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Internal versus External Auditory Hallucinations in Schizophrenia: Symptom and Course Correlates

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Abstract

Introduction—The auditory hallucinations associated with schizophrenia are phenomenologically diverse. “External” hallucinations classically have been considered to reflect more severe psychopathology than “internal” hallucinations, but empirical support has been equivocal.

Methods—We examined associations of “internal” v. “external” hallucinations with (a) other characteristics of the hallucinations, (b) severity of other symptoms, and (c) course of illness variables, in a sample of 97 stable outpatients with schizophrenia or schizoaffective disorder who experienced auditory hallucinations.

Results—Patients with internal hallucinations did not differ from those with external hallucinations on severity of other symptoms. However, they reported their hallucinations to be more emotionally negative, distressing, and long-lasting, less controllable, and less likely to remit over time. They also were more likely to experience voices commenting, conversing, or commanding. However, they also were more likely to have insight into the self-generated nature of their voices. Patients with internal hallucinations were not older, but had a later age of illness onset.

Conclusions—Differences in characteristics of auditory hallucinations are associated with differences in other characteristics of the disorder, and hence may be relevant to identifying subgroups of patients that are more homogeneous with respect to their underlying disease processes.

Keywords

Auditory hallucinations; hallucinations; schizophrenia

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Schizophrenia is heterogeneous in presentation, and differences among patients in symptom picture may well reflect differences in underlying disease processes. Identification of discriminating symptom characteristics and configurations can contribute to delineating more homogeneous subgroups for study (Bentall, 1993; Costello, 1992; Persons, 1986). The present study examined differences among patients on a dimension of one prominent symptom of schizophrenia, auditory hallucinations.

The auditory hallucinations experienced by people with schizophrenia are phenomenologically diverse. One dimension on which the sounds and voices vary is their perceived location. Although always perceived as if other-generated, they may be heard as coming from some external location or from inside the head. Some patients perceive only “external” hallucinations, others only “internal”, and still others experience both types. Jaspers (1962), among other early theorists (see Denning and Berrios, 1996), viewed internal hallucinations as indicative of less severe pathology than external ones, and this thinking is still reflected in some current conceptualizations of symptom severity (e.g., Haddock et al., 1999). However, our own clinical observations suggest that some of the most disturbing, negative, persistent, involving, and commanding voices are actually those experienced as inside the head. Furthermore, the hallucinatory phenomena considered most specific to schizophrenia, voices commenting and voices conversing, seem to be experienced more often as internal than external.

There have been only a few empirical studies of hallucinations location, and to our knowledge no differences have been identified between internal vs. external hallucinators in other symptoms or levels of overall psychopathology. Auditory hallucinations are a symptom of schizophrenia, but they are also experienced by some people who have no other symptoms of psychosis. Daalman et al. (2011) found no differences between patient vs. nonpatient voice hearers in perceived location, supporting the idea that externality does not indicate greater severity of illness. Stephane et al. (2010) found that schizophrenia patients with only internal hallucinations performed more poorly than those with only external hallucinations on an internal “say/think” source memory task, suggesting that internal hallucinators may be less able to discriminate between internal versus externalized stimuli, a deficit posited to be central to psychosis (Docherty, 2012a; Ferchiou et al., 2010; Johnson, 2006). Nayani and David (1996) found that internal verbal hallucinations consisted of longer word sequences than external ones, which led them to posit that internal voices might be more complex, and hence a more established and incorporated psychotic phenomenon that develops over time with illness progression. The findings from the studies of Stephane et al. and Nayani and David, taken together, suggest that internal hallucinations may actually be products of a more severe or entrenched psychotic process. However, in a study by Copolov et al. (2004) that looked specifically at associates of hallucinations location, internal hallucinations were associated with better insight regarding their origins, i.e., greater awareness that they were self-generated, even though perceived as if other-generated. Beyond that, they found location to be unrelated in either direction to other characteristics of the hallucinations, or to the severity of other symptoms.

Exploratory imaging studies have been done on the topic of location with a small sample of hallucinating patients (Plaze et al., 2011) and with non-psychiatric participants using a simulation technique to create the experience of voices (Hunter et al., 2003). The results of these studies are inconsistent with each other in some regards. Both supported the involvement of temporoparietal language areas in both internal and external hallucinations, but the left planum temporale was also implicated in external hallucinations (only) in one study, and the right temporoparietal junction in the other. It should be noted that although different areas were identified, both areas are involved in normal external sound location.

Only a handful of studies have attempted to address the question of the significance of hallucinations' perceived location. Because patient report suggests significant experiential differences, the topic needs further study. The present study examined the characteristics and associates of internal versus external hallucinations in more detail.

The Present Study

We examined associations between hallucinations location and (a) other characteristics of the hallucinations, (b) severity of other symptoms, and (c) age and duration of illness, in a sample of stable outpatients with schizophrenia or schizoaffective disorder who had experienced auditory hallucinations at some time during the course of their illness. Because the empirical literature on the topic is quite limited, our hypotheses were tentative.

Hypotheses

1. Our primary hypotheses, based mainly on clinical observation, were that patients whose auditory hallucinations were partly or wholly internal would report them to be more negative and distressing than patients whose hallucinations were exclusively external, and that internal hallucinators also would be more likely to report voices commenting, conversing, and commanding.
2. Based on Copolov et al.'s findings, we anticipated that patients whose hallucinations were exclusively internal would have more insight regarding their origins than patients with any external hallucinations.
3. Based on the findings of Copolov et al. and Nayani and David, we expected that patients with internal hallucinations would not differ from those with external hallucinations only on overall severity of positive, negative, general, or total symptoms.
4. Based on Nayani & David's idea that internal hallucinations may be a more fully developed stage of the phenomenon, we tested whether patients with internal hallucinations were older and had a longer duration of illness than those with external hallucinations only.

METHODS

Participants

Participants included 97 adult outpatients, aged 18–50, in treatment at an urban public mental health clinic, who were assessed as part of a large ongoing research project on language and cognition (Docherty, 2012b). The present cohort included all those enrolled in the larger study who had DSM-IV (American Psychiatric Association, 2000) diagnoses of schizophrenia ($n = 48$) or schizoaffective disorder ($n = 59$), as determined by diagnostic interview and clinic records, and who reported experiencing auditory hallucinations, either currently or in the past. Exclusion criteria included current (past year) DSM-IV substance abuse or dependence, seizure disorder, mental retardation, and injury/illness history suggestive of possible organic damage. The resulting sample included individuals with a range of symptom severity, from the virtually asymptomatic to the actively psychotic, with a long average duration of illness ($M = 19$ years), and a range in level of functioning. Most of the patients were receiving antipsychotic medications: 75 received atypicals only, 9 typicals only, 7 both, and 6 none. Many lived alone in subsidized housing; others lived in group homes, nursing homes, or other supervised settings. A few were gainfully employed, but most were not. Patient descriptive information is presented in Table 1.

Measures

Diagnosis—The Schedule for Affective Disorders and Schizophrenia – Lifetime Version (SADS-L) diagnostic interview (Spitzer and Endicott, 1977), adapted slightly for use with DSM-IV criteria, was administered to all participants by graduate assistants trained in the measure. Diagnoses were determined by the first author, in consultation with the graduate assistants, using information from the interview and clinic records.

Symptoms—Symptoms were rated for severity using the Positive and Negative Syndrome Scales (PANSS) (Kay et al., 1987). A subset of ten interviews were recorded and co-rated for reliability purposes. Interrater reliability was at an acceptable level for all PANSS scales, with intraclass correlations ranging from $r = .70 - .96$.

Duration of Illness—Duration of illness was calculated as length of time since first psychiatric hospitalization.

Auditory Hallucinations—Auditory hallucinations were assessed using the Psychotic symptoms Rating Scales (PSYRATS) (Haddock et al., 1999). This interview inquires about hallucinations on several different dimensions, including perceived location, frequency of occurrence, average duration, loudness, beliefs about origins, proportion of hallucinations that are affectively negative, intensity of the negativity, amount of distress experienced, intensity of distress, life disruption, and uncontrollability of the hallucinations. Each variable is coded on a scale of 0 – 4. Higher scores reflect worse hallucinations, e.g., more frequent, more negative, less controllable. This measure was administered for “worst past” hallucinations, and also for current hallucinations.

The SADS-L interview, which was used primarily for diagnostic purposes, also inquires about type and content of hallucinations (e.g., voices conversing, commenting, commanding, persecuting). When administering the SADS, the research assistants gathered additional detail on the content of hallucinations, including affective tone and the nature of any commands.

Procedures

Patients were assessed for the present study in one session. The study was explained and informed consent obtained, demographic and medication information was gathered, the SADS-L diagnostic interview was administered, current symptoms were assessed using the PANSS, and the PSYRATS was administered. The research assistants were blind to the hypotheses of the study. Patients were paid for their participation.

Analysis

First, patients were divided into three groups based on the location of their “worst past” auditory hallucinations: internal-only, both internal and external, and external-only, and the groups were compared on demographics by means of ANOVAs and chi-squares. Next, the first two groups (internal-only and both) were combined to create a group of all those who had experienced any internal hallucinations during their worst episode, and this group was compared with the external-only group on affective and other characteristics of their hallucinations using t-tests, and on the SADS hallucinations types using chi-square tests. Next, patients were regrouped into those with internal-only hallucinations versus those who had experienced any external hallucinations (i.e., external-only or both), and the groups were compared on their beliefs about the origins of their hallucinations by means of a chi-square test. Third, patients were grouped into internal (i.e., internal-only or both) versus external-only, and compared on PANSS symptoms by means of t-tests. Secondly, they were grouped by “current” hallucinations location, and again compared on symptom severities. Finally, internal (i.e., internal-only or both) vs. external-only location groups were compared on age and duration of illness using t-tests.

RESULTS

Schizophrenia patients did not differ from schizoaffective patients on any of the hallucinations characteristics. The two diagnostic groups were combined for all subsequent analyses. Patients were divided into three groups based on the perceived location of their “worst past” auditory hallucinations. The external-only group was the largest ($n = 48$), followed by the group with both types ($n = 31$), followed by the internal-only group ($n = 18$). The groups did not differ significantly on gender, race, level of education, or parents’ level of education. Means and standard deviations for each group on the other PSYRATS hallucinations dimensions are presented in Table 2. Group frequencies of the categorical SADS hallucinations variables are presented in Table 3.

Characteristics of the hallucinations of internal vs. external-only hallucinators

Patients with any internal hallucinations were compared to patients who had external-only, on characteristics of their hallucinations, see Tables 4 and 5. Internal hallucinators reported

more negative and distressing content, and more intensely negative content, with trends for more intense distress and greater life disruption associated with their hallucinations. They also reported longer duration of the average hallucination, and less perceived control over them. Internal hallucinators more frequently experienced voices commenting, voices conversing, voices commanding them to harm or kill others, and persecutory voices. The groups did not differ on occurrence of nonverbal auditory hallucinations or positive/helpful voices.

Beliefs about the origins of the hallucinations

Patients with exclusively internal hallucinations were more likely than those with any external hallucinations to believe their hallucinations were self-generated, chi-square = 7.03, $p < .01$.

Severity of Illness in Internal vs. External-Only Hallucinators

“Worst past” internal hallucinators did not differ significantly from external-only hallucinators on PANSS-rated severity of current hallucinatory behavior, positive symptoms, negative symptoms, general symptoms, or total symptoms, but did endorse more severe depression (Table 4).

Persistence of Hallucinations

In comparing “worst past” with current hallucinations, it emerged that 89% of patients with worst past internal-only hallucinations were also hallucinating at the time of assessment, compared with 77% of those with both internal and external, and 52% of those with external-only. Worst past internal hallucinators were significantly more likely than worst past external-only hallucinators to still (or again) be hallucinating currently, chi-square = 4.27, $p < .04$.

Phase of Illness

Patients with worst past internal hallucinations were numerically slightly older than those with external-only, but not significantly so, and the groups did not differ on duration of illness. These results are presented in Table 4. Groups based on current hallucinations location were similar. This is inconsistent with the idea that internal hallucinations are associated with a later phase of the illness. Unexpectedly, worst past internal hallucinators had a significantly later onset of illness than external-only hallucinators, assessed as age at first psychiatric hospitalization, $M (sd) = 23 (9)$ vs. $19 (8)$, $t (95) = 2.14$, $p < .04$.

DISCUSSION

Patients with internal hallucinations did not differ from those with external-only hallucinations in severity of positive, negative, general, or overall symptoms, but they were more depressed, and reported that their hallucinations were more emotionally negative, distressing, and disruptive. They also reported that their hallucinations lasted longer and were less controllable. They were more likely to experience voices commenting and voices conversing, as well as persecutory voices and commands to harm or kill others, and their hallucinations were less likely to have remitted over time. However, they also were more

likely to have insight into the self-generated nature of their voices. Furthermore, contrary to expectations, internal hallucinators were not at a more advanced stage of illness, at least chronologically speaking. They were not significantly older, nor was the duration of their illness longer; in fact, their illness onset was at a significantly later age.

Our findings that hallucinations location was not related to severity of symptoms are consistent with those of Copolov et al. (2004), as is our finding of an association between location and insight. However, unlike Copolov et al., we also found associations between location and a number of other characteristics of the hallucinations. We used different measures than they did to assess hallucinations, and ours may have been more sensitive to affective characteristics, the presence of voices commenting and conversing, and the nature of commands. Furthermore, their analyses were limited to comparisons of three separate groups: internal, external, and both. This may have obscured differences between those who experienced internal hallucinations versus those whose hallucinations were only external, and between those with any external hallucinations versus those with internal-only. In the present study, patients were sorted in more than one way for the analyses, as necessary to address the individual hypotheses. Copolov et al. concluded that internal hallucinations are not more benign than external hallucinations, a contention fully supported by our data; we would extend that to state that they are actually *less* benign, at least in some respects.

Our study supported the finding of Nayani and David (1996) that internal hallucinations were of longer duration than external ones, in the sense that each “utterance” went on longer, but we did not find them to be associated with a later phase of illness, although it might be argued that they were more entrenched. Hallucinations location was not related to duration of illness, but internal hallucinations were associated with a somewhat later age of illness onset, and also with a lower rate of remission of the hallucinations over time. These two serendipitous findings are of special interest. They suggest that hallucinations location is differentially related to course of illness variables, supporting the idea that they reflect differences in underlying pathology. The finding on differential persistence of hallucinations suggests the possibility that external hallucinations may be more responsive than internal hallucinations to antipsychotic medications. Alternatively, because schizophrenia is a stress-responsive disorder in at least some patients (Docherty et al., 2009; Myin-Germeys et al., 2005), the higher levels of distress associated with internal hallucinations may increase the likelihood of symptom persistence or recurrence.

Imaging studies of hallucinations location are few, but at this point it appears that external and internal hallucinations involve the same language areas of the brain, and that external hallucinations involve additional areas related to normal sound location (Hunter et al., 2003; Plaze et al., 2011). These neurocognitive findings suggest that external hallucinations involve more extensive brain abnormalities, yet in the present study the external hallucinations seemed to be, if anything, less pathological, less entrenched, and more likely to remit than the internal ones. Further research on the neurocognitive bases of hallucinations and their location will be necessary to understand this apparent paradox.

The associations of hallucinations location with negativity and intensity of content, and with the presence of voices conversing, commenting, insulting, and issuing commands for

aggression, are consistent with our clinical observations. Some patients are absolutely plagued by voices, and when they are, more often than not the voices seem to be internally located. Hoffman et al. (2008) found that internal hallucinators most often perceived the voices as coming from a specific location in the head. It is possible that voices with a perceived external location are experienced as less intrusive and threatening to the self, simply because they are located externally. They may be perceived as alien to the self more readily than if they are located internally, particularly in a specific place inside the head. Our findings on depression, negativity, distress, and insight are consistent with the idea that internal hallucinations are experienced as more integral with the self. Hallucinations that are more integral with the self are more entrenched, as described by Nayani and David, and this may make them less treatment-responsive.

Clustering of symptoms and course-related variables is important for developing methods of dividing schizophrenia patients into more process-homogeneous subgroups for study. Hallucinations location is a little-studied but promising variable in this regard. Future research should examine associations of location with other symptoms in a more fine-grained way, and with additional imaging work.

We examined one facet of one symptom in the present study. There may be other characteristics of hallucinations, or of other symptoms, that reflect underlying process differences among schizophrenia patients. Furthermore, auditory hallucinations are not found exclusively in schizophrenia and schizoaffective disorder. If the internal-external distinction were examined across hallucinators regardless of diagnostic classification, this could further elucidate underlying processes that are shared across current diagnostic groupings (Insel et al., 2010).

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Table 1**Participants**

Number	97
Age, yrs, M (sd)	40 (8)
Duration of Illness, yrs, M (sd)	19 (10)
% Male/Female	54/46
% African-American/Caucasian/Other	67/31/2
Education, yrs, M (sd)	12 (2)
Parent Educ, yrs, M (sd)	12 (3)
PANSS Positive Symptoms	M = 18; sd = 6; range = 8 (none) – 34 (moderate/severe)
PANSS Negative Symptoms	M = 15; sd = 5; range = 9 (very mild) – 31 (moderate/severe)
PANSS General Symptoms	M = 35; sd = 9; range = 20 (very mild) – 59 (moderate)
PANSS Total Symptoms	M = 68; sd = 16; range = 39 (very mild) – 113 (moderate)

PANSS = Positive and Negative Symptom Scales

Table 2

Hallucination Characteristics, Symptom Severities, Age, and Duration of Illness in Patients with “Worst Past” Auditory Hallucinations that were Internal Only, Both Internal and External, or External Only, M (sd).

	Internal Only (n = 18)	Both Internal & External (n = 31)	External Only (n = 48)
Auditory Hallucinations (PSYRATS):			
Frequency of Occurrence	3.17 (0.86)	3.06 (1.26)	2.71 (1.38)
Duration of Each Occurrence	3.39 (1.04)	3.10 (1.01)	2.58 (1.18)
Loudness	2.59 (1.37)	2.45 (1.15)	2.65 (1.02)
Beliefs about Origins	2.69 (1.45)	3.31 (0.93)	3.39 (1.02)
Amount of Negative Content	3.12 (1.32)	2.83 (1.46)	2.17 (1.63)
Degree of Negative Content	3.41 (1.06)	3.03 (1.56)	2.28 (1.75)
Amount of Distressing Content	3.28 (1.41)	3.42 (1.09)	2.77 (1.59)
Intensity of Distress	3.33 (1.33)	3.16 (1.29)	2.68 (1.63)
Amount of Life Disruption	3.18 (1.19)	3.16 (1.29)	2.66 (1.43)
Uncontrollability of Hallucinations	3.50 (1.15)	3.93 (0.25)	3.30 (1.38)
Current Symptom Severity:			
PANSS Hallucinatory Behavior	3.82 (1.38)	3.30 (1.56)	2.94 (1.74)
PANSS Depression	3.67 (1.28)	3.53 (1.89)	2.89 (1.37)
PANSS Positive Total	19.82 (5.56)	17.76 (6.30)	17.96 (6.12)
PANSS Negative Total	14.17 (3.85)	14.90 (4.51)	14.59 (5.11)
PANSS General Total	34.69 (7.22)	35.63 (10.34)	34.30 (9.55)
PANSS Total	68.47 (15.10)	68.48 (17.09)	67.05 (17.69)
Phase of Illness:			
Current Age, years	43 (6)	40 (7)	39 (8)
Age 1st Psych Hospitalization	24 (10)	23 (8)	19 (8)
Duration of Illness, years	19 (8)	17 (10)	20 (11)

PANSS = Positive and Negative Symptom Scales (Kay et al., 1987)

Table 3

Percentage of Patients in Each Group Experiencing Specific Auditory Hallucination Types: Patients Whose Hallucinations are Internal-Only, Internal and External, or External-Only.

	Internal Only (n = 18)	Internal & External (n = 31)	External Only (n = 48)
Nonverbal Auditory Hallucinations	44%	74%	59%
Voices Commenting	88%	84%	68%
Voices Conversing	59%	53%	26%
Voices Commanding	94%	81%	66%
Commands to Harm/Kill Self	27%	32%	34%
Commands to Harm/Kill Others	36%	32%	13%
Positive/Helpful Voices	20%	11%	18%
Persecutory Voices	65%	77%	53%

Hallucinations Characteristics and Other Symptoms in Patients with Internal Auditory Hallucinations versus Patients with External Hallucinations Only, M (sd).

Table 4

	Internal (or both) (n = 49)	External Only (n = 48)	t	p	Cohen's d
Auditory Hallucinations (PSYRATS):					
Frequency of Occurrence	3.10 (1.12)	2.71 (1.38)	1.54	.13	.31
Duration of Each Occurrence	3.20 (1.02)	2.58 (1.18)	2.77	.01	.57
Loudness	2.50 (1.22)	2.65 (1.02)	-0.64	.53	.13
Beliefs about Origins	3.09 (1.16)	3.39 (1.02)	-1.32	.19	.27
Amt of Negative Content	2.94 (1.41)	2.17 (1.63)	2.41	.02	.49
Degree of Negative Content	3.17 (1.40)	2.28 (1.75)	2.73	.01	.56
Amount of Distressing Content	3.37 (1.20)	2.77 (1.59)	2.09	.04	.43
Intensity of Distress	3.22 (1.30)	2.68 (1.63)	1.81	.07	.37
Amount of Life Disruption	3.17 (1.24)	2.66 (1.43)	1.84	.07	.38
Uncontrollability of Hallus	3.77 (0.75)	3.30 (1.38)	2.07	.04	.42
Symptom Severity:					
PANSS Hallucinatory Behavior	3.49 (1.50)	2.94 (1.74)	1.65	.10	.34
PANSS Depression	3.58 (1.67)	2.89 (1.37)	2.20	.03	.45
PANSS Positive Total	18.52 (6.06)	17.96 (6.12)	0.44	.66	.09
PANSS Negative Total	14.63 (4.25)	14.59 (5.11)	0.35	.97	.07
PANSS General Total	35.30 (9.31)	34.30 (9.55)	0.51	.61	.10
PANSS Total	68.48 (16.26)	67.05 (17.69)	0.40	.70	.08
Phase of Illness:					
Current Age, years	41 (7)	39 (8)	1.36	.18	.28
Age at First Hospitalization	23 (9)	19 (8)	2.14	.04	.44
Duration of Illness, years	18 (9)	20 (11)	-1.09	.28	.22

PANSS = Positive and Negative Symptom Scales

Table 5

Percentage of Patients Experiencing Various Hallucination Types: Patients with Internal Auditory Hallucinations (or both) vs. External Only.

	Internal (or both)	External Only	Chi-sq	p
Nonverbal Auditory Hallucinations	63%	59%	0.21	.68
Voices Commenting	85%	68%	4.01	.05
Voices Conversing	55%	26%	8.66	.01
Voices Commanding	83%	66%	3.01	.09
Commands to Harm/Kill Self	30%	37%	0.40	.53
Commands to Harm/Kill Others	33%	13%	4.59	.04
Affectively Positive and/or Helpful Voices	32%	46%	1.67	.20
Persecutory Voices	73%	53%	3.97	.05