresented (El-Islam et al., 1992). Conversely, health professionals may either be ignorant of the heuristic gap they are dealing with or, being aware of it, feel powerless to overcome it (Al-Krenawi & Graham, 1997; Bragazzi & Del Puente, 2012). In either case, patients may fail to benefit from the treatment programs offered, or may face unnecessary delays while trying to gain access to them (Khalifa & Hardie, 2005).

Another important factor in the encounter with Muslim patients in Western consulting rooms is that many of them have a personal migration background and, on top of that, some have had first-hand experience with traumatizing events in war zones (Hassan et al., 2016). However, even in the absence of war-related trauma, studies indicate that migration itself is an important risk factor for psychiatric disorders, including posttraumatic stress disorder (PTSD), and dissociation (Finkelstein, 2016). This is especially the case when migrants face a substantial cultural gap between their country of origin, and that of their destination. For example, Moroccans in the Netherlands, who usually do not

originate from conflict areas, but need to bridge a wide cultural gap, have been consistently found to have an elevated risk for developing mental disorders, notably schizophrenia spectrum disorders (Selten et al., 2001; Selten et al., 2010; Veling et al., 2008). In addition, low socioeconomic status, language barriers, feelings of shame and (self-)stigmatization, as well as fear for supernatural repercussions, may contribute to a delayed trajectory towards adequate care (Mullick et al., 2012; Shah & Carlsson, 2016).

In the Netherlands (with a population of 17 million), approximately 5% of the inhabitants are Muslims (Aussems, 2016; Central Bureau of Statistics, 2017). Of these, the majority are Turkish (n=397,471) or Moroccan (n=385,761) (Central Bureau of Statistics, 2017). From our clinical practice and the related literature, it is known that patients from these and other Muslim groups are inclined to attribute problems in life, including mental health problems, to jinn (Blom et al., 2010a; Lim et al., 2015).

In the Qur'an, jinn are described as beings created by Allah out of smokeless fire (Qur'an; 15:26-27). They are mentioned in 29 different places, including the chapter entitled *Al-Jinn*, and one about King Solomon. In the Hadith (sayings of the Prophet), jinn play an even more prominent role, although they are described most evocatively in Islamic folk belief.. On the basis of these sources, jinn are conceptualized as beings normally invisible to the human eye, but capable of making themselves visible if they so wish, and also capable of interfering with humans in powerful ways. Thus, they are endowed with the ability to travel great distances with incredible speed, to eavesdrop on humans and supernatural beings, to move through concrete walls, to appear in the shape of various animals, to take possession of humans, and to marry humans in secret to thus prevent them from entering a human relationship. As they are also said to be easily offended, and to live much longer than humans, they are considered capable of settling old scores with those who offended them, bridging successive generations. Because of this unnervingly unequal power balance, and the fact that the existence of jinn is part and parcel of the Islamic world view, in many Muslims these beings spring to mind whenever something goes wrong (Dein et al., 2008) even though jinn are also considered capable of aiding humans to attain positive goals in life (Drieskens, 2008; Hermans, 2007; Kuittinen et al., 2017).

Although insight into the belief in jinn as part of Muslim explanatory models of disease has grown over the years (Lim et al., 2015), it is still in its infancy. Much of the existing literature consists of case reports written from the vantage point of Western

physicians and accounts of a more expository nature published by Western medical anthropologists. Based on studies such as these, it is impossible to establish whether we are dealing with a remarkable, yet relatively rare attribution style, or whether the reported cases of patients attributing their mental health problems to jinn are the tip of the iceberg.

Therefore, the present study investigates the frequency of this occurrence by i) interviewing Muslim patients attending an urban outpatient clinic specialized in transcultural psychiatry, and ii) collecting data on their religious background and their experiences with hallucinations, including (if applicable) the phenomenological characteristics of those hallucinations.

Material and methods

Participants

At the transcultural outpatient clinic i-Psy, Parnassia Psychiatric Institute (Utrecht, the Netherlands), Muslim patients were recruited who were thought to attribute their mental health problems to a supernatural cause. Inclusion criteria were age ≥18 years, Muslim background, and willingness to give informed consent. After oral and written explanation of the study, all the participating patients gave informed consent.

Instruments

A search was made in patients' electronic medical files (covering the period April 2013 through January 2015). To identify patients familiar with Muslim concepts of distress, we screened the notes made at first contact and those made during the first psychiatric examination for the key words "jinn", "evil eye", "magic", and 'voodoo'. Whenever such terms were found, the relevant patients were invited to participate in the present study. In addition, we requested all health professionals at the outpatient clinic to screen their caseloads for eligible patients. During the course of the study, new eligible cases were also allowed to enroll. Demographic data, comprising gender, date of birth, country of birth, ethnicity, migration history, socio-economic status, and level of education were derived from the patient files and interviews. The interviews were all conducted by psychiatrists, psychiatric residents, psychologists, and psychologists in training, who had been trained to use the Hallucination Attribution List (HAL), a tailor-made semi-structured interview for Muslim patients that focuses on religion, attribution style, and (if applicable) the presence and phenomenological characteristics of hallucinations. The presence and (if applicable) phenomenological characteristics of hallucinations were explored in

depth to explore the sensory modalities in which they were experienced, their frequency and their duration. Certain items were rated “yes” or “no”, others were measured on a scale from 0 to 100. All psychiatric diagnoses at the start of treatment were made or confirmed by the patients’ treating psychiatrists, in conformity with the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA 2000). Whenever patients were insufficiently fluent in Dutch, an independent interpreter was hired at the Center for Interpreters to conduct the interview, in collaboration with one of the researchers.

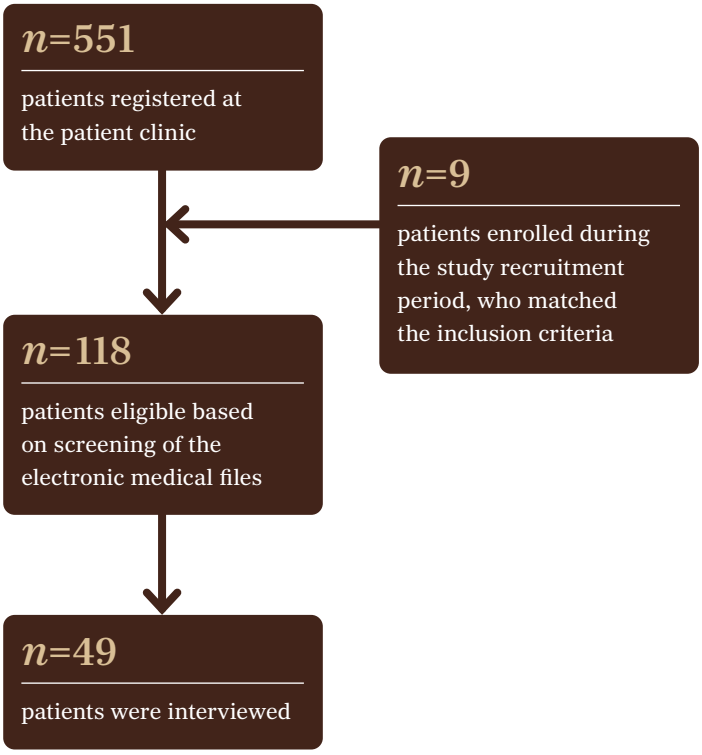
Statistical analyses

Data were analyzed with a Fisher’s exact test and Kruskal-Wallis test, using SPSS 23.0 and Microsoft Excel 2010.

Results

At the start of this study, 551 patients aged ≥18 years were registered at the outpatient clinic. Of these, 109 (19.8%) were considered eligible for participation **(Figure 1)**. During the course of the

Figure 1 Flowchart of patient participation



inclusion phase, nine additional participants were enrolled. Of the resulting 118 eligible patients, 49 (41.5%) gave informed consent and were subsequently interviewed. However, three of these participants were unable to complete the interviews because they felt unwell and wished to terminate the session due to fear for aggravation of their symptoms; nevertheless these cases were included in the analysis because (even though incomplete) they were considered to be informative and valuable. The 69 patients who did not wish to participate either: i) had finished their treatment by the time they were invited, ii) were afraid of the possible consequences they might suffer when talking about jinn and related subjects, iii) had dropped out of the treatment program, iv) were psychiatrically too unstable to participate, or v) were not available due to holidays or the Ramadan.

Demographics

Of the 49 patients who participated in the interviews, 27 were men (55.1%). Age ranged from 24 to 59 (mean 43.9, SD 9.42) years. Most patients were born outside the Netherlands (n=43; 87.8%) and were therefore considered first-generation immigrants. The majority were originally from Turkey (40.8%) or Morocco (40.8%) and the remainder were from Afghanistan (4.1%), Iran, Iraq, Syria, Lebanon, Palestine, and Guinea (each 2%). More than half of the patients were sufficiently fluent in Dutch to be interviewed without an interpreter (n=28; 57.1%), whereas 16 were not sufficiently fluent (37.7%) and five spoke no Dutch at all (10.2%). These latter 21 patients were interviewed with the aid of an interpreter, either face-to-face or by telephone. Almost one-third of the group (32.7%) had been educated at an elementary school, while a similar proportion had also finished high school (32.7%). A minority (8.2%) had finished community college, and a slightly larger group (12.3%) college or university. Of all interviewees, 14.3% had received no formal education at all. No association was found between attribution of symptoms to jinn and i) level of education (Kruskal-Wallis test: p = 0.21), or ii) ethnicity (Fisher's exact test: p = 0.053), or iii) the presence of a language barrier (Kruskal-Wallis test: p = 0.30).

Diagnosis

In this study population, the vast majority of patients had been diagnosed with a mood disorder (55.1%), PTSD (12.2%) or other anxiety disorder (12.1%). Only 8% of the patients met the diagnostic criteria for schizophrenia or a related disorder. The remainder of the group (10.2%) had diverse diagnoses, i.e. body dysmorphic

disorder (*n*=1), schizotypal personality disorder (*n*=1), acute stress disorder (*n*=1), adjustment disorder (*n*=1), and post-concussion syndrome (*n*=1). In one medical file, the initial diagnosis was missing (2%). Because of the relatively small numbers, we were unable to establish any correlations between diagnosis and attribution style.

Religion and attribution style

Although all participants had a Muslim background, of the 49 interviewees 2 had converted to Christianity. In conformity with their new-found faith, both these participants stated that they did not attribute any of their symptoms to jinn, black magic or the evil eye. Of the remaining group of 47 Muslim interviewees, 80.9% (*n*=38) believed in the evil eye, 63.8% (*n*=30) in magic, and 78.7% (*n*=37) in jinn **(Table 1)**. Moreover, 57% (*n*=27) claimed to have had first-hand experiences with one or more jinn in the past, versus 23.4% (*n*=11) who denied any personal encounters, and nine participants (19.1%) who expressed their doubts about this. When asked whether it is possible that their psychiatric symptoms were caused by these metaphysical beings, in the group of interviewees, 44.7% (*n*=21) confirmed this, 23% (*n*=11) were convinced that this was not the case, and the remaining 32% (*n*=15) expressed doubts as to whether jinn had anything to do with their mental health problems, although they admitted that they had considered the possibility **(Table 2)**. One participant was so overwhelmed that it was not possible to explore the theme in any more depth.

Symptoms

When exploring the symptoms further, the participants mentioned anxiety, obsessive-compulsive symptoms, aggression attacks, nightmares, physical pain, sadness, suicidal thoughts, weakening of the legs, headaches, insomnia, brooding, flashbacks of traumatic events, incubus phenomena, sensed presence, and hallucinations. The two patients who had been converted to Christianity reported hallucinations (one auditory, one auditory and visual), insomnia, anxiety, and posttraumatic stress. In the group of 47 Muslim patients, these widely varying symptoms were attributed with great certainty to jinn by 14.8% of the participants (*n*=7; i.e., *n*=1 aggression attacks; *n*=3 verbal auditory hallucinations; *n*=1 depression; *n*=1 dissociation and depression; *n*=1 insomnia). Although 19 patients (38.7%) were doubtful about this, they did not dare to dismiss the possibility. The incubus phenomenon (i.e., sleep paralysis combined with the sensation of a metaphysical being sitting on the thorax and producing feelings

Table 1 Attribution styles (*n*=47)

	Belief in Jinn (%)	Magic/voodoo (%)	Evil eye (%)
	Jinn (%)	Voodoo (%)	Evil eye (%)
Yes	37 (78.7)	30 (63.8)	38 (80.9)
No	6 (12.8)	6 (12.8)	5 (10.6)
In doubt	4 (8.5)	9 (19.1)	3 (6.4)
Missing	-	2 (4.3)	1 (2.1)

Table 2 Attribution of mental health symptoms to jinn (*n*=47)

	Attribution to	Alternative, if not jinn	Alternative, if not jinn
	Jinn (%)	Voodoo (%)	Evil eye (%)
Yes / possible	21 (44.7)	10 (21.3)	6 (12.8)
No / improbable	11 (23.4)	22 (46.8)	25 (53.2)
In doubt	15 (30.6)	8 (17.0)	10 (21.3)
Missing	-	7 (14.9)	6 (12.8)

of suffocation and panic) was described by 23.4% (*n*=11), while sensed presence (i.e., the experience of some person or entity being present while there is no-one around) was described by 21.2% (*n*=10). Of the latter patients, three were convinced that jinn were to blame, versus two from the incubus group. In both groups, however, 11% said that jinn *might* be the cause.

Of the 47 participants, 41 (87.2%) had experienced hallucinations at least once during their lives: of these, 34% (*n*=16) had experienced unimodal hallucinations, including one person who described a typical hypnagogic hallucination, and one who reported visual hallucinations under the influence of morphine during postoperative recovery. In all other cases, participants experienced hallucinations in the auditory (19.1%, *n*=9); visual (8.5%, *n*=4) or tactile modalities (2%, *n*=1). No participants had had any unimodal olfactory or gustatory hallucinations, whereas 25 (53.2%) had experienced hallucinations in multiple sensory modalities (two modalities *n*=17; three modalities *n*=6; four modalities *n*=2).

In the case of two modalities, most had experienced auditory and visual hallucinations (29.8%, *n*=14), whereas the others had experienced hallucinations in the auditory and tactile (*n*=1), visual and tactile (*n*=1) or auditory and gustatory (*n*=1) modalities. In this latter group, none of the participants had experienced hallucinations in these sensory modalities simultaneously, meaning that they had experienced multimodal hallucinations not compound hallucinations. In the group of three sensory modalities, five participants had experienced hallucinations in the auditory, visual, and tactile modalities; one of them had eventually been diagnosed with multiple sclerosis. One of the other hallucinating patients had also experienced derealization and micropsia (e.g., seeing her husband's body shrink, seeing a dwarf walking through the room), i.e., symptoms characteristic of an Alice in Wonderland syndrome (Blom, 2016). One participant had experienced hallucinations in the auditory, visual, and olfactory modalities. The two participants who had reported hallucinations in four sensory modalities, had experienced them in the auditory, visual, gustatory, and olfactory modalities, and in the auditory, visual, tactile, and olfactory modalities, respectively. Of the participants who had experienced only unimodal hallucinations, the majority doubted whether these were caused by jinn, whereas all participants with hallucinations in three or four sensory modalities were (almost) certain about this. The two participants with hallucinations in four sensory modalities were entirely certain that jinn were the cause of their symptoms. Statistically, however, we found no significant associations between the presence of hallucinations in various sensory modalities and the attribution of these phenomena to jinn. The same held true for the certainty with which participants attributed their symptoms to jinn.

Discussion

In this transcultural psychiatric outpatient population, we investigated how often Muslim patients attributed their mental health problems to jinn. In the group of interviewed patients 44.7% stated their psychiatric symptoms could be caused by jinn. Looking at the total eligible group of 118 patients, the percentage of attribution was only 17.7% (*n*=21 of 118 patients). We estimate that this number might have been higher had all eligible patients agreed to participate. An earlier investigation of this attribution style in a clinical population of psychotic patients was estimated at 80% (Blom et al., 2010a). However, it should be noted that the latter patient group differs substantially from the present group, in that

all the latter patients were diagnosed with a schizophrenia spectrum disorder and were so severely ill that admission had been necessary (in some cases under the Dutch equivalent of the Mental Health Act). Nevertheless, the findings in the present outpatient group are expected to be an underestimation of the actual situation, since 58.5% of the patients eligible for participation (69 of 118) decided to back out. Some of these patients openly admitted that they were afraid of repercussions from jinn if they would speak about them, whereas others considered it inappropriate to discuss issues such as these with a non-Muslim, or denied (contrary to written evidence in their records) that they had ever thought about the subject or even knew what jinn might be. In the light of these reactions, it is also conceivable that, vice versa, we may have missed eligible patients during the search of the electronic medical files because they had never discussed their suspicions regarding the role of jinn with their treating mental health professionals. In general, minority groups are hard to recruit for scientific research (Brown et al., 2014). In this light, and given the delicate theme of our study, these patients may have experienced a higher threshold to participate.

During the interviews, it was also found that patients often had a difficult time discussing the topics of this study. Many patients seemed to tone down their earlier attribution to jinn during the interviews. More than once they showed to be doubtful about their earlier conviction that jinn had anything to do with their symptoms, or showed to be reluctant to discuss their symptoms and their supposed origins, fearing that the symptoms would thereby increase. We suspect that these reserved reactions were also due to a certain reluctance to share any information on jinn with schooled professionals. In addition, it may have had something to do with a mismatch with the interviewers (all non-Muslim; one Asian, two Caucasian), combined with feelings of fear and shame, which may have contributed to the relatively high number of inconclusive answers (i.e., by 30% of the interviewees). Considering the cautiousness of so many patients, it was in fact surprising that 42% did agree to participate. When asked about their motivation to do so, these patients often expressed the wish to help increase the knowledge of Western mental health professionals about the way they experienced their symptoms, or said that they wanted to do something in return for their therapists. Nonetheless, some of these patients feared stigmatization by third parties to such an extent, that they did not dare to speak about their experiences with anyone else.

Psychopathology

As regards psychopathology, this study demonstrates that patients attributing their mental health problems to jinn are certainly not restricted to those diagnosed (in biomedical terms) with a schizophrenia spectrum disorder. Although the group under study was too small for further statistical analysis, we found that this attribution style cut across many diagnostic categories, varying from anxiety and mood disorders to PTSD and personality disorders. Another remarkable finding was that 87.2% of the interviewees reported having experienced hallucinations at least once in their lives. These hallucinations were mostly auditory in nature, followed by visual and tactile ones, whereas gustatory and olfactory ones were relatively rare. This pattern is in line with the distribution of hallucinations across various sensory modalities as experienced by psychotic patients in Western countries (David et al., 2011; Lim et al., 2016), whereas it contradicts the findings from earlier studies on hallucinations in Muslim countries, which found visual hallucinations to be more prevalent (Al-Issa, 1977). An equally remarkable finding was that hallucinations experienced in three or four sensory modalities were far more likely to be attributed to jinn, and with far greater certainty, than those experienced in fewer sensory modalities. An explanation for this might be that multimodal hallucinations tend to have a more lifelike character and are, therefore, experienced as more realistic in nature, and/or that these particular hallucinations made a more threatening impression on the patients experiencing them. Whether this explanation is correct should, however, be the subject of further study.

Idiom of distress

The present study also confirms the need for adequate knowledge about Muslim explanatory models of disease among biomedically trained health professionals. The explanatory models (and hence the idiom of distress employed) can make differential diagnosis a challenge, especially when health professionals are not used to working with these patients and/or multicultural populations in general. Moreover, additional problems may arise when there is also a language barrier, or when clinical syndromes are not listed in major psychiatric classifications (such as the DSM-5), as is the case with sensed presence and the incubus phenomenon, which may easily be mistaken for symptoms of a schizophrenia spectrum disorder and be treated accordingly (Blom, 2017).

Equally challenging for biomedically trained health professionals is that the Qur'an conceptualizes jinn as living beings, so

that patients tend to doubt whether the powers of these beings can be 'undone' by medical means. This doubt has substantial consequences for the patient-physician relationship, often leading to ambiguous expectations (at best) regarding what good biomedical treatments can achieve. In the context of the present study, we met a patient who believed that she was haunted by a jinn who wanted to marry her. Feeling thereby deprived of the life she wanted to live, she felt trapped to such an extent that she showed signs of utter helplessness. As a consequence, she dismissed all biomedical interventions indiscriminately, thereby contributing even further to her own feelings of helplessness, as well as of those of all parties involved, including her family. In effect, through her behavior, the jinn was perceived by them as holding her hostage and as playing a role in the family dynamics that was just as real as had a person prevented her from getting married. Similarly, during the course of this study, we found that many patients experienced additional suffering due to the fact that they attributed their symptoms to actual, living beings. They often showed signs of fear and depression while talking about jinn, and suffered considerably from the prospect of the consequences that that might have.

Treatment

Many of the patients frequenting our outpatient clinic had previously sought help at general (i.e; non-specialized) mental health services or with faith healers, either in the Netherlands or in their country of origin. Some of them had benefited temporarily from those treatments but, in the end, all of them had felt the need to seek help at our specialized outpatient clinic, often after many years of suffering. But how is one to manage psychiatric symptoms attributed to jinn, the evil eye or magic in a Western mental healthcare setting, however "specialized" the setting may be? In our experience, sometimes it may be helpful to discuss the existence of various explanatory models of disease, to challenge the notion that the patient's symptoms are necessarily caused by a jinn, and to explain in which ways a biomedical approach might contribute to their wellbeing. In other cases, it may help to consult an Islamic counselor, preferably in the service of one's institution, to give due attention to the religious dimension of the patient's complaints and have explained, if necessary, that the Qur'an does not forbid the undergoing of a biomedical treatment. That said, the question remains whether it suffices to offer medications and psychotherapies "as usual", and relegate religious issues to an Islamic counselor. The principles of cognitive-behavioral therapy

(CBT), for example, and those of traditional Islamic healing are divergent (Beshai et al., 2013). Recently, therefore, various initiatives and protocols have been developed in the field of CBT with modifications that are tuned specifically to Islamic values (van den Berg et al., 2016; Husain & Hodge, 2016). Such modifications are considered important to connect better with patients and thereby promote better treatment compliance, faster recovery, lower rates of relapse, and reduced treatment disparities (Husain & Hodge, 2016). Like all patient groups, the group of Muslim patients consists of very diverse individuals; however, proper care stands or falls with a broader knowledge of prevailing notions and expectations within the group as a whole, and with therapeutic techniques that adhere to the principles of personalized medicine.

Limitations

A limitation of the present study is the relatively large proportion of eligible patients who declined to participate. Among the various reasons for this, the main ones were the reluctance to discuss the possible role of jinn out of fear for metaphysical repercussions and stigma, and the possible mismatch with the interviewers, none of whom had a Muslim background. While we do advocate the involvement of non-Islamic professionals in studies such as these (if only to create opportunities for a growth of mutual understanding) we recognize that the employment of Muslim researchers might have resulted in a higher number of participants. A second limitation (which follows from the first), is that the numbers were too small for statistical analyses of relations between specific patient characteristics and the propensity to attribute mental health problems to jinn. Therefore, we recommend that future studies be designed in such a way that this power problem can be solved. A third limitation is that this study was carried out in an outpatient population, which makes it difficult to generalize the results to other populations. That said, the present study did succeed in demonstrating that the inclination of Muslim patients to attribute mental health problems to jinn is not confined to psychotic patients alone. A final point that we wish to raise, is that the illness attribution of Muslim patients in Western countries is obviously shaped by many more factors, including migration stress, language problems, issues pertaining to the intercultural gap, and cultural conceptions of specific phenomena such as hallucination, dissociation, and derealization, which all deserve to be brought into view if one wishes to obtain a more comprehensive understanding of health issues in this heterogeneous group.

Conclusion

It is concluded that, in this specialized, psychiatric, transcultural outpatient setting in the Netherlands, 17.7% of Muslim patients attribute their mental health problems to jinn. This underlines the importance of the need for culturally sensitive interviewing techniques for this patient group, including proper attention to attribution styles, religious matters, and systems dynamics, as well as the further development of tailor-made therapeutic strategies, preferentially in close collaboration with Islamic counselors.

Ethics statement

This study was a pilot study carried out in accordance with the recommendations of the Parnassia Academy, Parnassia Psychiatric Institute, The Hague, with written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Medical Ethical Committee of University of Leiden, reference number NL44388.058.14

Acknowledgments

The authors thank the psychologists of i-Psy, Utrecht, for referring the patients included in this study.

Funding

The research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of Interest Statement

The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.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Tactile and somatic hallucinations

Published as:
Lim, A., Blom, J. D. (2021). Tactile and somatic hallucinations in a Muslim population of psychotic patients. *Frontiers in Psychiatry*, *12*, 728397. https://doi.org/10.3389/fpsyt.2021.728397

Abstract

Background: Tactile and somatic hallucinations are distressing phenomena that have hardly been researched. The few studies that have been published focus on their occurrence in neurodegenerative disorders and substance use, and, surprisingly, not on schizophrenia spectrum disorders. *Objective:* To fill this gap in our knowledge, we sought to explore the phenomenological characteristics of tactile and somatic hallucinations in a group of psychotic Muslim patients. Since many Muslims attribute such experiences to jinn (invisible spirits) and jinn are often perceived in multiple sensory modalities, we not only charted the involvement of the tactile and somatic modalities but also their interrelatedness with hallucinations in other sensory modalities. *Methods:* We performed a cross-sectional study using a semi-structured interview and dedicated questionnaire. *Results:* Of the 42 Muslim inpatients mostly diagnosed with a schizophrenia spectrum disorder, 62% reported to suffer from tactile and/or somatic hallucinations. Their phenomenological characteristics varied, with 96% being multimodal in nature and 38% taking the form of full-blown entity/jinn encounters. In comparison to other entity experiences, the involvement of the tactile and somatic modalities was exceptionally high, as was the level of ensuing distress. Regarding the order of recruitment of the various sensory modalities, we suggest the involvement of an underlying stochastic process. *Conclusion:* Muslim patients with severe psychosis can have tactile and somatic hallucinations, of which a large number are multimodal or full-blown entity/jinn encounters, which are almost invariably appreciated as harrowing. On the basis of our findings we make recommendations for further research and clinical practice.

Keywords
bodily hallucination, entity experience, multimodal hallucination, schizophrenia spectrum disorder, transcultural psychiatry

Introduction

Tactile and somatic hallucinations are classified as bodily hallucinations (Berrios, 1982; Blom & Sommer, 2012), i.e., hallucinations of the "proximity senses" **(Table 1)**, as opposed to hallucinations of smell, sight and hearing, which have bearing on the "distance senses." These phenomena have been overly neglected in literature and research, while both modalities are clinically relevant. Touch, as one of the main senses, is such a common and continuous presence in our everyday lives that we mostly take it for granted. Provided that we are comfortable and at ease, we hardly notice the pressure shoes or clothing exert on our feet and skin, or the weight of glasses on our nose and ears, or even the accidental touch of fellow travelers on a busy morning train. Dating back at least to Aristotle, touch has, moreover, been ranked as the lowest and most ordinary of the senses, providing either pain or pleasure but nothing that transcends these "bestial" feelings. Together with our relative lack of awareness of information generated by the body surface that may well be the reason why this sensory modality has received less scientific attention than others. One might say, though, that touch, that touch has thus been gravely neglected. Touch serves crucial communicative and protective functions. We need it to establish the body's boundaries, to determine what is inside and outside of us, and to assess whether our contacts and surroundings are safe and healthy or whether perhaps a painful and potentially fatal transgression is imminent. In addition, touch allows us to integrate the input from the other sense organs and to thus create a coherent whole that we experience as the body or "self". Therefore, losing our sense of touch—as in acenesthesia, for instance—means nothing less than losing our sense of body ownership and, with that, losing our sense of identity (Blom et al., 2010b). Thus, touch does not only tell us *where* we are with respect to our immediate surroundings but also *who* we are (Rodaway, 1994). Last but by no means least, touch is a compelling indicator of what is real and what is not real in the outside world. Despised and neglected as it may be as a sensory modality, we trust it more than any of the other senses when we seek to verify perceptual information. Seeing or hearing an object is one thing, touching it means that it is actually there. If touch thus has the dual, almost mystical connotation of "the sense that makes us human" and "the sense that tells the truth," what then are the implications of being touched by unseen forces, to experience touch where no external source or cause can be discerned? This is what the present paper is about.

Table 1 Classification of bodily hallucinations and concomitant sensory modalities (from Blom & Sommer, 2012)

Sensory modality	Type of hallucination
1. Exteroceptive modality	Tactile (haptic) hallucination
2. Interoceptive modality	Somatic hallucination, visceral hallucination
3. Proprioceptive modality	Proprioceptive hallucination
4. Kinesthetic modality	Kinesthetic hallucination
5. Vestibular modality	Vestibular hallucination
6. Coenesthetic modality	Coenesthetic hallucination
7. Pain modality	Hallucinated pain, central pain
8. Sexual modality	Sexual hallucination
9. Temperature modality	Thermal (thermic) hallucination

Tactile hallucinations

Tactile hallucinations are also known as haptic hallucinations and tactile phantasmata (Fénelon et al., 2002). They are defined as sensations of touch in the absence of a corresponding stimulus from the outside world and characterized by apparent touch to the skin, including, sometimes, the underlying tissues. They can mimic all kinds of bodily sensations normally registered by the skin, such as pin pricks, the sensation of fluids or the wind upon one's skin, a hand on one's shoulder, or a blow to the face. Pathophysiologically, they are associated with activity in sensory cortical areas subserving the skin and subcutaneous tissues. Over the past 15 years, case reports and modest case series have reported on tactile hallucinations in varying conditions, including neurodegenerative disorders (Fénelon et al., 2002), illicit drug use (Roncero et al., 2017), and medication use (Rashid & Mitelman, 2007; Dowben et al., 2017; Kiyokawa and Haning, 2021; Iqbal et al., 2021). Rare as they may seem in psychiatric and neurological conditions, in the general population they were found to be the second-most prevalent type of hallucination. Thus, the NEMESIS II trial, a large cohort study carried out in the Netherlands from 2007 through 2015, mentioned 0.31% as the yearly incidence for tactile hallucinations (the first place being occupied by visual hallucinations, with a slightly higher rate of 0.33%; Braun et al., 2003). The study also emphasized the clinical relevance of tactile hallucinations through associations with poorer quality of mental health and risk factors for psychosis.

Somatic hallucinations

Somatic hallucinations are defined as bodily sensations experienced inside the body, in the absence of an objectifiable source or cause. At times it is difficult to differentiate these phenomena from unexplained medical complaints, in the sense that local

pathology in the thorax or the abdomen, for instance, can be either overlooked or simply remain undiagnosed despite current state-of-the-art procedures. Examples of somatic hallucinations are the sensation of having a lump in the throat that is not there, of animals crawling through the body, of a plant scraping its pointed leaves against the inside of one's skull, or bones apparently increasing or decreasing in size. The literature on somatic hallucinations is even less prolific than that on tactile hallucinations (Braun et al., 2003; Silberman et al., 1985). Case descriptions and small case series chiefly report on these phenomena in the context of brain lesions (Braun et al., 2003), temporal-lobe epilepsy (Elliott et al., 2009), and intoxications (Roncero et al., 2017; Rashid & Mitelman, 2007). In schizophrenia spectrum disorders they are considered to be rare. When they have been documented at all, it is mostly in combination with other psychotic symptoms [e.g., (Shergill et al., 2001; Lim et al., 2016; Schutte et al., 2020)]. Pathophysiologically, somatic hallucinations are mainly attributed to activity in the secondary somatosensory cortex, posterior parietal cortex (Shergill et al., 2001; Takaya et al., 2005), and limbic regions (Kathirvel et al., 2013).

In general, cultural patterns and expectations can affect hallucinations in those who experience them (Larøi et al., 2014) and therefore should be taken into account. The gap between the medical approach of hallucinations, often the first tactic taken on by Western health professionals, and the patient's own cultural point of view, is a common theme in psychiatric settings. The present study examines tactile and somatic hallucinations in a rather specific population, namely in Muslim patients diagnosed with a psychotic disorder who are liable to attribute their hallucinations to jinn, i.e., invisible beings created by Allah. Among Muslims in general, it is not uncommon to attribute setbacks in life—whether they are of a medical, psychological, social, religious, or even financial nature—to jinn (Lim et al., 2015). As a consequence, many Muslims consider the existence of jinn a given. To perceive them, on the other hand, is generally seen as an indication that the natural order of things is broken (Drieskens, 2008). In the context of what biomedicine considers to be psychosis, these entities are often experienced in more than one sensory modality at the same time.

Since it is unknown to what extent the tactile and somatic modalities are involved in such instances, and since these hallucinations have hardly been researched in people diagnosed with schizophrenia spectrum disorder or in patients with a Muslim background, below we describe their phenomenological characteristics and assess their relevance for clinical practice and fur-

ther scientific research. Of note here is that we will approach these sensations in this article from a biomedical perspective only, although taking into account the knowledge and experience of our previous research on Muslim explanatory models of disease. We have no intention to pass an opinion on the ontological status of said entities from a religious or cultural point of view.

Methods

We performed a cross-sectional phenomenological study among Muslim patients under care at Parnassia Psychiatric Institute, The Hague, the Netherlands, in the period of 2008-2014. Inclusion criteria were age >18 years, a Muslim background, the self-reported presence of hallucinations, the attribution of these hallucinations to jinn or related culturoreligious entities, and a sufficient mastery of Dutch or English. All participants were or had recently been) admitted to our hospital.

All participants were interviewed with the aid of the Hallucination Attribution List (HAL), an 80-item, purpose-built, semi-structured questionnaire that systematically assesses the presence of (lifetime and present-state) hallucinations, the sensory modalities involved, and the attribution of these phenomena- in conformity with Muslim culturoreligious practices- to jinn, voodoo, and/or the evil eye (Supplementary Material). When participants reported hallucinations in the tactile or somatic modalities, the phenomenological characteristics of their sensations were explored, as well as their interrelatedness with other types of hallucination -if present- in the auditory, visual, olfactory, and gustatory modalities. The study was approved by the Scientific Committee of the Parnassia Academy and considered exempt from independent ethics review, and was carried out in accordance with the revised conditions of the Declaration of Helsinki.

Results

In our convenience sample of 42 patients admitted to our inpatient center in an acute clinical state, 62% (*n*=26) reported bodily, i.e., tactile and/or somatic, hallucinations. Of these, 69% (*n*=18) were men. Most participant reporting hallucinations (*n*=21, 81%) were diagnosed with a schizophrenia spectrum disorder following the DSM-IV criteria. In nine cases (35%) a second diagnosis was made (see **Table 2** for details). The participants 'mean age was 31 years (range 22-52 years). Of the 26 patients with tactile or somatic hallucinations only one had unimodal tactile hallucinations; he was diagnosed with bipolar disorder. None made mention of unimodal somatic hallucinations.

Table 2 Diagnoses of the participants experiencing tactile and/or somatic hallucinations (*n*=26)

Primary diagnosis	*n*	Secondary diagnosis	*n*
Schizophrenia spectrum disorder	21	Major depressive disorder	2
		Cannabis use disorder	3
		Posttraumatic stress disorder	1
		Substance use disorder (multidrug use)	2
		Social anxiety disorder	1
Bipolar disorder	1	Sensed presence and incubus phenomenon	-
Posttraumatic stress disorder	1	Incubus phenomenon	-
Major depressive disorder with psychotic symptoms	1	Incubus phenomenon, epilepsy, personality disorder	-
Major depressive disorder	1	Panic disorder with agoraphobia	-
Major depressive disorder	1	Incubus phenomenon	-

In the total group of 42 patients, 23 (55%) experienced tactile hallucination. Fourteen patients experienced somatic hallucinations (33%).

Of the 26 patients with tactile/somatic hallucination, all but one experienced multimodal hallucinations, all but one experienced multimodal hallucinations, in essence in 96% (*n*=25 of 26 patients) in this subgroup focused on. In the total group of patients who were interviewed, 60% (*n*=25 of the total group of 42 patients) had experienced multimodal hallucinations. There were 23 patients who experienced tactile hallucinations (either unimodal or multimodal) (88%) and 14 who experienced somatic hallucinations (54%). In the group of 26 patients, there were 12 who experienced tactile and somatic hallucinations simultaneously or serially **(Tables 3A, B)**.

In eight of the 23 cases (35%) having tactile hallucinations, these consisted of *serial*, *congruent* multimodal hallucinations, with the involvement of at least two sensory modalities, meaning that the hallucinations were attributed to the same source but experienced at different moment in time. In 39% they were described as *simultaneous*, *congruent* hallucinations, reflecting that they were attributed to the same source and experienced at the same moment in time, in conformity with the multimodal nature of entity

experiences. In the case of somatic hallucinations, 43% were serial and congruent, and 36% simultaneous and congruent. **Tables 3A, B** detail these interrelations. In 91% of the participants having tactile hallucinations, auditory hallucinations were also present, while 87% experienced these in combination with visual hallucinations. The co-occurrence of tactile hallucinations with olfactory and gustatory hallucinations was reported by 57 and 30%, respectively. We found comparable rates for somatic hallucinations; these coincided with auditory, visual, and tactile hallucinations in 86%, with olfactory hallucinations in 79%, and with gustatory hallucinations in 43%.

Table 3A Interrelatedness of the sensory modalities in the patients having tactile hallucinations (*n*=23)

		Tactile	
Number of sensory modalities	Serial congruent	Serial congruent and simultaneous congruent	Simultaneous congruent
2	2	-	1
3	1	3	1
4	3	1	-
5	1	-	6
6	1	2	1
n=	8	6	9

Table 3B Interrelatedness of the sensory modalities in the patients having somatic hallucinations (*n*=14)

		Somatic	
Number of sensory modalities	Serial congruent	Serial congruent and simultaneous congruent	Simultaneous congruent
2	-	-	-
3	1	1	-
4	3	-	-
5	1	-	4
6	1	2	1
n=	6	3	5

Phenomenology

The way in which the participants experienced their tactile and somatic hallucinations showed considerable interindividual variation. **Table 4** sums up the phenomenological characteristics. Ten participants (38%) only recounted of a single hallucinated sensation, whereas the other 16 (62%) described two or more sensations (e.g., the feeling of being stabbed *and* suffering electrical shocks). In **Table 4** the category 'different sensations' comprises a motley collection of tactile phenomena, including being tapped on the back, being groped and/or squeezed, feeling nails being

Table 4 Phenomenological characteristics of the tactile and somatic hallucinations reported

	Tactile hallucinations	Somatic hallucinations
Phenomenological characteristics		
Feeling of being pushed	4	-
Feeling of being hit	4	-
Feeling of being stabbed	7	-
Feeling of wind	7	-
Feeling of water on the skin	2	-
Burning sensation	4	-
Electrical shock	5	-
Different	13	-
Feeling of something moving inside or into the body	-	9
Feeling of sexual arousal and/or stimulation	-	4

hammered into the head, being kicked, being bitten, and being grabbed by the throat. One participant also described the sensation of someone stepping on her blanket while she was lying awake in bed. We did not find such a broad range of sensations in the group reporting somatic hallucinations. Here, they were limited to the feeling of something entering the body, something moving inside the body, and sexual sensations (including orgasmic experiences). Regarding the sexual sensations, one partic-

ipant reported being stroked and sexually abused while he was awake, while another participant reported experiencing multiple orgasms.

The patient with unimodal tactile hallucinations was in doubt whether his hallucinations were caused by jinn, with a conviction of 50%. Most patients (n = 15, 58%) were fully convinced (100%) that their experiences were caused by a jinn, while in the remaining 10 patients (38%) this conviction was lower than 90%, with the majority (n = 6, 23%) rating the degree of conviction at 30–60% and one participant indicating that he could not tell whether this should perhaps be 0% even though he insisted on having (had) personal experience with jinn. The participants expressing doubt about the involvement of jinn mentioned alternative causes for their tactile and somatic sensations such as Allah, God, Iblis, a ghost, an actual person, their own brain, and "disease".

Phenomenologically, the hallucinations were quite diverse. Almost 40% reported simultaneous, congruent multimodal hallucinations, thus constituting full-blown entity experiences. One of our participants indeed described how he saw a female jinn walking toward him, felt her entering his body, and then giving birth to a baby inside him. When the jinn subsequently left his body, he kept feeling the baby moving inside his abdomen and even heard it crying from time to time. Another participant recounted how, for years, he recurrently saw and felt a small jinn nestle itself on his face when he was lying on his back, attaching itself so firmly that he could hardly breathe. The sensation was so frightening that, when he was scheduled to have an MRI scan he requested a junior physician to accompany him inside the scanner room so that she could help him when he would signal its presence. Yet another participant had the gruesome experience of feeling a jinn crawling up against his buttocks, positioning itself anus- to-anus, and squirting feces into his rectum. As these examples illustrate, the hallucinations our participants were experiencing were not only harrowing but also phenomenologically quite diverse. And yet, they did not even cover the entire spectrum of bodily hallucinations **(Table 1)**.

Discussion

In our convenience sample of 42 psychotic inpatients with a Muslim background, a relatively high rate (62%) acknowledged to have tactile and somatic hallucinations, the far majority of which were denoted as unpleasant, threatening and/or painful, and all of them being attributed to jinn (albeit with varying degrees of certainty). Our patient group mainly reported tactile, somatic, and sexual sensations. Although not actively probed, proprio-

ceptive and kinesthetic hallucinations, for example, went unreported. Nonetheless, the severity and impact of the tactile and somatic hallucinations imparted to us were impressive. Moriyama et al. (2020) already pointed out the clinical relevance of tactile hallucinations for the general population in terms of an increased risk of developing psychosis. When tactile and somatic hallucinations occur as described above, it is quite imaginable that patients appreciate such a multidimensional breach of the boundaries of their bodies as an extreme threat to "the self " and thus as most terrifying. Thus the normal, "primary" belief in jinn may be replaced by abnormal, "secondary" beliefs (in the sense of overvalued ideas and/or delusions) when jinn are experienced as entities in the perceptual domain. The relatively high prevalence of bodily hallucinations in our group might be explained by the high prevalence of hallucinations in the auditory and/or visual modalities, which may be a necessary condition to trigger bodily hallucinations *via* a stochastic process (to be explained below). In clinical practice, Western health professionals may be inclined to treat these phenomena as hallucinations and delusions in the context of psychotic disorder. In the literature, evidence for the effects of antipsychotics on tactile and somatic hallucinations is only presented in case reports, with a favorable role for olanzapine (Adli et al., 1999; Marinescu et al., 2014). However, there is a more extensive body of literature that stresses the importance – in cases such as these – of a culture – sensitive approach which may include religious counseling and/or culturally adapted cognitive- behavioral therapy (Lim et al., 2016; Lim et al., 2018; Subbhas et al., 2021).

Religious perspective

The examples above suffice to illustrate the impact of tactile and somatic hallucinations on the population we studied. We did not formally quantify the levels of experienced distress, but the far majority of our participants were so terrified that they had taken refuge to religiously and culturally sanctioned treatments– often for years or even decades on end, spending considerable amounts of money in the process – before seeking the advice of biomedical practitioners. The belief in jinn is an integral part of Islamic faith and of the body of folk beliefs prevalent in Muslim societies (Blom & Hoffer, 2012). They are said to live among us and to go about their business much the same as humans. Reportedly being created out of smokeless fire, they are deemed invisible to the human eye. However, according to religious authorities they can make themselves visible if they so wish. According to others, they will merely take the shape of an animal or other creature

without revealing their true identity. Either way, for a human to perceive jinn, if only by means of the distant senses, is considered utterly alarming and a clear sign that the natural order of things has been breached. Even though jinn can allegedly be as virtuous or immoral as we humans can be, with numerous gradations in between, customarily a distinction is made between good and bad jinn. Among the jinn appraised as "bad," those who touch or transgress the boundaries of the human body are generally considered the most dangerous. According to Islamic folk belief, the body is like a fortress that has doors and windows but also invisible fissures in the skin through which jinn can slip inside (Drieskens, 2008). People who keep their bodies, hearts, and souls pure are believed to be relatively immune to jinn thanks to the light that shines within them, but those who do not may find their bodies' apertures growing wider, thus rendering themselves more vulnerable to jinn. As Drieskens (2008) summarizes:

The cause of weakness toward djinns is always a combination of factors. The susceptibility to djinns increases when the orifices grow wider and the protecting light diminishes. Various circumstances can cause this, but fear, confusion, doubt and pollution are often involved [(Drieskens, 2008), p. 168].

To Muslims, bodily hallucinations may therefore not only indicate the dangerously close proximity of jinn – or even suggest a state of possession – they also implicitly signal one's religious, moral, and/or bodily inferiority, which may be yet another source of anxiety, and, along with that, embarrassment. This, in turn, may prompt people to keep their experiences to themselves and to suffer in silence, even for long periods of time. When they finally decide to seek help, they will tend to turn to a professional knowledgeable of these entities, such as an imam, traditional healer, or Muslim religious counselor—which for them is the logical thing to do. After all, why would one expose oneself to a Western-style health professional who cannot be expected to understand matters such as these and who is, moreover, powerless in the face of such actual, living entities? And, on top of that, why would one risk yet another type of stigma, the likelihood of being branded a psychiatric patient (Lim et al., 2018)?

Developmental perspective

One can also explain the impact of bodily hallucinations from the vantage point of our ontogeny. The proximity senses are the first means by which the embryo registers signals from its envi-

ronment, with the distant senses developing at a later stage of gestation. Ontogenetically, the skin, the organ of touch, thus is the oldest of our sense organs. With a mean surface area of 1.7 m^2 in adults, it is also the largest. Located at the crucial interface of the body and the surrounding world, it is connected with the spinal cord and brain by a quarter million tactile afferent fibers (Corniani & Saal, 2020). Together with the skin's tactile receptors, these anatomical structures enable us to discern an almost infinite range of tactile sensations. Throughout our lives, the skin also forms the flimsy barrier between the inside and the outside world, enveloping and protecting us. Without it, we would soon succumb to the multitude of unfiltered stimuli that assail us (which would then directly affect the underlying tissues) and lose our ability to integrate information coming from the other senses. Ironically, for such an important sensory modality, touch is the first but also – as we saw – the most neglected sense (Bremner & Spence, 2017). And yet, it has furnished us longer than any of the other senses with multiple perceptions that are all of vital importance to our functioning and survival. Their range is reflected in the equally wide range of hallucinatory phenomena that we are capable of experiencing. That so many people report these phenomena (Moriyama et al., 2020) and tend to typify them as impactful may then well be due to the fundamental role touch plays from an early embryonic stage onwards.

Comparison with other entity experiences

Jinn are not the only entities that have been the subject of analyses of multimodal hallucinations. Recently, studies have been published on tiny hallucinated creatures (lilliputian hallucinations) (Blom, 2021), entities perceived in the context of dimethyltryptamine (DMT) use (Davis et al., 2020), and God experiences (in non-drug-using individuals and in those using four types of hallucinogen) (Griffiths et al., 2019). In all four studies multimodality played a substantial role. However, only 9–43% of the participants in these studies reported the involvement of the tactile and somatic modalities, where this is 62% in the present study. Since the other four types of entity experience were much more often appraised as agreeable, we may ask ourselves whether the high levels of distress associated with jinn encounters are connected with (i) the catastrophic beliefs of our patients concerning jinn in general, (ii) the threatening way in which these entities frequently appear to behave, (iii) the psychiatric disorders in the context of which they were encountered, (iv) the duration of the experience (which in our study often amounted to years), or (v) the overrep-

resentation of tactile and somatic components in the experiences recounted. Likely, the answer lies in a combination of these factors, if only because the episodes during which the participants in the four previously published studies had had their entity encounters often were much shorter, while fewer participants were diagnosed with a psychiatric disorder. In a chicken-and-egg type of unresolved issue, the tendency of our study population to react with horror to the entities they perceived may also have increased the likelihood that they would develop a psychotic disorder. Since a negative appraisal of hallucinations is known to be an important predictor of schizophrenia spectrum disorders, at least in the case of auditory hallucinations (Daalman et al., 2011), this might well be a factor to reckon with. If we also call to mind Moriyama et al.'s finding (2020) that tactile hallucinations in the general population are linked to poorer mental health and an increased risk of psychosis, we may conclude that multiple factors are at play that together increase the likelihood that jinn are experienced as distressing entities *and* that a biomedical diagnosis of schizophrenia spectrum disorder is probable.

Stochastic process

The order in which the various sensory modalities are engaged in multimodal hallucinations is a topic of emerging interest (Lim et al., 2016; Toh et al., 2020). In schizophrenia spectrum disorders, for example, auditory hallucinations often appear to precede hallucinations in the visual and tactile modalities (Lim et al., 2016). The reasons for this are unclear, although Hoffman's (2007) social deafferentiation hypothesis stresses the vital importance of language—in a social and evolutionary sense—and accordingly proposes that hallucinated speech is the first symptom to arise in the context of social isolation, which often precedes and/or accompanies psychosis. By contrast, hallucinations triggered by sleep deprivation almost invariably start out in the visual modality, sometimes followed by auditory and tactile sensations, and finally by cognitive failure in terms of delusions (Waters et al., 2018). Thus, in severe sleep deprivation, the recruitment of brain areas responsible for the mediation of hallucinations appears to proceed from occipital toward prefrontal areas. We found that the tactile hallucinations our psychotic Muslim patients reported seem to chiefly co-occur with auditory and visual hallucinations, which suggests that they only appear when at least one other sensory modality—and often two—are already involved. We observed a somewhat similar pattern for the somatic hallucinations, in

that these only seem to appear when at least two other sensory modalities are involved, with 64% of the participants reporting hallucinations in as many as four or five other modalities. Limited by the cross-sectional nature of our study, we cannot draw any firm conclusions about the order of recruitment of these sensory modalities, but **Tables 3A,B** do hint at a stochastic process where other sensory modalities need to have been engaged first in order for tactile and especially somatic hallucinations to appear.

Limitations

The group of patients participating in our study was relatively small and, moreover, comprised a subgroup at the severe end of the psychosis spectrum. The generalizability of our findings – even to other Muslim patients with psychosis – is therefore questionable.

For the purpose of charting the phenomenological characteristics of bodily hallucinations we did not consider PANSS scores and medication histories as strictly necessary at this point, and therefore refrained from including these methods in our study design. In the future, these sources of information might have the potential of adding valuable information.

Also, since the structure of the questionnaire we used did not allow us to chart the full spectrum of bodily hallucinations, proprioceptive and kinesthetic hallucinations, for example, remain to be explored. Also, the cross-sectional nature of our study prevented us from establishing the order in which the various sensory modalities were recruited. What is more, the lack of a control group—and the scarcity of published studies on bodily hallucinations in other populations—prevents us from drawing any firm conclusions regarding the question whether these phenomena are overrepresented in Muslim patients. Finally, although the majority of our participants reported high levels of distress, we did not formally quantify its extent. As a consequence, we were unable to relate the intensity of distress to the types or number of sensory modalities involved. This work provides a first step of describing the phenomenology of tactile and somatic hallucinations. These descriptions can be very useful in the further development of culturally appropriate assessments and treatments. Future research might benefit from (i) broadening the scope of this research by including all varieties of bodily hallucination (as well as their relation with hallucinations of the distance senses), (ii) a prospective design that would allow the order in which the various sensory modalities are recruited to be determined, (iii) a

quantification of the extent of distress in relation to the sensory modalities involved *and* to entity experiences of the jinn type, and (iv) functional imaging to shed further light on the brain networks implicated in the various types of hallucination.

Conclusions

Bodily hallucinations have long been neglected by clinicians and researchers. This may have to do with the fact that touch is traditionally ranked as one of the "lower" senses but also with the prominence of auditory and visual hallucinations in psychiatric and neurological conditions, ranging from psychotic disorder to Parkinson's disease and Charles Bonnet syndrome. We have shown that at least in a subgroup of psychotic patients tactile and somatic hallucinations deserve our full clinical attention. Of the 42 Muslim patients clinically admitted with severe psychosis, 62% reported to suffer from such hallucinations, with several describing sexual hallucinations. In 96%, the hallucinations were of a multimodal nature, of which almost 40% took the form of full-blown entity experiences. The involvement of the tactile and somatic modalities was exceptionally high in our group, as was the level of concomitant distress, which may be due to the strong belief most claimed to have in the objective existence of jinn. This, along with the anxiety generally associated with these beings, may have helped to shape their hallucinations, explaining the prominent role of bodily sensations. Also or alternatively, the relatively long duration of illness in our group may have allowed for the recruitment of the tactile and somatic modalities, which we believe become involved in a relatively late stage compared to other sensory modalities when people experience hallucinations in the context of schizophrenia spectrum disorders. Although the cross-sectional nature of our study does not allow for firm conclusions regarding this issue, we found indirect evidence for a stochastic process underlying this recruitment process. The high levels of distress our participants reported indicate that both bodily hallucinations and jinn (encounter) experiences deserve closer attention in clinical practice, as do similar phenomena in patients with analogous culturo-religious backgrounds.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt. 2021.728397/full#supplementary-material

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.


06

The entity experience revisited

Submitted as:
Lim, A., Hoek, H. W., Blom, J. D. (2024). Multimodal hallucinations in Muslim patients with severe psychotic disorders: the entity experiences revisited. *Psychopathology*

Abstract

Introduction: In biomedicine, entity experiences are conceptualised as compound hallucinations featuring one or more living beings. The term 'experience' suggests that these entities have an objective basis in reality, as those perceiving them may maintain. So-called jinn encounters, typically described by Muslims with and without a psychiatric diagnosis, involve the multimodal perception of a spirit that, as is described in the Qur'an, was created by Allah. We here analyse their distinctive phenomenological characteristics. *Methods:* In 42 semi-structured interviews with Muslim inpatients mostly diagnosed with a schizophrenia spectrum disorder we inquired specifically into multimodal hallucinations featuring jinn or related entities. *Results:* Of the 42 interviewees, 35 described multimodal hallucinations of which 22 fulfilled the criteria of entity experiences involving two to six sensory modalities simultaneously. Twelve participants (54.5%) were fully convinced they were dealing with jinn; the others left some room for doubt. Although we did not quantitatively assess the levels of jinn-associated distress, all participants characterised their experiences as impressive and impactful. *Conclusion:* Multimodal hallucinations may involve full-blown entity experiences, which in Muslim patients typically take the form of jinn encounters. Since visual, auditory, and tactile hallucinations in our sample were described substantially more frequently than somatic, olfactory, and gustatory ones, we hypothesise that the processes underlying the hallucinations may be driven by a stochastic mechanism in that the first three sensory modalities need to have been engaged before the latter three can be recruited. Although the exact way in which these entity experiences are mediated is as yet uncertain, we highlight several biological models of potential underlying mechanisms as well as two overarching models that may help place the mechanisms in the wider context of personal, social, cultural, religious, philosophical, and evolutionary factors that, conceivably, all play a role in their mediation.

Keywords
compound hallucination, jinn, personification, schizophrenia spectrum disorder, transcultural psychiatry

Introduction

First-person accounts of people witnessing ghosts, spirits, and other entities are probably as old as humanity itself. In different times and cultures the entities reported on have been interpreted in a multitude of ways, but in biomedicine they are traditionally designated as entity experiences, meaning that they are conceptualised as compound hallucinations that feature one or more human, humanoid or metaphysical beings (Blom, 2023). This definition is indebted to the overarching definition of hallucination, i.e. 'a percept experienced during wakefulness that lacks a corresponding stimulus from the outside world'. In the hallucinatory experience, any of the sensory modalities may be recruited, either in isolation, serially, or simultaneously. In the latter two cases, the ensuing percepts are known as multimodal hallucinations. These may be either incongruent or congruent in nature (Lim et al., 2016). When incongruent, the ensuing percept does not add up to a coherent whole (e.g. seeing a hallucinated cat which appears to be meowing while one is simultaneously hearing water running). Congruent multimodal hallucinations (i.e. compound hallucinations) do add up to a coherent whole. When they involve living beings, we speak of an entity experience. In biomedicine, the term entity experience thus refers to a compound hallucination featuring one or more living beings (Blom, 2023; Davis et al., 2020). Experiencing hallucinated persons himself, the German chemist Ludwig Staudenmaier (1865-1933) was the first to coin the now classic term 'personification' for this phenomenon (Jaspers, 1997; Staudenmaier, 1912). The reason why experiences such as these are not simply addressed as compound hallucinations is (a) the life-like appearance of the entities perceived and (b) the professed need to leave room for the possibility that they have an autonomous existence. Staudenmaier, who was diagnosed with schizophrenia later in life, considered personifications to be 'emancipated parts of the subconscious', thus acknowledging their source in his own psyche while simultaneously granting them an autonomous existence once they were projected into the outside world. As a consequence, in psychiatry, when people recount of subjective meetings with a living being whose ontological status may be uncertain to them, we use the term entity experience or entity encounter.

One such entity experience is the jinn encounter, a phenomenon well-known to people with a Muslim background. In the medical literature it is mainly described in the context of psychosis (Lim et al., 2015), although it is also documented in association

with other psychiatric disorders and reported by people who do not fulfil the criteria of any mental disorder (Lim et al., 2018). In pre-Islamic traditions and in the Qur'an, jinn are conceptualised as supernatural beings, where in the Qur'an it is described how they were created by Allah out of smokeless fire. To Muslims, they are hence as real as angels that, according to the same scripture, were created out of light, and as humans who were created out of dust or clay. In an earlier paper we described the tactile and somatic hallucinations reported by psychotic patients with a Muslim background admitted to our nursing ward for acute psychiatry (Lim & Blom, 2021), detailing the impact these hallucinations of the 'proximity senses' had on these severely ill patients while noting that in 38% of these hallucinations also involved other sensory modalities and took the form of full-blown entity or jinn encounters. This paper zooms in on the nature, impact, and possible origins of these latter experiences in this patient group.

Various recent studies indicate that multimodal hallucinations are associated with a greater severity of pathology than unimodal hallucinations. Thus, Chouinard and colleagues (2019) observed a higher severity of illness in terms of suicide attempts and catatonic behaviour in patients reporting multimodal hallucinations, while Laloyaux and colleagues (2019) recorded higher anxiety and depression, and lower quality of life scores. In their recent review, Montagnese and colleagues (2021) moreover note that multimodal hallucinations tend to be experienced as more realistic, more threatening, and more distressing than unimodal ones, and that they are linked to worse mental health outcomes. Elaborating on these themes, in this paper we analyse the phenomenological and experiential characteristics of entity experiences and tentatively suggest road maps to uncover underlying mechanisms.

Methods

We draw on the data we collected in a convenience sample of 42 Muslim patients most of whom had been admitted to inpatient centres of the Parnassia Psychiatric Institute in The Hague, the Netherlands on account of acute psychotic symptoms (Lim & Blom, 2021). Inclusion criteria for participation in this and the present study were: age ≥18 years, being Muslim, presenting with hallucinations and attributing these experiences to the presence of jinn or similar entities, with participants needing to be Dutch- or English-speaking. We interviewed all participants with the aid of the Hallucination Attribution List (HAL; see Supplementary Material (Lim & Blom, 2021)), which purpose-built, semi-structured 80-item questionnaire helps to systematically assess the presence

of hallucinations (lifetime and present-state), the sensory modalities in which these are experienced, and the ways in which they are attributed - in conformity with religious practices in, among other societies, Muslim culture - to jinn, voodoo, and/or the evil eye. Clinical diagnoses and other data relevant to a proper assessment of the group under study were extracted from the patients' electronic medical files. The study was approved by the Scientific Committee of the Parnassia Academy and considered exempt from independent ethics review and the need for informed consent was waived by this committee. It was carried out in accordance with the revised conditions of the Declaration of Helsinki.

Results

Demographics

All 42 inpatients were interviewed at their respective psychiatric nursing wards. The data of three patients (7%) were excluded; one had a sleeping disorder and only recounted of a sensed presence, another reported hypnagogic-hypnopompic hallucinations, and the third refused to complete the interview, rendering the data incomplete. Of the remaining 39 participants, four experienced unimodal hallucinations: two in the auditory modality, one in the visual, and one in the tactile modality. The other 35 participants, of whom 25 (71.4%) were men, all described multimodal hallucinations. Their median age was 32 years (SD 7.4), with 26 (74.3%) having been diagnosed with a schizophrenia spectrum disorder consistent with DSM-IV criteria, while nine had other diagnoses; for details, see **Table 1**. Below, we will be reporting on this subset.

Table 1 Diagnoses of the participants reporting multimodal hallucinations (*n*=35)

Diagnosis	*n*
Obsessive-compulsive disorder	1
Depressive disorder with psychotic symptoms	4
Depressive disorder	4
Schizophrenia spectrum disorder	26

Religion

Most of the participants (69.2%) were actively engaged in religious routines such as daily prayers (salat, salah) and mosque visits. **Table 2** details how many of them believed in the existence of the evil eye, voodoo/magic, and jinn, the extent to which they claimed to have personal experience(s) with these phenomena, and their opinion about the proportion of people in their immediate surroundings they thought believed in them.

Table 2 Participants' notions about and experiences with the evil eye, voodoo/magic, and jinn (*n*=35)

Belief/experience	Evil eye	Voodoo/magic	Jinn
Other people's belief in	80%	82.9%	100%
Own belief in	77.1%	74.3%	97.1%
Personal experiences with	45.7%	48.6%	94.3%

Almost all participants (97.1%) believed that their perceptual experiences (recorded as hallucinations by their treating physicians) were caused by jinn, with 65.7% being fully convinced that jinn played a role, while 28.6% were not entirely sure (with the degree of conviction ranging from 40 to 90%). Only one participant (2.9%) was certain that jinn were not involved and another (2.9%) had no clear ideas about the cause of the phenomena experienced.

Hallucinations and the sensory modalities involved

We divided the multimodal hallucinations reported on into serial congruent (SeC) and simultaneous congruent (SiC) hallucinations (Lim et al., 2016). As can be seen in **Table 3**, the hallucinations of 13 participants were of the SeC type, of 11 participants of the SiC type, and of another 11 both types. **Table 3** also shows how many participants experienced hallucinations in which sensory modalities.

Table 3 The number of sensory modalities recruited in the multimodal hallucinations analysed (*n*=35)

Number of sensory modalities	SeC	SeC and SiC	SiC	Total
2	4	0	2	6
3	3	5	2	10
4	4	4	0	8
5	1	0	6	7
6	1	2	1	4
	13	11	11	35

Serial congruent hallucinations

In the SeC group (37.1%), those experiencing hallucinations in two sensory modalities (11.4%) described audiovisual, audiotactile, audio-olfactory, and visuotactile sensations. None reported the involvement of the gustatory or somatic modalities. Those whose hallucinations involved three senses mentioned the auditory, visual, and olfactory modalities (two participants) or the olfactory, gustatory, and somatic modalities (8.6%). Finally, 11.4% of the

participants experienced hallucinations in four, 2.9% in five, and again 2.9% in six sensory modalities. Ranging from full dismissal (0%) to absolute conviction (100%), the belief in whether their experiences were caused by or involved jinn was quite variable. The only participant with 0% conviction had visual and tactile hallucinations, while the participants who had a 100% conviction had hallucinations in either two, three, four, or five sensory modalities. One participant was unable to rate his confidence.

Simultaneous congruent hallucinations involving jinn encounters

By definition, entity experiences fall into the category of simultaneous/congruent perceptions. All 22 participants (62.9%) reporting such SiC experiences identified the entities as jinn, whom they described as having varying colours (ranging from black and white to pink, white, or multicoloured such as yellow, red, black, and green or black and dark red). Some recounted of jinn having an extremely bright or luminescent appearance, whereas others described them as being translucent, drab, or extremely dark. The entities were designated as human or humanoid figures, of which occasionally only the head could be seen. Some participants spoke of animals or animal features, for instance creatures with (reversely placed) hooves or bat-like wings. For others the figures' appearance remained somewhat vague. Most interviewees estimated the jinn to have the size of an adult person (59.1%), although three participants (13.6%) described them as very small and three others (13.6%) as very large. As to the participants hearing voices, one heard a familiar male voice (family member), while in 11 others it also concerned male but unfamiliar voices (together 54.5%). Seventeen participants heard female voices (77.3%), of which two were familiar and the other 15 unfamiliar. Musical hallucinations were reported by five participants (22.7%), while 13 (59.1%) heard other non-verbal sounds. The smells sensed during olfactory hallucinations were highly varied, ranging from gas to sulphur, faeces, rotten eggs, vomit, animal corpses, perfume, flowers, and food smells. Sometimes participants used less precise terminology to characterise their olfactory sensations, speaking of 'foul smells', 'the smell of (old) people', 'the smell of hell', or 'the smell of something burnt'. Gustatory hallucinations likewise covered a wide array of taste sensations, varying from garlic to candy, faeces, 'something burnt', petroleum, spit, sand, and 'something sour'. Mutatis mutandi, the same held true for tactile and somatic hallucinations (for detailed phenomenological descriptions of these sensations, see Lim & Blom, 2021).

Sensory modalities recruited

The participants in the Sic group having hallucinations in two sensory modalities reported either audiovisual or audiotactile hallucinations. Most of those reporting the involvement of three or four modalities likewise described auditory, visual, and tactile components. The gustatory and somatic modalities were mostly recruited when four or more sensory modalities were involved.

Attribution

Twelve of the 22 participants with entity experiences were fully convinced that they were dealing with jinn, while the other 10 estimated the likelihood somewhere between 40 and 100%. Their narratives indicated that they had given their experiences a good deal of thought. For example, one of the participants describing hallucinations in five sensory modalities claimed to be in touch with a spiritual world that had both enriched and ruined her life. She nonetheless left room for doubt regarding the ontological status of 'her' entities, stating that she was 50% sure that the sensations were caused by jinn. Another participant was fully convinced that he was dealing with jinn. During his imperative verbal auditory hallucinations he saw a man dressed in black who sometimes took him to a different world with beautiful trees and animals, a place he described as 'a kind of paradise.' In addition, he once had an out-of-body experience. Because his family considered the jinn to be exceptionally strong, they occasionally took their relative to traditional healers in Morocco. Yet another participant indicated that he had only disclosed a fraction of the things he experienced and hinted at the possibility that he was plagued by sexual hallucinations. Some participants expressed the wish to 'be rid of their jinn,' others sought to deal with them by staying awake during the night.

Discussion

In our convenience sample of 42 Muslim inpatients, mostly admitted because of an acute psychotic episode, 22 said to be dealing with direct encounters with entities that they sensed in two to six sensory modalities simultaneously. Although the entities' phenomenological characteristics varied widely, as did their certitude, all 22 attributed their experiences to jinn.

Underlying stochastic process

Although phenomenologically not uniform, the jinn encounters shared a striking commonality in that the visual, auditory, and tactile modalities were recruited in the majority of cases, with

the somatic, olfactory, and gustatory senses almost exclusively being involved in combination with these first three. As suggested previously by our group, we think this may be indicative of an underlying stochastic process that drives the order in which the different sensory modalities are being recruited in psychotic patients (Lim et al., 2021). As explained by Bateson (1979), stochastic processes are characterised by 'a stream of events that is random in certain aspects' while 'in each case there is a non-random selective process which causes certain of the random components to "survive" longer than others'. Applied to jinn encounters, this may mean that the mediation of auditory or visual hallucinations may be quite random, whereas the recruitment of subsequent sensory modalities may follow a fixed pattern while retaining the original type of hallucination as a component of the compound hallucination. In our previous paper on this topic (Lim & Blom, 2021) we moreover pointed out that the jinn encounters described show a remarkable overlap with hallucinations involving entities such as machine elves or clockwork elves as chronicled for users of N,N-dimethyltryptamine (Davis et al., 2020), God experiences (Griffiths et al., 2019), lilliputian hallucinations (Blom, 2021), and incubus phenomena experienced in the context of sleep paralysis (Molendijk et al., 2022; Sharpless & Doghramji, 2015). All these hallucinations are characterised by the involvement of multiple sensory modalities, with a prominent role for the visual modality, again suggesting that in entity experiences, this modality needs to be activated before other sensory modalities can be recruited.

Ensuing distress

As indicated by Dudley et al. (2018), who studied 22 psychotic patients with multimodal hallucinations, congruent hallucinations perceived in several sensory modalities simultaneously (i.e. SiC multimodal hallucinations, such as those in which the image of a person is seen and heard talking and/or whose touch is felt) are associated with a greater conviction that the encounter is real as well as with a higher degree of distress. Although we did not quantitatively assess the levels of jinn-associated distress in our group, our clinical impression is that the anguish experienced was indeed positively correlated with the number of sensory modalities involved, as well as the involvement of the 'proximity senses', as in tactile and somatic hallucinations (Lim et al., 2016).

Neurobiology

The brain mechanisms underlying entity experiences are not fully understood. Several models elaborate on Staudenmaier's idea

that these are complex, endogenously mediated percepts that are 'projected' into the outside world (Staudenmaier, 1912). Since the late 1950s, this idea has been incorporated into the perceptual release model of hallucinations, which starts from the notion that 'lower' (i.e. phylogenetically older) brain areas constantly produce perceptual material that under physiological circumstances, at least during our waking hours, is suppressed by 'higher' (i.e. cortical, phylogenetically younger) brain areas (West, 1962). From this it follows that endogenously mediated percepts may be 'released' into consciousness when cortical areas fail to restrain them. A virtue of this model is its continuity with what is known about deafferentiation (as in Charles Bonnet syndrome) and sleep-related hallucinations (Waters et al., 2024). It moreover conveniently circumvents the necessity to explain the possible involvement of separate primary cortical networks for vision, audition, and so on. After all, the question whether multimodal hallucinations recruit several of these networks simultaneously or rather a single higher-order network, remains unanswered (Lim et al., 2016). A drawback of 'perceptual release' as an explanatory model for entity experiences is that it does not explain how these endogenously mediated percepts are projected into the outside word; it does not account for the mechanism that is responsible for the phenomenon that, for instance, jinn can be perceived as being actually present and standing in one's bedroom or kitchen.

Montagnese and colleagues (2021) summarised and reviewed current theories on the mediation of hallucinations. In their work they distinguish theories that focus on modality-specific processes, on modality-general processes, on information theory frameworks (including predictive coding and circular inference), and on functional systems. They also conclude that in their current iterations none of these theories is sufficiently equipped to explain the mediation of multimodal hallucinations. As to the role of specific brain networks, it has been suggested that the default mode network may be the source of increased activity that subsequently arises in primary cortical areas (Alderson-Day et al., 2015). Those areas, in turn, might induce spontaneous endogenous signals that are misinterpreted as exogenously mediated percepts, and/or give rise to activity in secondary association areas. Another explanation starts from the premise that all perception is shaped by previous experiences or priors (Corlett et al., 2019). This goes a long way to explain why people with different cultural backgrounds experience (multimodal) hallucinations differently and why Muslim patients have jinn encounters and non-Muslims do not. It also makes sense from an anthropological point of view, where hallu-

cinations are considered more than mere biological phenomena and the role of personal, social, cultural, philosophical, and religious influences is stressed (Luhrmann, 2011). Especially relevant for the present topic are cultural and religious beliefs and the way they may shape - what physicians call - psychotic experiences (Wilt et al., 2023). The interviews we conducted demonstrated that all participants were familiar with the concept of jinn, as handed down to them by family members, peers, and (religious) teachers. What is more, since jinn are described in the Qur'an as an integral part of Allah's creation, they cannot be ignored by Muslims as real, living beings.

Integrative models

A model that integrates many of the above-mentioned mechanisms is the Hyperactive Agency Detection Device (HADD) theory (Barrett & Johnson, 2003; Barrett & Lanman, 2008). It takes as its starting point the basic human need to detect potential threats and details how and why environmental stimuli are perceived as purposive and intentional. In that context, the HADD is conceptualised as a hard-wired (i.e. neurological) remnant of our ancestral past that serves to detect and quickly assess the presence of potential threats. Since this system is prone to false-positive outcomes ('better safe than sorry'), especially people who have relatively little control over their environment may be susceptible to overly anxious reactions (Barrett & Johnson, 2003; Barnes & Gibson, 2013). Applied to the current topic, the HADD theory may then help to explain why entity experiences - over which people claim to have little control - are likely to be interpreted as threatening, as was often the case with the jinn encounters of our participants. A later iteration of the HADD theory, called the Interactive Religious Experience Model (IREM), describes the relationship between beliefs and experiences in more detail and additionally stresses the role of feedback loops (van Leeuwen & van Elk, 2019). Although the road towards a satisfying explanatory model of entity experiences is likely to be long and winding, we believe that models such as the IREM and the HADD theory are important steps in the right direction.

Limitations

Our study has several limitations. First, the size of our sample was relatively small. A larger sample would have increased the power of our findings, but we are not aware of any studies that describe larger groups of Muslim patients experiencing entity experiences. Also, since our participants were all admitted to psychiatric treat-

ment facilities at the time of the interviews, the data obtained is not necessarily representative of all psychotic Muslim patients or of Muslims with jinn experiences in general. Third, the cross-sectional nature of our study precludes the possibility to establish the temporal order in which the different sensory modalities were being recruited. Fourth, this study was set up without a control group. Therefore, we cannot conclude from our data whether jinn encounters do indeed cause poorer clinical outcomes than psychotic symptoms that are not interpreted as such encounters. Finally, since we did not quantitatively assess the distress associated with the jinn encounters reported on, we were unable to substantiate the hypothesis that entity experiences with involvement of a greater number of sensory modalities are more distressing than those with smaller numbers. We therefore suggest that future studies assess these issues systematically, preferably with the aid of rating scales that have a high interrater reliability.

Conclusions

Multimodal hallucinations can comprise vivid entity experiences. In the group of 22 (out of 35) Muslim inpatients with psychosis here described, they took the form of full-blown jinn encounters experienced in two to six sensory modalities. Since the visual, auditory, and tactile modalities were involved most frequently, we hypothesise that the underlying neurobiological mechanism may well be stochastic in nature, in the sense that these sensory modalities need to have been activated before others can be recruited. The exact way in which multimodal hallucinations are being mediated is as yet uncertain, but we highlight several models proposing potential underlying biological mechanisms as well as two overarching models that may aid to place these mechanisms in the wider context of personal, social, cultural, religious, philosophical, and evolutionary factors, which all appear to play a role in the mediation of entity experiences. More research is needed to gain insight into the separate and joint effects of these factors.

Statements

Acknowledgements

The authors thank all the patients at Parnassia Psychiatric Institute, The Hague, who contributed to this study.

Statement of Ethics

The study was approved by the Scientific Committee of the Parnassia Academy and considered exempt from independent ethics review. The need for informed consent was also waived by this committee. It was carried out in accordance with the revised conditions of the Declaration of Helsinki.

Conflict of Interest Statement

J.D.B. received publishing royalties for A Dictionary of Hallucinations (Springer Nature, 2010/2023), Alice in Wonderland Syndrome (Springer Nature 2020), Katatonie en Dissociatie (AccreDidact/Prelum, 2014), Visuele Hallucinaties en Andere Positieve Visuele Waarnemingsstoornissen (AccreDidact/Prelum, 2013), and Hallucinations: Research and Practice (Springer, 2012).

Funding Sources

This study was not supported by any sponsor or funder.

Data Availability Statement

All data generated or analysed during this study are included in this article and its supplementary material files. Further enquiries can be directed to the corresponding author.

Conflicts of interest

The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.


07

General discussion & summary

In this thesis I explored the occurrence and phenomenology of multimodal hallucinations (i.e., hallucinations experienced in two or more sensory modalities) in the context of psychosis, with a special focus on these hallucinations reported by Muslim patients who attribute these sensations to jinn, voodoo or the evil eye. This chapter provides a summary of the main findings and my recommendations for clinical practice and further research.

Main findings

Chapter 1 provides an introduction on the subject of the thesis. In *Chapter 2* I provided a review of the medical literature on jinn as an explanatory model in the context of biomedical disorders. As indicated in the review, in Muslim culture the origins of the notion of jinn are very old. Jinn are not only described in the Qur'an but also in pre-Islamic texts from Egypt, Babylon, Greece, and Assyria, where they are strongly connected with beliefs in possession and magic. An important difference between religious interpretations and those in Muslim folk beliefs is that in the first jinn are considered neutral entities capable of being good as well as bad, whereas in the latter they are mostly deemed bad or else seen as instrumental in achieving important goals in life with a serious risk of negative consequences. In the 105 biomedical articles that I reviewed, I found 47 case descriptions mentioning an attribution to jinn, voodoo, or the evil eye. Among these cases, there were ten describing patients who thought their multimodal hallucinations were instigated by and/or featured jinn. I analyzed the phenomenological features of these hallucinations as well as other symptoms reported on, which ranged from anxiety and depression to neurological pathology. Since multimodal hallucinations are rarely reported in Western populations, I assumed on the basis of my analysis and previous publications on hallucinations in non-Western patient groups that Muslim patients might experience these complex hallucinations more often. An additional preliminary conclusion was that patient delay was common in this group. To further elaborate on the combined findings and verify my assumptions, I carried out four empirical studies on the nature and prevalence of multimodal hallucinations in people with a Muslim background coping with schizophrenia spectrum disorders.

To find out whether multimodal hallucinations are indeed experienced more often in Muslim and other non-Western populations of psychotic patients, I analyzed data from the longitudinal, multi-site Dutch GROUP (Genetic Risk and Outcome of Psychosis) study. Contrary to expectations, my analysis, presented in *Chapter 3*, revealed that the opposite is true in that multimodal hallucina-

tions are simply underreported in Western patients. The GROUP study provided data on more than 1,000 patients diagnosed with a schizophrenia spectrum disorder and in the 750 patients who had fully completed the CASH (Comprehensive Assessment of Symptoms and History) I calculated an 80% lifetime prevalence for hallucinations in general, while the lifetime prevalence of multimodal hallucinations proved to be almost twice as high (53%) as that of unimodal hallucinations (27%). Again contrary to my hypothesis, I also found no significant differences between participants with a Dutch background and those descending from the four largest migrant groups residing in the Netherlands (i.e., Morocco, Turkey, Surinam, and the former Dutch Antilles). Since not all sensory modalities were explored in the GROUP study, I venture that even higher prevalence rates would have been found for multimodal hallucinations had all modalities been investigated.

Given that a relatively high number of GROUP participants reported hallucinations in three or four sensory modalities with relatively high rates for hallucinations involving the auditory and visual senses, I put forward that the mechanism underlying multimodal hallucinations is likely to be a stochastic process in that having hallucinations in these latter two modalities increases the chance for the additional recruitment of other modalities. I also proposed a clinical classification of types of multimodal hallucination based on their serial or simultaneous presence, and on their degree of congruence or incongruence.

Chapter 4 presented data on a group of 47 patients recruited from a transcultural outpatient clinic who attributed their psychiatric symptoms (rather than their hallucinations alone) to the evil eye, voodoo, and/or jinn. The psychiatric symptoms were diverse, ranging from anxiety and obsessive-compulsive symptoms to flashbacks of traumatic events, somatic symptoms, and hallucinations. Most of the participants had been diagnosed with an anxiety disorder, a mood disorder, or PTSD, with or without hallucinations. Of this group, 43% were positive that their symptoms were caused by jinn, whereas 27% thought that they were not, and 31% were in doubt. As to the hallucinations reported on, the auditory, visual, and tactile were the most prevalent sensory modalities mentioned. A relatively large number of participants eligible for inclusion (58.8%) dropped out because of a fear of repercussions from the jinn were they to open up about them. Also, a majority did not dare to speak freely about their symptoms and their alleged causes, showing reluctance to share information on jinn and other cultural-religious matters with the attending biomedically trained health professionals.

In *Chapter 5* I presented the results from a study among psychotic Muslim inpatients experiencing hallucinations that they attributed to jinn. Since information on these specific sensory modalities is scarce, with only few case reports mentioning them explicitly, I focused on tactile and somatic components. The vast majority (96%) of the patients interviewed experienced multimodal hallucinations. Having detailed the phenomenology of these hallucinations, I assessed the interrelatedness of tactile and somatic hallucinations with those in other sensory modalities and found all of the tactile and somatic hallucinations to be congruent, meaning that the hallucinations experienced in these two sensory modalities added up to a coherent whole, often to the extent that they constituted full-blown entity experiences, which, moreover, tended to be very frightening, exerting a substantial impact on the patients' daily lives. The overriding involvement of the auditory and visual modalities as well as the pattern of frequencies of hallucinations in the olfactory and gustatory modalities provided tentative empirical confirmation for the stochastic process that I had proposed in Chapter 3 as a mechanism underlying multimodal hallucinations.

In *Chapter 6*, I reported additional data on multimodal hallucinations in the above-mentioned group of psychotic Muslim inpatients, now zooming in on the phenomenon of entity experiences, which, in the cases investigated, took the form of vivid, mostly harrowing jinn encounters, concluding the chapter by presenting several biological and psychological models that may pave the way to understanding the underlying mechanisms contributing to the mediation of such lifelike entity experiences.

Discussion

The complex challenge of multimodal hallucinations attributed to jinn

Working with patients who attribute their multimodal hallucinations to supernatural causes poses a multifaceted challenge to Western health professionals. Although the notion of jinn is well-known in Muslim communities, several reasons may explain the relative silence on the matter in case reports and research papers. On the one hand, when people from these communities (finally) decide to seek help and turn to biomedical health providers, they may find that the attending practitioners are not always sufficiently familiar with Muslim religious and cultural beliefs and practices. These practitioners may easily miss important clues or misinterpret the symptoms their patients present with, or, realizing their lack of insight, they may feel inadequate in diagnosing

and treating them, hampering effective treatment. Even though the practice to label unusual symptoms as 'exotic' and 'incomprehensible,' which prevailed in much of the 19th and 20th centuries, has largely been abandoned (Kirmayer & Minas, 2000), there is still a risk that they will be relegated to the group of 'culture-bound syndromes', especially by practitioners with divergent attributional models who have an oversimplified view on these matters. Furthermore, a lack of (in-depth) knowledge of multimodal hallucinations may further increase the risk of miscommunications, misdiagnoses, and inapt treatments.

On the other hand, and exactly because they are fearful of being misunderstood, Muslims may be reluctant to share their jinn experiences with biomedically trained practitioners. After all, how should they cope with a supposedly knowledgeable person who interprets beings they can see, hear, smell, and even touch as mere hallucinations? In addition, they may fear that fellow-Muslims will take their jinn encounters as proof that they have not been faithful to Allah or the Qur'an's teachings, and that they will therefore be frowned upon or regarded as a dishonorable Muslim. Moreover, they may dread that the mere mention of jinn may cause the entities to reappear, adding to the burden and suffering they already experience. Finally, they may be afraid of stigmatization and social exclusion (e.g., being labeled and shunned as a crazy person) if and when their mental problems become known. These factors are all likely to have contributed to the fact that a large proportion of the people I interviewed were reluctant to discuss their symptoms and attributions or at least to discuss them in more detail than they did (*Chapter 4*).

The continuing challenge of multimodal hallucinations

Although this thesis may well be the first to be devoted in its entirety to multimodal hallucinations, the phenomenon was already empirically researched in the context of the 19th-century Census of Hallucinations (Sidgwick et al., 1894; Parish, 1894). This classic study was carried out in the overlap area of biomedicine and parapsychology and designed to gather proof that hallucinations sometimes reflect metaphysical phenomena such as true contact with the dead. The study is still widely cited today, albeit stripped of its paranormal overtones. Over time, multimodal hallucinations became primarily associated with a diverse spectrum of psychiatric disorders, ranging from organic brain syndromes to neurotic disorders, sleep disorders, and drug-related disorders, and seldom with schizophrenia spectrum disorders. Subsequent findings published during the second half of the 20th century

(Chesterman & Boast, 1994; Goodwin et al., 1971; Mueser et al., 1990) did little to change that.

Be that as it may, the 1994 study by Chesterman and Boast as well as reports on multimodal hallucinations in the cultural field (Al-Krenawi & Graham, 1997; Ndetei & Singh, 1983; Zarroug, 1975) did prompt the question whether these hallucinations might be more prevalent in people with a non-Western background. However, in the GROUP data set I found no corroboration for this hypothesis. What my analysis did show was that 53% of the participants, who were all diagnosed with a schizophrenia spectrum disorder, experienced multimodal hallucinations irrespective of their country of birth or the country of birth of one or both parents. My findings on frequency confirmed previous findings by Waters et al. (2014). Also, studying psychotic patients with visual hallucinations, Dudley et al. (2018), showed that the rate of multimodal hallucinations was significantly higher in this group in comparison to the rates recorded for patients with eye disease, Lewy body dementia, and Parkinson's disease. Specifically, people with a psychotic disorder more often reported a tactile component in addition to their visual sensations than did the patients from the other groups. Similar rates for and patterns in multimodal hallucinations were noted by McCarthy-Jones et al. (2017) in their intercontinental, multi-center project comprising patients diagnosed with chronic schizophrenia spectrum disorders receiving treatment in Ireland and Australia. The authors likewise found that, besides the visual modality, the auditory modality was predominant but also that, based on the participants' accounts, the visual, tactile, olfactory, and gustatory perceptions always appeared in this particular order.

Similarly, to what is discussed in this thesis, in their study of psychotic patients Dudley et al. (2018) described congruent multimodal hallucinations with their participants experiencing auditory hallucinations that were congruent to their primary visual hallucinations. What is more, Toh et al. (2021), who studied 50 patients experiencing verbal auditory hallucinations (VAH) and 50 patients with auditory hallucinations, additionally reported hallucinations in at least one other sensory modality (VAH+), and found the latter group to be clinically more severely ill. One may thus infer that multimodal hallucinations are primarily associated with severe and acute states of psychiatric disorders. Yet, they are also experienced by people without a known psychiatric disorder as well as by individuals without any diagnosis (neurological or otherwise). Overall, auditory hallucinations are most often seen in patients with a psychotic disorder, while visual hallucinations

are observed in both psychotic and non-psychotic patients (Connell et al., 2019). Moreover, in a large online survey including 10,448 participants from the general population, Linszen et al. (2022) not only found the same pattern in the order in which the four main sensory modalities were involved but also occurrence rates that are quite similar to those presented in this thesis *(see Chapter 3)*, (i.e., auditory 29.5%, visual 21.5%, tactile 19.9%, and olfactory 17.3%). Moreover, 47.6% of Linszen et al.'s respondents reported having experienced hallucinations in two or more sensory modalities, which comes close to the 53% I recorded for people with psychotic disorders in my study of the GROUP data *(Chapter 3)*.

Indications for a stochastic process underlying multimodal hallucinations

Several hypotheses have been postulated for the origins of and mechanisms underlying (multimodal) hallucinations. For example, the perceptual release model suggests that hallucinations are outwardly projected endogenous percepts released from anatomically and phylogenetically 'lower' parts of the brain that subsequently find their way towards the cortex and thus into consciousness (West, 1962). A second model proposes that the content of hallucinations derives from previously perceived scenes, objects, or stimuli stored in memory. Aptly called the reperception model, it was first described by Ferriar (1813) and then by Kahlbaum (1866), and – more than a century later – by Penfield (1975), whose work helped to shape our current understanding of multimodal hallucinations. A third theory was introduced by Lhermitte (1922), who found reason to believe that hallucinations were mediated by areas in the brainstem and rostrum previously designated as the brain's 'dream center'. These so-called peduncular hallucinations are thought to be complex, vivid, and often brightly colored visual and multimodal phenomena. Friston et al. (2016) posited a fourth hypothesis, basing their paradigm on the assumption that a predictive coding process leads to so-called grounded expectations, which may aid higher cortical areas to form multimodal hallucinations based on relatively simple cues. Thus, perceptual experiences in one sensory modality will then give rise to the expectation that related percepts will appear in other modalities. Especially the latter hypothesis shows a good fit with what I found in our samples, where it may be plausible that the (psychotic) Muslim patients who experienced multimodal hallucinations may have expected full-blown entity experiences on the basis of relatively simple events involving auditory or visual perceptions, prompting them to go on and hallucinate sensations

in these and other sensory modalities up to and including lifelike jinn encounters. As noted, the order in which the different sensory modalities are being recruited to form multimodal hallucinations appears to follow a pattern that has been recognized by several authors (Dudley et al., 2023; Linszen et al., 2021). In the study presented in *Chapter 3*, we found the consistent successive recruitment of the auditory, visual, tactile, olfactory, and gustatory modalities to be suggestive of a stochastic process (Lim et al., 2016). Stochastic processes, first conceptualized during the 1930s (Khinchin, 1933; Doob, 1934), involve mathematical processes in which "at any point of time the precise state or value is unpredictable and neither depends on previous values or states of the system, nor on an inherent bias of the system" (Hiesinger & Hassan, 2018). Bateson (1979) conceptualized the stochastic process in his book Mind and Nature as a semi-random process because each step in the sequence has a limited range of outcomes, which then form the starting point for the next step in the sequence, which likewise has a limited range. Thus, each step is dependent on the outcome of the previous step and, in fact, impossible without the previous step having been made. Although stochastic processes may have a respectable number of outcomes, this number is still limited, rendering the process itself not completely random. As clarified by Hiesinger and Hassan (2018), this type of process is also known as non-deterministic, probabilistic, or noisy. The pattern in the recruitment of multimodal hallucinations that we observed in our collective studies suggests the involvement of a noisy process that starts with either an auditory or a visual hallucinatory component, followed by a component in a different sensory modality (i.e., usually either a visual or auditory sensation depending on the initial hallucinated sensation), which may then be followed by a tactile and/or somatic component and, finally, an olfactory and/or gustatory component. With hindsight, as early as in 1900 Störring (1900) already suggested a noisy process to explain the sequence of sensory modalities recruited in multimodal hallucinations when he wrote that "one modality will provide presence of one of the other modalities". More than a century later, David et al. (2011) made a similar observation when they recognized the "additive nature of hallucinations by the pattern of overlap". As observed above, several recent studies provide empirical data that fits the hypothesis of noisy processes in the mediation of multimodal hallucinations (Waters et al., 2018; Blom, 2021; Lim & Blom, 2021). In a systematic review of the occurrence of hallucinations after sleep deprivation, Waters et al. (2018) analyzed the data from 760 otherwise healthy individuals and found the prevalence of the

visual modality to be the highest, followed by the somatosensory and the auditory modalities. The authors noted that when sleep deprivation was prolonged to 50 hours multimodal hallucinations occurred. Describing and analyzing 226 cases in his review of lilliputian hallucinations, Blom (2021) also found the prevalence of hallucinations in the visual modality to be the highest, while in the case of multimodal lilliputian hallucinations the auditory modality was also involved quite frequently. The other sensory modalities were, again comparable to what I recorded in the study reported in *Chapter 3*, recruited in a particular order, with tactile and somatic modalities following the visual modality.

Limitations

As far as I know, the present thesis is the first to address the clinical importance of multimodal hallucinations in general and, more specifically, in Muslim patients with schizophrenia spectrum disorders who attribute these hallucinations to jinn, the evil eye and/or voodoo. I found that hallucinations involving more than one sensory modality are more prevalent than hitherto known, and not only, as was long believed, in non-Western patient groups. Of course, the weaknesses of the studies collected in this thesis warrant attention. The first and main drawback of the research reported is the relatively small number of Muslim patients that we were able to interview comprehensively in the studies on jinn encounters. During the recruitment phase we already noted that, both in the clinical and the outpatient groups, many patients were reluctant to open up about their perceived encounters with jinn because they feared repercussions and stigmatization. This led to a lower number of participants than anticipated as well as a higher dropout during the interviews. The number of patients participating in the study on tactile and somatic hallucinations (*Chapter 5*) was particularly low. It is questionable whether the results on this subgroup of clinical patients with severe psychotic disorders are generalizable to other Muslim patients with schizophrenia spectrum disorders and to other patients with these specific symptoms. Still, here too, we found indications that the actual number of patients that suffer from these phenomena may be much higher. Secondly, our studies were all cross-sectional in nature, which necessarily meant that we were unable to properly assess the development of multimodal hallucinations over time or to further corroborate the hypothesis of the involvement of a stochastic process.

Recommendations for clinical practice and further research

In clinical settings, I recommend including a routine assessment of multimodal hallucinations in the evaluation of the psychiatric history and mental state examination. Moreover, rather than limiting this to the five 'main' sensory modalities, I advocate to systematically gauge the presence of hallucinations in all 14 sensory modalities cited in this thesis to help increase our understanding of the experiences of the patients we see in our daily practice and to accordingly arrive at more precise differential diagnoses. In doing so, we, as clinician-scientists, will be enabled to gain more in-depth knowledge of the etiology and pathophysiology of multimodal hallucinations and thus improve treatment strategies. Since little is known about the effects of antipsychotics on multimodal hallucinations, let alone in the context of varying underlying disorders, another step might be to set up pharmacological clinical trials with the ultimate goal to develop targeted treatment guidelines.

To test the influence of stochastic processes empirically, we need prospective studies. If such noisy processes are indeed pivotal to the mediation of multimodal hallucinations, early interventions with antipsychotics targeting auditory or visual hallucinations might well prevent the recruitment of subsequent sensory modalities, and thus diminish the risk of multimodal hallucinations developing. Regarding non-pharmacological therapies for hallucinations (e.g., cognitive-behavioral therapy and psychoeducation), at present most are directed at unimodal hallucinations, notably in the auditory or visual modality (O'Brien & Johns, 2013; Wilson et al., 2016; Thomson et al., 2017). What is more, the efficacy of repetitive transcranial magnetic stimulation (rTMS) has chiefly been researched in the context of (treatment-resistant) auditory hallucinations (Guttesen et al., 2021). As a corollary, there is still a long way to go before these non-pharmacological therapies can be applied to multimodal hallucinations. Given that systematic research into multimodal hallucinations has only recently gained momentum and the clinical burden for patients experiencing them tends to be substantial, a further exploration of these treatment possibilities deserves our full attention and effort.


08

Nederlandse samenvatting

In dit proefschrift verken ik de fenomenologie van multimodale hallucinaties in de context van psychosen, met een speciaal focus op de attributie van deze hallucinaties aan jinn, voodoo en het boze oog bij islamitische patiënten. Dit hoofdstuk biedt een samenvatting van mijn belangrijkste bevindingen en aanbevelingen voor de klinische praktijk en toekomstig onderzoek.

Belangrijkste bevindingen

Hoofdstuk 1 biedt een inleiding op het onderwerp van studie. *Hoofdstuk 2* is een review over de medische literatuur met als thema de attributie van hallucinaties bij islamitische patiënten aan djinns, voodoo en het boze oog. In 105 biomedische artikelen die ik heb bestudeerd, vond ik 47 casusbeschrijvingen. Ik analyseerde de fenomenologische kenmerken van de gerapporteerde hallucinaties en andere symptomen, variërend van angst en somberheid tot neurologische klachten. Omdat multimodale hallucinaties weinig worden gerapporteerd in Westerse populaties verwachtte ik op basis van deze analyse dat islamitische patiënten deze mogelijk eerder en vaker zouden ervaren. Gebaseerd op deze verwachting heb ik vier empirische studies uitgevoerd om deze hallucinaties nader te onderzoeken.

Om uit te zoeken of multimodale hallucinaties inderdaad meer worden ervaren door islamitische en andere niet-Westerse psychotische patiënten analyseerde ik data van de Nederlandse GROUP-studie (Genetic Risk and Outcome of Psychosis).

Hoofdstuk 3 laat zien dat het tegendeel waar is en dat multimodale hallucinaties juist worden ondergerapporteerd bij Westerse patiënten. In totaal leverde de GROUP-studie data over meer dan 1000 patiënten gediagnosticeerd met een schizofreniespectrumstoornis. In deze groep vond ik bij 750 patiënten met volledige data een lifetime prevalentie van 80% voor hallucinaties. In vergelijking met unimodale hallucinaties was de lifetime prevalentie van multimodale hallucinaties bovendien bijna twee keer zo hoog (27% versus 53%). In tegenstelling tot mijn hypothese werden voor de prevalentie geen significante verschillen gevonden tussen Nederlandse deelnemers en die uit de vier grootste migrantengroepen in Nederland. Een relatief groot aantal deelnemers rapporteerde te hallucineren in drie of vier sensorische modaliteiten. Binnen deze groep was de frequentie van auditieve en visuele hallucinaties hoog. Mede op basis daarvan formuleerde ik de hypothese dat het mogelijke onderliggende mechanisme bij het ontstaan van multimodale hallucinaties een stochastisch proces behelst. Daarbij verhogen hallucinaties in deze twee sensorische modaliteiten de kans op aanvullende hallucinaties in andere sensorische

modaliteiten. In hetzelfde hoofdstuk heb ik een klinische classificatie opgesteld voor typen multimodale hallucinaties, gebaseerd op hun seriële of simultane presentie en de mate van congruentie of incongruentie.

Hoofdstuk 4 biedt data over een groep van 47 patiënten op een polikliniek voor transculturele psychiatrie die hun psychiatrische symptomen (niet alleen hallucinaties) toeschreef aan het boze oog, voodoo en/of djinns. De psychiatrische symptomen waren divers, variërend van angst en obsessieve-compulsieve symptomen tot flashbacks van traumatische gebeurtenissen, somatische symptomen en hallucinaties. De meerderheid van de deelnemers was gediagnosticeerd met een angststoornis, een stemmingsstoornis of PTSS. Wat betreft de hallucinaties waren de meest voorkomende gerapporteerde sensorische modaliteiten de auditieve, visuele en tactiele. Een relatief groot aantal deelnemers aan de studie (58%) viel uit vanwege angst voor de gevolgen wanneer ze openlijk zouden spreken over djinns.

In *hoofdstuk 5* presenteerde ik de resultaten van een studie over psychotische islamitische patiënten die hallucinaties ervoeren die zij toeschreven aan djinns. Deze patiënten waren op het moment van interviewen ernstig ziek en om die reden opgenomen in een psychiatrische instelling. In dit hoofdstuk ligt de nadruk op de tactiele en somatische componenten van deze hallucinaties, omdat informatie over deze hallucinaties zeer schaars is. De meerderheid van de deelnemers ervoer multimodale hallucinaties (96%). Ik beschreef de fenomenologie van deze hallucinaties en de relatie met hallucinaties in andere sensorische modaliteiten. Alle tactiele en somatische hallucinaties die werden gerapporteerd waren congruent, wat betekent dat de hallucinaties die in verschillende sensorische modaliteiten werden ervaren een coherent geheel vormden, vaak in die mate dat zij door de geïnterviewde patiënten werden ervaren als een levend wezen (een entiteit). Die ervaring was erg beangstigend en had een substantiële uitwerking op het dagelijkse leven van patiënten. De combinatie met auditieve en visuele hallucinaties die werd gevonden bij de meerderheid van de deelnemers verschafte een voorlopige empirische bevestiging voor het stochastische proces dat ik in *hoofdstuk 3* voorstelde als onderliggend mechanisme.

Hoofdstuk 6 tenslotte, biedt een meer gedetailleerde inkijk in de fenomenologie van multimodale hallucinaties die worden ervaren als entiteiten. In dat hoofdstuk stel ik ook een aantal verklaringsmodellen voor voor dit type hallucinatie, variërend van biologische tot persoonlijke, sociale en cultureel-religieuze.

Algemene discussie

In de algemene discussie van dit proefschrift bied ik een aantal handvaten voor hulpverleners en onderzoekers die te maken krijgen met multimodale hallucinaties die worden toegeschreven aan djinns. Hier ligt een dubbele uitdaging, namelijk om zowel aandacht te hebben voor het transculturele aspect van de beleving als voor het multimodale karakter van de hallucinaties.

Het onderzoek naar multimodale hallucinaties staat anno 2024 in feite nog in de kinderschoenen. Hoewel aan het eind van de 19de eeuw al empirisch onderzoek werd verricht naar dit type hallucinaties werd dit pas aan het eind de 20ste eeuw verder opgepakt. In de algemene discussie laat ik ook verschillende hypothesen de revue passeren die een mogelijke verklaring bieden voor de mecha- nismen die ten grondslag liggen aan (multimodale) hallucinaties. Vooral de laatste hypothese (predictive coding) sluit aan bij de gedachte dat multimodale hallucinaties bij islamitische patiënten mogelijk ontstaan op basis van relatief simpele fenomenen (zoals tactiele of visuele hallucinaties) die vervolgens een multimodaal karakter krijgen door de verwachtingen van de patiënt.

De opeenvolgende rekrutering van de auditieve, visuele, tactiele, olfactorische en gustatorische modaliteiten bij multimodale hallucinaties suggereert een onderliggend stochastisch proces (of noisy process) dat start met ofwel een auditieve ofwel een visuele hallucinatoire component, gevolgd door een hallucinatie in een andere sensorische modaliteit (meestal visueel of auditief, dus de andere kant op) en dan mogelijk een tactiele en/of somatische component en uiteindelijk een olfactorische en/of gustatorische component. Terugkijkend suggereerde Störring al in 1900 een dergelijk proces bij multimodale hallucinaties toen hij schreef: “Eén modaliteit zal de aanwezigheid van een van de andere teweegbrengen”.

Beperkingen

Voor zover mij bekend is het huidige proefschrift het eerste dat in zijn geheel gaat over multimodale hallucinaties. Daarnaast richt het zich specifiek op patiënten die deze hallucinaties toeschrijven aan djinns, het boze oog en/of voodoo. Een beperking van dit proefschrift is dat bij een aantal studies relatief kleine aantallen patiënten werden geïncludeerd. Tijdens de inclusiefase merkten wij dat veel moslimpatiënten het moeilijk vonden om open te zijn over hun ervaringen met djinns, uit angst voor repercussies en om gestigmatiseerd te worden. Dit fenomeen deed zich voor bij zowel de klinische als de poliklinische groepen. Het valt dan

ook te betwijfelen of de resultaten van de studies te generaliseren zijn naar andere groepen van moslimpatiënten met een schizofreniespectrumstoornis en naar andere patiënten met deze specifieke symptomen. Een tweede beperking is dat alle studies cross-sectioneel van aard waren, waardoor het ontstaan van multimodale hallucinaties in de tijd niet kon worden nagegaan en de gepresenteerde hypothese over een onderliggend stochastisch proces niet kon worden getoetst.

Aanbevelingen voor de klinische praktijk en toekomstig onderzoek

Op basis van de huidige bevindingen adviseer ik om in de klinische praktijk hallucinaties uit te vragen in alle 14 sensorische moda- liteiten in plaats van alleen de vijf 'hoofdmodaliteiten'. Dit kan helpen om beter inzicht te krijgen in de belevingen van patiënten en een zuiverder differentiaaldiagnose op te stellen. In wetenschappelijk opzicht komt dit ook onze kennis van de etiologie en pathofysiologie van (multimodale) hallucinaties ten goede, met als uiteindelijk doel een verbetering van onze behandelstrategieën.

Om de invloed van stochastische processen empirisch te toetsen beveel ik prospectief onderzoek aan. Indien dergelijke noisy processen inderdaad cruciaal zijn bij het ontstaan van multimodale hallucinaties, dan kunnen vroege interventies met antipsychotica, gericht op auditieve of visuele hallucinaties, mogelijk de rekrutering van opeenvolgende sensorische modaliteiten voorkomen en daarmee het risico op het ontstaan van multimodale hallucinaties verminderen.

Wat betreft niet-farmacologische therapieën voor hallucinaties (zoals cognitieve gedragstherapie en psycho-educatie) zijn momenteel de meeste gericht op unimodale hallucinaties, vooral in de auditieve en visuele modaliteiten. Omdat systematisch onderzoek bij multimodale hallucinaties nog maar net is gestart en de klinische lijdensdruk bij patiënten die deze ervaren over het algemeen hoog is, verdient een verdere verkenning van deze behandelopties onze volle aandacht en inzet.


09

Ringkasan dalam Bahasa Indonesia

Vertaald uit het Nederlands door E. Lim

Dalam disertasi ini saya mengeksplorasi fenomenologi halusinasi multimodal dalam konteks psikosis, dengan fokus khusus mengenai atribusi halusinasi dalam bentuk jin, voodoo, dan mata jahat [pandangan yang menyeramkan/mengerikan] pada kelompok pasien Muslim. Disertasi ini memberikan ringkasan riset utama saya dan rekomendasi untuk praktik klinis saat ini dan penelitian masa depan.

Hasil Penyelidikan Utama

Bab 1 memberikan pengenalan topik kajian. *Bab 2* adalah tinjauan literatur medis dengan tema hubungan halusinasi pada kelompok pasien Muslim dengan jin, voodoo, dan „mata jahat“ [tatapan mata menyeramkan/tatapan mengerikan]. Dalam 105 artikel biomedis yang saya selidiki, saya menemukan 47 studi kasus. Saya menganalisa karakteristik fenomenologi halusinasi dan gejala emosi lain yang dilaporkan, mulai dari emosi kecemasan dan kesedihan hingga keluhan neurologis. Karena halusinasi multimodal secara sepintas lebih jarang dilaporkan pada populasi pasien dinegara Barat, maka berdasarkan analisis ini saya menduga semula bahwa pasien Muslim mungkin mengalaminya lebih awal dan lebih sering. Berdasarkan ekspektasi ini, saya melakukan empat studi empiris untuk menyelidiki lebih lanjut mengenai halusinasi tersebut.

Untuk mengetahui apakah halusinasi multimodal memang lebih banyak dialami oleh pasien psikotik Muslim dan non-Barat lainnya, saya menganalisa pelbagai data dari studi Dutch GROUP (Risiko Genetik dan Hasil Psikosis). *Bab 3* menunjukkan bahwa data yang ditemukan justru berlawanan dengan dugaan semula bahwa halusinasi multimodal jarang dilaporkan pada para pasien di negara Barat. Secara total, studi GROUP menyediakan data lebih dari 1.000 pasien yang di diagnose dalam gangguan spektrum skizofrenia. Dalam kelompok ini saya menemukan 750 pasien dengan data lengkap prevalensi seumur hidup sebesar 80% untuk halusinasi. Selain itu, dibandingkan dengan halusinasi unimodal, prevalensi halusinasi multimodal seumur hidup hampir dua kali lebih tinggi (27% berbanding 53%). Bertentangan dengan hipotesis saya, ternyata tidak ditemukan perbedaan signifikan dalam prevalensi antara peserta asal Belanda dan peserta dari empat kelompok migran terbesar di Belanda Sejumlah besar peserta melaporkan mengalami halusinasi dalam tiga atau empat modalitas sensorik. Pada kelompok ini, frekuensi halusinasi pendengaran dan halusinasi visual cukup tinggi. Dengan berdasarkan hal ini, saya merumuskan hipotesis berikutnya, bahwa kemungkinan

mekanisme yang mendasari perkembangan halusinasi multimodal berhubungan dengan proses stokastik. Selain itu, adanya halusinasi pada kedua modalitas sensorik ini meningkatkan kemungkinan halusinasi tambahan pada modalitas sensorik lainnya. Dalam bab yang sama, saya menetapkan klasifikasi klinis untuk jenis halusinasi multimodal, berdasarkan kehadirannya secara serial atau simultan dan tingkat kesesuaian atau ketidaksesuaian.

Bab 4 memberikan data tentang sekelompok 47 pasien di klinik rawat jalan psikiatri transkultural yang menghubungkan gejala kejiwaan mereka (tidak hanya halusinasi) dengan "mata jahat" [tatapan mata mengerikan/tatapan mata], voodoo dan/atau jin. Gejala kejiwaan beragam, mulai dari kecemasan dan gejala obsesif-kompulsif hingga kilas balik peristiwa traumatis, gejala somatik, dan halusinasi. Mayoritas peserta sebelumnya telah di-diagnosis menderita gangguan kecemasan, gangguan mood/keresahan batin atau bahkan PTSD. Mengenai halusinasi, modalitas sensorik yang paling umum dilaporkan adalah pendengaran, visual dan sentuhan. Ternyata jumlah peserta pasien yang keluar selama penelitian cukup besar (58%) dengan alasan khawatir akan konsekuensinya jika berbicara terbuka tentang jin.

Bab 5 didalam bab ini saya mengemukakan hasil penelitian terhadap pasien Muslim psikotik yang mengalami halusinasi yang dikaitkan dengan jin. Kelompok pasien ini mengalami sakit parah pada saat wawancara dan oleh karena itu dirawat di rumah sakit jiwa. Dalam bab ini ditekankan komponen taktil dan somatik dari halusinasi ini, karena informasi tentang halusinasi ini sangat langka. Mayoritas pasien peserta mengalami halusinasi multimodal (96%). Saya menjelaskan fenomenologi halusinasi ini dan hubungannya dengan halusinasi dalam modalitas sensorik lainnya. Semua halusinasi taktil dan somatik yang dilaporkan ada- lah kongruen, ini berarti bahwa halusinasi yang dialami dalam modalitas sensorik berbeda-beda membentuk keseluruhan yang koheren, dan sering kali dialami oleh pasien yang diwawancara sebagai „makhluk hidup" (suatu entitas). Pengalaman itu sangat menakutkan dan berdampak besar pada kehidupan sehari-hari pasien. Kombinasi halusinasi pendengaran dan visual yang ditemukan pada sebagian besar peserta memberikan konfirmasi empiris awal untuk proses stokastik yang saya usulkan sebagai mekanisme yang mendasarinya di *Bab 3*.

Bab 6 sebagai bab terakhir memberikan wawasan lebih terperinci mengenai fenomenologi halusinasi multimodal yang di-alami sebagai entitas. Dalam bab tersebut saya juga mengusulkan sejumlah model penjelasan untuk halusinasi jenis ini, mulai dari biologis hingga personal, sosial, dan budaya-agama.

Diskusi Umum

Dalam pembahasan umum disertasi ini, saya mengusulkan sejumlah alat/sarana dalam pemberian layanan dan penelitian terhadap halusinasi multimodal yang dikaitkan dengan jin. Perlu dikemukakan bahwa adanya tantangan ganda dalam hal ini, yaitu harus diperhatikan dua hal: aspek transkultural dari pengalaman dan karakter multimodal halusinasi.

Pada tahun 2024, penelitian tentang halusinasi multimodal sebenarnya masih dalam tahap awal. Meskipun penelitian empiris terhadap halusinasi jenis ini telah dilakukan pada akhir abad ke-19, penelitian tersebut baru dilanjutkan di akhir abad ke-20. Dalam diskusi umum saya juga mengulas berbagai hipotesis yang menawarkan kemungkinan penjelasan mekanisme yang mendasari halusinasi (multimodal). Hipotesis terakhir (pemberian kode prediktif) khususnya sejalan dengan gagasan bahwa halusinasi multimodal pada pasien Muslim mungkin akan muncul berdasarkan fenomena yang relatif sederhana (seperti halusinasi sentuhan atau visual) yang kemudian memperoleh karakter multimodal karena ekspektasi pasien.

Perekrutan modalitas pendengaran, visual, sentuhan (taktil - penciuman, dan pengecapan [penangkapan rasa] secara berurutan dalam halusinasi multimodal yang menunjukkan proses stokastik dapat diawali misalnya dengan iritasi kebisingan, dilanjutkan dengan komponen halusinasi pendengaran atau visual, dan terakhir dengan halusinasi dalam modalitas sensorik yang berbeda-beda (dimulai dengan visual atau akustik, lalu berubah ke arah lain) , dapat pula mungkin dimulai komponen sentuhan dan/atau somatik dan akhirnya beralih menjadi komponen penciuman dan/atau pengecapan. Retrospektif ternyata Störring telah meneliti proses halusinasi multimodal serupa sejak tahun 1900, yang ditulisnya dalam kalimat : “Satu modalitas akan [dapat] menimbulkan kehadiran salah satu modalitas lainnya.”

Batas penetrapan hasil penyelidikan dan kesimpulan hipotese ini

Sejauh pengetahuan saya, disertasi ini adalah penyelidikan pertama yang membahas sepenuhnya halusinasi multimodal. Selain itu, penelitian ini secara khusus menitik beratkan para pasien yang mengaitkan halusinasi ini dengan jin, “mata jahat” (pandangan menyeramkan/pandangan mengerikan) dan/atau voodoo. Keterbatasan pertama dari penelitian yang menjadi dasar tesis ini adalah jumlah pasien yang diteliti relatif kecil. Selama fase inklusi, kami memperhatikan bahwa banyak pasien Muslim merasa sulit untuk berbicara secara terbuka tentang pengalaman

mereka dengan jin, karena khawatir akan dampak buruk dan/atau stigma. Fenomena ini terjadi baik pada kelompok pasien rawat inap maupun rawat jalan. Oleh karena itu diragukan apakah hasil penelitian ini dapat digeneralisasikan atau ditrapkan pada kelompok pasien Muslim lain yang menderita gangguan spektrum skizofrenia dan juga pada pasien lain dengan gejala spesifik tersebut. Keterbatasan kedua adalah bahwa semua penelitian bersifat cross-sectional, yang artinya bahwa perkembangan halusinasi multimodal dari waktu ke waktu tidak dapat diperiksa, terulang atau dibuktikan, dan hipotesis yang dikemukakan mengenai proses stokastik yang mendasarinya tidak dapat diuji.

Rekomendasi untuk praktek klinis dan penelitian masa depan

Berdasarkan hasil penyelidikan saat ini, saya merekomendasikan bahwa dalam praktik klinis, halusinasi harus diperiksa pada seluruh 14 modalitas sensorik, bukan hanya pada lima 'modalitas utama'. Ini dapat membantu anda untuk pemahaman lebih baik tentang pengalaman pasien dan untuk menyusun diagnosis perbandingan yang lebih jelas. Dari sudut pandang ilmiah, hal ini juga bermanfaat bagi pengetahuan kita tentang etiologi dan patofisiologi halusinasi (multimodal), dengan tujuan akhir: memperbaiki strategi pengobatan kita.

Untuk menguji secara empiris pengaruh proses stokastik, saya usulkan/rekomendasikan penelitian prospektif. Jika proses bising memang penting dalam munculnya („trigger") halusinasi multimodal, maka intervensi dini dengan antipsikotik, yang menargetkan halusinasi pendengaran atau visual, dapat dipakai untuk mencegah perekrutan modalitas sensorik berikutnya dan dengan demikian mengurangi risiko perkembangan parahnya halusinasi multimodal.

Terapi non-farmakologis untuk halusinasi pada saat ini (seperti terapi perilaku kognitif dan psikoedukasi), sebagian besar mentargetkan halusinasi unimodal, terutama pada modalitas pendengaran dan visual. Karena penelitian sistematis terhadap halusinasi multimodal masih dalam tahap dini (permulaan) dan beban penderitaan klinis pada pasien yang mengalami pada umumnya cukup tinggi, maka penyelidikan lebih lanjut terhadap pilihan pengobatan ini memerlukan perhatian dan merupakan daya upaya penuh kami dimasa depan.


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Addendum

Supplementary material

Table 1-3, part of Chapter 2
Hallucination Attribution List, part of Chapter 5

Author	Gender	Age (years)	Symptoms	Explanation patient	Explanation family	Explanation healer	Explanation doctor	Intervention	Method	Result	Follow-up
Al-Krenawi (1997)	M	31	hallucinations (verbal/visual, dressed in white) disorientation	jinn	jinn	unknown	schizophrenia	1) medical 2) "psychothe-rapy" and exorcism	1) Halo-periodol 30 mg/d	1) partial response	FU 3 months
Al-Sinawi (2008)	M	48	withdrawal signs, Koro like complaints	unknown	jinn	jinn	delirium tremens	medical	olanzapine 10mg/d thiamine sidinafil	response	first response, relapse in alcohol abuse
Beiser (1973)	M	15	somatic; epileptic seizures	unknown	jinn	jinn	not mentioned, seems to be epilepsy	Islamic/ traditional	sacrifice to Pangols	no response	unknown
Bose (1997)	F	not clear	delusion catatonia	unknown	other	jinn	hypomania	Islamic/ traditional	Talisman, oil, Qur'an texts reading	response	partial recovery
	M	15	hallucination, anxiety	other	jinn	jinn	rapid cycling psychosis	1) Islamic/ traditional 2) Medical	1) oil, reading Qur'an, texts, talisman 2) phenothia-zines	1) no response 2) response	partial recovery
Blom et al. (2010)	M	30	hallucination anxiety	jinn	unknown	jinn	OCD	Islamic/ traditional	Qur'an texts, sleeping at graveyard, thrown in well	no response	loss to follow up
	M	25	hallucination delusion other	jinn	unknown	medical	schizophrenia	medical	classic antipsychotics clozapine	response	rehabilitation/ full recovery
	F	26	hallucination (verbal/tac-tile), suicide attempts, anxiety	jinn	unknown	jinn	schizoaffec-tive disorder	medical	classic and atypical antipsychotics lithium	response	deterioration
Blom & Hoffer (2012)	M	45	hallucination	jinn	unknown	jinn	DD: borderline personality disorder, temporal epilepsy	Islamic/ traditional	praying, texts, antidepres-sants	no response	unknown

Author	Gender	Age (years)	Symptoms	Explanation patient	Explanation family	Explanation healer	Explanation doctor	Intervention	Method	Result	Follow-up
Boubeci (1985)	F	49	aggression	jinn	unknown	unknown	psychosis/ depression??	medical	neuroleptics	no response	unknown
Broch (2001)	M	30	aggression delusion	jinn	jinn	jinn	description: trauma capitis after fit	Medical, Islamic/ traditional	medication, herb teas, siram, offerings hen	after sacrifice: less symptoms	after 1,5 y less symptoms
Colaço Belmonte (1976)	F	26	hallucination catatonia anxiety	unknown	jinn	unknown	psychotic relapse	medical	neuroleptics: perfenazine 3dd 4 to 8 mg, orfenadrine 3 dd 50 mg	response	after 6 weeks discharge without medication
Dein (2008)	F	56	somatic	jinn	other	jinn	not mentioned	Islamic/ traditional	recitation Sura, blow over her	response	rehabilitation/ full recovery
	F	40	acoustic-hallucination, sleeplessness	unknown	jinn	jinn	not mentioned	Islamic/ traditional	recitation Sura, praying over water	response	unknown
	M	21	mutism, catatonia, automuti-lation	medical	jinn	jinn	mood disorder (depression)	Islamic/ traditional	1) prayers, exorcism 2) medical	1) no response 2) unknown	unknown
Diop (1965)	M	54	hallucinations catatonia (bizarre gestures and sounds)	jinn	unknown	unknown	DD: epilepsy, catatonia, personality disorder	Medication	Tranquillizers, Chloor-promazine 300 mg/d, Haloperidol 45 drops/d	response	unknown
Good (1994)	M	26	anxiety epilepsy	jinn	unknown	jinn	epilepsy	medical	antiepileptics	response	unknown
Guenedi (2009)	M	22	change in personality, acoustic hallucinations	jinn	jinn	unknown	DD:schi-zophrenia or specific functional changes in temporal lobe after traumatic brain injury	1) traditional 2) medical	1) healing, Umra 2) ECT, rispe-ridone 2mg/d, lamotrigine 50 mg 2dd1	no response no response	slow recovery

Author	Gender	Age (years)	Symptoms	Explanation patient	Explanation family	Explanation healer	Explanation doctor	Intervention	Method	Result	Follow-up
Khalifa (2005)	F	25	mutism, stopped eating (catatonia)	unknown	medical	unknown	mood disorder	1) medical 2) Islamic/ traditional	1) ECT 2) dhikr and ruqyah	1) no response 2) response	2) rehabilitation/full recovery
	F	35	somatic	jinn	jinn	unknown	cerebral malaria	1) traditional 2) medical	1) traditional 2) antibiotics	1) no response 2) response	2 rehabilitation/full recovery
Leavey (2007)	M	25	social anxiety?	jinn	unknown	jinn	not mentioned	traditional	amulet, drinking healing waters	unknown	unknown
	M	not mentioned	visual/ acoustichallucination somatic	jinn	unknown	unknown	not mentioned	medical	unknown which medication	no response	admission to hospital
Mölsä (2010)	M	not mentioned	hallucination	jinn	jinn	jinn	not mentioned	Islamic/ traditional	Qur'an readings sacrificing animal, soaking pt in blood	response	unknown
Nelson (1977)	F	55	hallucination somatic	jinn	unknown	jinn	not mentioned	Islamic/ traditional	Zar	response	unknown
	F	19	other	unknown		spirit	not mentioned	Islamic/ traditional	Zar	unknown	unknown
	M	41	aggression somatic	jinn	unknown	jinn	unknown	Islamic/ traditional	Zar	response	unknown
Parveen (2001)	M	28	aggression	witchcraft	unknown	churail	schizophrenia	Islamic/ traditional	amulet	unknown	unknown.
Quresi (2001)	F	35	delusion	jinn	unknown	unknown	psychosis/ hallucination/ delusion	medical	trifluoperazine 30mg/d, benztropinemesylate 2 mg/d and fluphenazine 50 mg i.m./ mo	response	unknown

Author	Gender	Age (years)	Symptoms	Explanation patient	Explanation family	Explanation healer	Explanation doctor	Intervention	Method	Result	Follow-up
	F	43	delusion	jinn	unknown	unknown	psychosis/ hallucination/ delusion	medical	antipsycho-tics, brief psychothe-rapy	response	unknown
	F	35	delusion	jinn	unknown	unknown	mood disorder	medical	lithium	response	delusion gone in three weeks
	F	29	delusion	jinn	unknown	unknown	psychosis/ hallucination/ delusion	medical	antipsychotics and benzodia-zepines	no response	still delusional
Salvatore (2008)	F	30	1) feeling replaced by a dead woman, parents were imposters, possessed by a jinn, mood swings, able to predict automutila-tion, strange gestures with arms 2) anxiety, confusion, unsure of identity, odd arm gestures, incoherent 3)verbal/vi-sual/olfactory hallucinations	jinn	jinn	unknown	cycloid psychosis or misidentifica-tion syndrome (Capgras)	1) exorcism 2) medical 3) medical	1) lorazepam 2) risperidon 3 mg/d 3) antidepres-sant, sedative	1) no response 2) response 3) response	1) for 6 months continued symptoms 2) for two years in remission 3) after several months still symptoms, olanzapine 2,5 mg/d for a week full resolution of symptoms
Severien (1995)	M	36	imperative and visual hallucinations	jinn	unknown	unknown	DD: psychosis or depression	medical	Haloperidol 3x5mg, levomepro-mazine 25 mg	response	unknown
	M	29	imperative and visual hallucination	jinn	unknown	jinn	DD: anxiety disorder or depression	1) Islamic/ traditional 2) medical	1)amulet 2) Tryptizol, Dalmadorm	1) no response 2) does not take it	1) no response 2) rehabilitation/ full recovery without meds

Author	Gender	Age (years)	Symptoms	Explanation patient	Explanation family	Explanation healer	Explanation doctor	Intervention	Method	Result	Follow-up
Stein (2000)	M	young	delusion aggression	unknown	jinn	jinn	psychosis	1) traditional 2)medical	1) fumigation 2) Haldol	unknown	unknown
	M	young	hallucination	unknown	unknown	jinn	delirium tremens	1) traditional 2) medical	1) emetic 2) not described	not mentioned	not mentioned
	M	young	anxiety	jinn	jinn	jinn	obsessive compulsive disorder	1) traditional 2) medical	1) reading Qu'ran 2) clomipra-mine	unknown	unknown
Streit (1998)	F	46	muteness, in-somnia, poor concentration	magic			depression	1) traditional 2) medical	1) 2) paroxetine 20 mg-> 10mg+psy-chotherapy		
Spensieri (2010)	M	34	other	jinn	unknown	unknown	alcohol abuse	no treatment	not applicable	not applicable	not applicable
Wintrob (1965)	F	middle aged	sleeplessness	bewitched	unknown	unknown	melancholia	no treatment described	not applicable	not applicable	not applicable
	M	young (army)	aggression, sleeplessness, not eating, eating dirt, drink own urine, incoherent	Mammy Water	unknown	unknown	psychosis	traditional	not mentioned	response	not mentioned
Wintrob (1966)	M	26	delusion aggression	jinn	unknown	unknown	psychosis/ hallucination/ delusion	medical	phenothiazine artane	response	unknown
Younis (2000)	F	23	aggression	jinn	jinn	jinn/ possession	bipolar disorder	1) Islamic/ traditional 2) medical	1) exorcism 2) Haloperidol	response	rehabilitation/ full recovery
Zouari (2010)	F	55	hallucination	jinn	unknown	unknown	depression with psychotic features	medical	unknown	no response	unknown
	F	26	acoustic, tac-tile (genital) hallucinations	jinn	unknown	unknown	depression with psychotic features	unknown	unknown		

DD: differential diagnosis
OCD: obsessive compulsive disorder

Table 2 Psychiatric diagnoses in 30 cases of psychiatric symptoms attributed to jinns

Diagnosis	*n*=
Schizophrenia	3
Psychosis (including one case with a Capgras-like misidentification syndrome)	11
Schizoaffective disorder	1
Mood disorder	8
Obsessive-compulsive disorder	2
Anxiety disorder	1
Alcohol abuse	1
Epilepsy	2
Delirium tremens	2
Delirium tremens	1

Table 3 Differential diagnoses in five cases of 30 cases mentioned

Article	Differential Diagnosis
Blom (2012)	Borderline personality syndrome, temporal epilepsy
Diop (1965)	Epilepsy, catatonia, personality disorder
Guenedi (2009)	Schizophrenia, traumatic brain injury
Severien (1995)	Reactive psychosis (first admission), depressie mood (second admission)
Severien (1995)	Anxiety disorder NAS, depressive disorder, lariah

Lariah: A Moroccan form of superstition, for the traditional Moroccan people part of every day life. To be compared with a black cat in western cultures as a sign of bad luck.

Hallucination Attribution List (HAL)

Translated from Dutch by Prof.dr. J.D. Blom, MD,
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Instructions for use

The HAL aids to chart the phenomenological characteristics of hallucinations that are attributed to jinn (djinns, jnun). It is a semi-structured questionnaire, meaning that the order in which the various questions are asked is not essential. What is important though, is that all questions be answered. When for a given question more than one answer is applicable, all of them need to be scored.

Attention! This is a non-validated questionnaire developed for purely scientific purposes. It is not a diagnostic tool.

Date of interview:
Name of interviewer:
Patient number:

SECTION 1: HALLUCINATIONS GENERAL

Presence or absence of hallucinations, lifetime

1.0 Did you ever in your life perceive things that others could not perceive? For example, did you ever hear voices or have visions?
O Yes
O No -> *Stop interview*

Level of consciousness

1.1 Did that ever happen while you were awake? Or was it always when you were asleep? Or during a transitional phase between sleep and wakefulness?
O While I was awake -> *go to question 1.1.1*
O Always during a transitional phase between sleep and wakefulness -> *go to question 1.1.2*
O Always while asleep -> *Stop interview*
O Unknown

Sensorium

1.1.1 Were you wide awake?
O Yes
O No, during such moments I was always sleepy/drowsy
O Unknown

Influence of substance use

1.2 Did you ever experience this without being under the influence of mind-altering substances such as alcohol, medicines or illicit substances?
O Yes
O No, I was under the influence of.....
O Unknown

Open question, description of hallucinations

1.3 Would you mind telling me what you perceived?
.....
.....
.....

SECTION 2: RELIGIOSITY

Religious denomination, passive

2.1 Are you a Muslim?
O Yes
O No

Religious denomination, active

2.1.1 Are you a practising Muslim?

O Yes

O No

Reading the Quran

2.1.2 How often do you read the Qur'an?

O Every day

O At least once a week

O At least once per month

O At least once per year

O Rarely or never

Visiting the mosque

2.1.3 How often do you visit the mosque?

O Every day

O At least once a week

O At least once per month

O At least once per year

O Rarely or never

Evil eye, belief of others

2.2 Do you know anyone who believes in the evil eye?

O Yes, namely.....

O No

Evil eye, own belief

2.2.1 Do you yourself believe in the evil eye?

O Yes

O No

Evil eye, own experience

2.2.2 Did you ever experience anything in which the evil eye played a role?

O Yes, namely.....

O No

O I don't know

Magic, belief of others

2.3 Do you know anyone who believes in magic?

O Yes, namely.....

O No

Magic, own belief

2.3.1 Do you yourself believe in magic?

O Yes.....

O No

O I don't know

Magic, own experience

2.3.2 Did you ever experience anything in which magic played a role?

O Yes, namely.....

O No

O I don't know

Jinn, belief of others

2.4 Do you know anyone who believes in jinn?

O Yes, namely.....

O No

Jinn, own belief

2.4.1 Do you yourself believe in jinn?

O Yes

O No

O I don't know

Jinn, own experience

2.4.2 Did you ever experience anything in which jinn played a role?

O Yes, namely.....

O No

O I don't know

SECTION 3: ATTRIBUTION

Attribution

3.1 Could it be that the visions/voices/experiences described by you before were caused by a jinn?

O Yes, it is possible

O No, that is impossible

O I don't know

O That is something I do not want to talk about -> *stop interview*

O That is something I am not allowed to talk about (because.....) -> *stop interview*

Conviction

3.2 How sure are you that a jinn was at play?

O I am 100% certain that it was a jinn

O I think that it was a jinn, but I am not sure

O I am 100% certain that it was not a jinn

O I have no idea

Conviction, on Likert scale

3.2.1 Could you indicate on the scale below how certain you are that one or more jinn were involved?
0% (not)----------100% (certain)

Alternative explanations

3.3 If your perceptual experiences were not caused by a jinn, what else could have been their cause?
O Allah
O God
O An angel (or angels)
O Iblis/Shaitan
O A spirit (or spirits) of deceased people, namely .....
O A living person, namely.....
O An animal (or animals), namely.....
O A device, namely.....
O My own brain or mind (due to illness or medicine use, for example)
O Magic
O The evil eye
O Something else, namely.....

Open question, working mechanism of hallucinations

3.4 Can you explain in which way your visions/voices/experiences were caused by this?.....

SECTION 4: PHENOMENOLOGICAL CHARACTERISTICS

Involvement with jinn

4.1 Were you ever involved with jinn?
O Yes
O No -> *stop interview*
O I don't know -> *stop interview*

Involvement with jinn, number

4.1.1 With how many jinn were you involved?
O One
O Several, namely.....
O Several, but I have no idea how many

Classification of jinn

4.1.2 Were you involved with a

O Female jinn?
O Male jinn?
O Young jinn?
O Old jinn?
O Turkish jinn?
O Moroccan jinn?
O Jewish djinn?
O European jinn?
O Different, namely.....

Visual hallucinations

4.2 Did you see the jinn with which you were involved?

O Yes
O No -> *go to question 4.3*

Jinn, visual aspects

4.2.1 What was the colour of the jinn you saw?

O No colour (including grey or black-and-white)
O Monochromatic, namely.....
O Polychromatic, namely.....
O Extremely bright or lively colours
O As if beaming and emanating a bright light
O Vague colours, as if bleached
O Vague colours, as if transparent
O Extremely dark or sombre colours
O Different, namely.....

Jinn, size

4.2.2 How large was/were the jinn you saw?

O The size of an adult
O The size of a child
O Very small, namely.....
O Very large, namely.....
O Different, namely.....
O I don't know, because.....

Outward projection

4.2.3 Did you see the jinn outside yourself, the way you see me, for example?

O Yes
O No, I saw the jinn 'in my mind'
O Different, namely.....
O I don't know, because.....

Blending into background

4.2.3.1 Did you see the jinn occupying a natural place in your environment?
O Yes, the jinn stood/sat/lay on the ground/on a chair etc.
O No, the jinn appeared to float
O Different, namely.....
O I don't know, because.....

Background

4.2.3.2 Did you see the jinn against the background of your own surroundings?
O Yes
O No, the background was different from the place I was at (namely.....)
O Different, namely.....
O I don't know, because.....

Extracampine hallucinations

4.2.4 Did you see the jinn within the normal boundaries of your field of vision, or outside of it?
O Within the normal boundaries of my field of vision
O Outside my field of vision, namely above/below/next to me
O I saw the jinn with the back of my head
O I saw the jinn with a different body part, namely.....
O Different, namely.....
O I don't know, because.....

Movement

4.2.5 Did the jinn show any movement?
O Yes, the jinn moved
O No, there was no movement
O I don't know, because.....

Likeness

4.2.6 Did the jinn look like a familiar person, animal or character?
O Yes, it looked like an actual human being, namely.....
O Yes, it looked like an animal, namely.....
O Yes, it looked like a familiar figure from an image/photograph/film, namely.....
O Yes, it looked like myself
O Different, namely.....
O No
O I don't know, because.....

Auditory hallucinations

4.3 Were you able to hear the jinn?
- O Yes
- O No -> *go to question 4.4*
- O I don't know, because.....

Jinn, auditory aspect, localisation

4.3.1 Did you hear the jinn inside or outside your head?
- O Outside my head
- O Inside my head
- O I don't know, because.....

Verbal auditory hallucinations

4.3.2 Did the jinn speak?
- O Yes
- O No -> *go to question 4.3.6*
- O I don't know, because.....

Verbal auditory hallucinations, phenomenological aspects

4.3.2.1 What type of voice did the jinn have?
- O A familiar male voice, namely.....
- O An unfamiliar male voice
- O A familiar female voice, namely.....
- O An unfamiliar female voice
- O A different type of voice, namely (a child's voice, an animal voice, a mechanical voice, etc.).....
- O My own voice
- O I don't know, because.....

Verbal auditory hallucinations, interaction

4.3.2.2 Were there any voices conversing with each other or talking simultaneously?
- O Yes, namely.....
- O No
- O I don't know, because.....

Intelligibility

4.3.2.3 Could you properly hear what the jinn were saying?
- O Yes -> *go to question 4.3.3*
- O No

Reasons for unintelligibility

4.3.2.3.1 Why were you unable to properly hear what the jinn were saying?
- O The voice was too soft
- O The voice sounded as if from far away
- O Voices were speaking simultaneously

O They spoke a language I do not understand, namely.....
O There were too many other sounds, namely.....
O Different, namely.....

Content, open question

4.3.3. Would you mind telling me what they said?.....
.....
.....
.....

Content, origin

4.3.3.1 What did this content make you think of?
O They were things I had *never* heard before
O Things that are in the Qur'an or which I heard in the mosque
O Things that other people, outside the mosque, once said to me
O Things that I heard in a film or on the radio
O Things that I myself once said
O Different, namely.....

Content, repetitive nature

4.3.4 Were there any words (or sentences or phrases) that were repeated over and over? (-> *Interviewer gives as an example, "I'll be there, I'll be there, I'll be there"*)
O Yes, sometimes it is like listening to a broken record
O No
O Different, namely.....

Relation with the interviewee

4.3.5 Do the voices interfere with you?
O Yes, they provide me with useful information
O Yes they provide critical comments
O Yes, they give commands
O No
O Different, namely.....

Musical aspect

4.3.6 Do you ever hear any music while being in contact with a jinn?
O Yes, with vocals
O Yes, instrumental
O No

Nonverbal auditory hallucinations

4.3.7 Do you ever hear any other sounds while being in contact with a jinn?
O Yes
O No -> *go to question 4.4*

Nonverbal auditory hallucinations, aspect

4.3.7.1 What other sounds do you hear?

O Humming
O White noise
O Crackling
O Squeaking
O Ticking
O Knocking
O The doorbell
O The telephone
O Other electrical devices
O Traffic
O Different, namely……..

Olfactory hallucinations

4.4 Do you ever smell any strange odours while being in contact with a jinn?

O Yes
O No -> *go to question 4.5*

Olfactory hallucinations, aspect

4.4.1 What odours did you smell?

O Gas
O Sulphur
O Feces
O Perfume
O Flowers
O Food, namely……...
O Different, namely……

Gustatory hallucinations

4.5 Do you ever experience a strange taste while being in contact with a jinn?

O Yes
O No -> *go to question 4.6*

Gustatory hallucinations, aspect

4.5.1 What did you taste?

O Garlic
O Other food, namely……...
O Feces
O Different, namely……

Tactile hallucinations

4.6 Were you ever physically touched by a jinn?

O Yes
O No -> *go to Section 5*

Tactile hallucinations, aspect

4.6.1 What did you feel when you were being touched?

O As if I were being pushed
O As if I were hit
O As if I were stabbed
O The wind
O Water
O Electricity
O As if a jinn entered my body
O As if I had sexual contact
O Different, namely.....

Tactile hallucinations, other

4.6.2 Did you ever feel anything else on your skin or inside your body while being in contact with a jinn?

O Yes, namely.....
O No

SECTION 5: HALLUCINATIONS, LIFETIME

Debut of hallucinations

5.0. Can you recall when <u>for the first time in your life</u> you came into contact with a jinn?

O Yes, it was the year ....
O The jinn has/have always been there
O No

Debut of hallucinations, activity

5.1. Can you recall what you were doing at the time?

O I slept
O I was somewhere between waking and sleeping
O I was awake and I was (talking, walking, praying, etc.).....
.....
.....
O I was ill, I suffered from (name of affliction/ description of complaints).....
O I had just taken medication, namely.....
O I had just used alcohol, namely.....
O I had just used an illicit substance, namely.....
O I had been under great mental pressure, namely.....
O I had done something wrong, namely.....
O I was under someone's spell, namely.....
O Different, namely.....
O No

Debut of hallucinations, first reaction

5.2 What was your immediate reaction when you first came into contact with a jinn?

O I don't recall
O I started
O I got afraid
O I was surprised, but not afraid
O I became suspicious
O I tried to act as if nothing were the matter
O I was not surprised, I had been expecting something like this for a long time
O I was happy
O Different, namely.....

Frequency

5.3 How often, on average, are you involved with (a) jinn?

O Just once
O A few times
O Not every day
O Every day
O Several times a day
O Several times per hour
O Continuous, all day long
O Different, namely.....

SECTION 6: FINAL QUESTIONS

Influence on jinn

6.0 Do you have any influence on the jinn?

O Yes, I can (sometimes) make them go away
O Yes, I can (sometimes) make them do something different than what they want
O Yes, I can (sometimes) summon them
O No, they come and go at their own time -> *Go to question 6.2*
O No, they are always there -> *Go to question 6.2*
O Different, namely.....

Influence on jinn, mechanism of action

6.1 In which way do you influence the jinn?

O By praying
O By reading the Qur'an
O By distracting myself, namely.....
O By doing what they tell me to do, namely.....
O By silently subjecting them to my will
O By negotiating with them
O By speaking to them out loud
O By taking medication, namely.....
O By using a different substance, namely.....
O Different, namely.....

Own wish regarding the jinn

6.2 Would you like to be rid of the jinn?
O Yes
O No, because.....
O I don't know

Therapeutic options

6.3 Which of the following methods do you think might help to get rid of a jinn?
O Prayer
O Reading the Qur'an
O Visiting the mosque
O Herbal treatment
O Dissolving Qur'anic texts in water and drinking them
O Pilgrimage
O By restoring a previously made mistake
O Medications (antipsychotics)
O Different, namely.....
O I don't know

Subjective typification of jinn

6.4 Would you mind indicating which of the following statements comply best with the way you experience jinn?
O "Those jinn are real, I am surprised that you don't see or hear them."
O "Those jinn are proof that there is more between Heaven and earth."
O "Whether I will ever be rid of those jinn is in Allah's hands."
O "That I am involved with those jinn is because I have an illness."
O "Those jinn are merely my own thoughts."
O "Those jinn are like dreaming during the day."
O "Those jinn ruined my life."
O "Those jinn enriched my life."
O Different, namely.....

Other

6.5 Are there any other issues, pertaining to the jinn that you experienced, which you would like to mention in the context of the present study?

Acknowledgements

Dit proefschrift schrijven en afmaken heeft even geduurd. Dit dankwoord is voor diegenen die significant hebben bijgedragen aan dit werk. Mijn grootste dank gaat naar alle patiënten die de moed vonden om over hun symptomen en attributies te vertellen. Zonder hen zou dit werk simpelweg niet bestaan.

Prof. dr. Jan Dirk Blom: beste JD, naar verluidt wist jij tijdens onze kennismaking al, dat ik uiteindelijk psychiater zou worden. Mede dankzij jouw continue, onvoorwaardelijke begeleiding en steun tijdens alle fasen van mijn professionele leven de afgelopen jaren, was ik in staat om dit proefschrift tot een goed einde te brengen. Prof. dr. Wijbrand Hoek: beste Wijbrand, je wist mij altijd de juiste kant op te wijzen tijdens mijn opleiding en promotietraject. Hierdoor leerde ik beter kijken en ook strategischer te denken, en heb ik deze skills op meerdere vlakken tijdens mijn werkzaamheden kunnen inzetten.

De beoordelingscommissie ben ik zeer erkentelijk voor het kritisch lezen en beoordelen van mijn proefschrift. Degenen die patiënten hebben geïnterviewd, collega's van i-Psy Utrecht die mij hielpen patiënten te includeren en lastige interviews vertaalden: jullie inspanningen waren cruciaal voor het resultaat dat hier ligt. De medewerkers van de Bibliotheek Parnassia wil ik expliciet danken voor hun meer dan uitstekende service bij het opvragen van obscure en meest recente referenties. Birgitta Vrins, je was onmisbaar in het coördineren tijdens de inclusiefase van het onderzoek, door jou kreeg ik overzicht. Sam Ghane, je gaf mij inspiratie, een open blik op transculturele psychiatrie, en vrolijke collegialiteit. Mathijs Deen, je hebt mij een stukje wijzer gemaakt in de statistiek. Daphne van Hoeken, je hebt me de goede kant op gewezen tijdens het schrijven van de onderzoeksopzet en de aanvraag voor de METC. Judith Offringa, met jouw heldere blik op de laatste fase van het afronden van het proefschrift, heb ik kunnen doorzetten.

Ik dank directe collega's, management en directie van Parnassia Haaglanden, voor de ruimte en het vertrouwen om mij naast mijn werkzaamheden als klinisch psychiater en manager, de eindsprint te laten nemen.

Mijn vrienden en vriendinnen hebben gezorgd voor balans en afleiding door vele koffiemomenten, diners, bezoeken van jazzconcerten en vooral goede gesprekken over wat nu echt telt in het leven.

Tamara, jouw werk is de bron voor de lay-out, waarmee mijn werk meer kleur en diepte kreeg. Dimitri, door jouw inspanningen voor de vormgeving van dit proefschrift, ben ik nog trotser geworden op het eindresultaat.

Tidak dilupakan kepada keluarga saya tercinta yang berada di Jerman, Indonesia, Amerika Serikat dan Kanada: meskipun kalian tidak mungkin datang untuk menghadiri upacara promosi S3 (PhD) saya pada saat ini, tapi saya yakin kita dapat merayakannya secara batin bersama meskipun terpisah oleh jarak amat jauh, dengan mengingat inti sari dari pepatah terkenal dalam Bahasa Indonesia: “jauh dimata namun dekat dihati”. Untuk itu saya ucapkan banyak terima kasih.

Bijzonder veel dank ben ik verschuldigd aan mijn vader, die bereid was om een Indonesische vertaling te schrijven van de samenvatting.

Pap, mam en Cynthia, jullie onvoorwaardelijke liefde en steun geven mij kracht om altijd het beste ervan te maken.

Mijn paranimfen Laura en Anda: Al jaren delen wij lief en leed en ik ben zeer verheugd dat jullie op deze dag naast mij staan.

My dearest Kent, I feel very fortunate, that we sailed into each other’s lives. Since we met, you always helped me to overcome challenges in work and life, with humor and strength of words. With this chapter in my life finally completed, I am looking forward to opening and exploring new, joint ones.

Curriculum Vitae

Anastasia Lim werd geboren in Amsterdam op 14 december 1978 en is getogen in een klein dorp in Gelderland. Als dochter van Indonesisch-Chinese geëmigreerde ouders is zij daarmee opgegroeid en opgevoed te midden van meerdere culturen. Zij studeerde geneeskunde aan de Erasmus Universiteit Rotterdam (1997), waar zij in 2005 haar artsexamen behaalde. Tijdens haar geneeskundestudie verrichte zij onderzoek aan de afdelingen Algemene Heelkunde en Anesthesiologie aan het Erasmus MC en volgde zij een keuze-coschap traumachirurgie van twee maanden in het Alfred Hospital, Melbourne, Australië. Na het behalen van haar artsexamen heeft zij in verschillende ziekenhuizen gewerkt op chirurgische afdelingen, de intensive care en spoedeisende-hulpafdelingen als arts-assistent chirurgie. In 2010 koos zij voor de psychiatrie en startte zij in april 2011 met de opleiding tot psychiater en met dit promotieonderzoek bij de Parnassia Groep te 's-Gravenhage. Na haar opleiding tot psychiater (2015) was zij werkzaam bij het Nederlands Instituut voor Forensische Psychiatrie en Psychologie, ministerie van Justitie en Veiligheid. Zij was binnen de Penitentiaire Inrichting Haaglanden achtereenvolgens werkzaam als psychiater, eerste geneeskundige en tot slot als Directeur Zorg en Behandeling. In 2019 keerde zij terug naar de Parnassia Groep als psychiater op het Klinisch Centrum Acute Psychiatrie, waar zij per oktober 2021 manager zorg werd. Zij is mentor van meerdere artsen in opleiding tot psychiater en sinds oktober 2023 volgt zij de opleiding tot pro justitia-rapporteur. In haar vrije tijd loopt zij hard en combineert zij dit met krachttraining. Zij is reislustig en geniet graag van live jazzconcerten.

List of publications

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Colofon

Printing:
Impressed Print & Sign
Rotterdam

Artwork:
“Deep Water” by Tamara Traxel
www.tamaratraxel.com

Graphic design:
Dimitri Mau-Asam
www.dimardesign.nl