International Journal of Psychology

Analysis of the multidimensionality of hallucination-like experiences in clinical and nonclinical Spanish samples and their relation to clinical symptoms: Implications for the model of continuity

Álvaro I. Langer[a]; Adolfo J. Cangas[a]; Mark Serper[b]

[a] University of Almeria, Spain [b] Hofstra University, Hempstead, NY, USA

PLEASE SCROLL DOWN FOR ARTICLE

ψ **Psychology Press**
Taylor & Francis Group

Analysis of the multidimensionality of hallucination-like experiences in clinical and nonclinical Spanish samples and their relation to clinical symptoms: Implications for the model of continuity

Álvaro I. Langer and Adolfo J. Cangas

University of Almeria, Spain

Mark Serper

Hofstra University, Hempstead, NY, USA

R Numerous studies have found that hallucinatory experiences occur in the general population. But to date, few studies have been conducted to compare clinical and nonclinical groups across a broad array of clinical symptoms that may co-occur with hallucinations. Likewise, hallucination-like experiences are measured as a multidimensional construct, with clinical and subclinical components related to vivid daydreams, intrusive thoughts, perceptual disturbance, and clinical hallucinatory experiences. Nevertheless, these individual subcomponents have not been examined across a broad spectrum of clinically disordered and nonclinical groups. The goal of the present study was to analyze the differences and similarities in the distribution of responses to hallucination-like experience in clinical and nonclinical populations and to determine the relation of these hallucination-like experiences with various clinical symptoms. These groups included patients with schizophrenia, non-psychotic clinically disordered patients, and a group of individuals with no psychiatric diagnoses. The results revealed that hallucination-like experiences are related to various clinical symptoms across diverse groups of individuals. Regression analysis found that the Psychoticism dimension of the Symptom Check List (SCL-90-R) was the most important predictor of hallucination-like experiences. Additionally, increased auditory and visual hallucination was the only subcomponent that differentiated schizophrenic patients from other groups. This distribution of responses in the dimensions of hallucination-like experiences suggests that not all the dimensions are characteristic of people hearing voices. Vivid daydreams, intrusive thoughts, and auditory distortions and visual perceptual distortions may represent a state of general vulnerability that does not denote a specific risk for clinical hallucinations. Overall, these results support the notion that hallucination-like experiences are closer to a quasi-continuum approach and that total scores on these scales explain a state of vulnerability to general perceptual disturbance.

Keywords: Hallucination; Hallucination-like experiences; Perceptual disturbance; Clinical symptoms; Continuum approach.

D e nombreuses études ont montré que des expériences hallucinatoires se produisent dans la population générale. Jusqu'à présent peu d'études ont été menées afin de comparer des groupes cliniques et non cliniques à travers une large gamme de symptômes cliniques qui pourraient apparaître en concomitance avec les hallucinations. De même, les expériences de type hallucinatoire sont évaluées en tant que construction multidimensionnelle, avec des composantes cliniques et sous-cliniques reliées à des rêves éveillés très nets, des pensées intrusives, des troubles perceptifs et des expériences cliniques hallucinatoires. Néanmoins, ces

sous-composantes n'ont pas été examinées à travers un large spectre de groupes présentant des troubles cliniques et de groupes non cliniques. Le but de cette étude est d'analyser les différences et les similarités dans la distribution des réponses à une expérience de type hallucinatoire dans des populations cliniques et non cliniques et de déterminer la relation entre ces expériences et différents symptômes cliniques. Les groupes comprennent des patients schizophrènes, des patients avec des troubles cliniques non psychotiques et des individus sans diagnostique psychiatrique. Les résultats révèlent que les expériences de type hallucinatoire sont liées à différents symptômes cliniques à travers différents groupes d'individus. Une analyse de régression a montré que la dimension Psychotisme du "Symptom Check List" (SCL-90-R) était le prédicteur le plus important des expériences de type hallucinatoire. De plus, l'augmentation des hallucinations auditives et visuelles est la seule sous-composante qui différencie les patients schizophrènes des autres groupes. Cette distribution des réponses quant aux dimensions des expériences de type hallucinatoire suggère que toutes ces dimensions ne sont pas caractéristiques des personnes entendant des voix. Des rêves éveillés nets, des pensées intrusives, des distorsions auditives et des distorsions perceptives visuelles pourraient représenter un état de vulnérabilité générale qui ne signale pas de risque spécifique d'hallucinations cliniques. Dans l'ensemble, ces résultats appuient la notion que les expériences de type hallucinatoire sont davantage proches d'une conception invoquant un quasi-continuum et que le total des scores pour l'ensemble des échelles explique un état de vulnérabilité à des troubles perceptifs généraux.

*N*umerosos estudios han encontrado que en la población general se producen experiencias alucinatorias. Pero hasta la fecha, se han realizado escasos estudios en los que se comparen los grupos clínicos y no clínicos a través de una amplia gama de síntomas clínicos que pueden coexistir con las alucinaciones. Del mismo modo, las experiencias de tipo alucinatorias se miden como un constructo multidimensional, con componentes clínicos y subclínicos relacionados con sueños vívidos, pensamientos intrusivos, alteraciones de la percepción y experiencias alucinatorias clínicas. Sin embargo, estos subcomponentes individuales no han sido examinados en un amplio espectro de grupos con desórdenes clínicos y grupos no clínicos. El objetivo del presente estudio fue analizar las diferencias y similitudes en la distribución de respuestas a las experiencias de tipo alucinatorias en poblaciones clínicas y no clínicas y determinar la relación de estas experiencias alucinatorias con diversos síntomas clínicos. Estos grupos incluyeron pacientes con esquizofrenia, pacientes con desórdenes clínicos no psicóticos y un grupo de individuos sin diagnóstico psiquiátrico. Los resultados revelaron que las experiencias de tipo alucinatorias se relacionan con diversos síntomas clínicos a través de diversos grupos de individuos. A partir de los análisis de regresión se encontró que la dimensión de psicoticismo de la Symptom Check List (SCL-90-R) [Inventario de Síntomas] fue el predictor más importante de experiencias de tipo alucinatorias. Además, las alucinaciones auditivas y visuales incrementadas fueron el único subcomponente en el que se diferenciaron los pacientes esquizofrénicos de otros grupos. Esta distribución de las respuestas en la dimensión de experiencias de tipo alucinatorias sugiere que no todas las dimensiones son características de las personas que oyen voces. Los sueños vívidos, los pensamientos intrusivos y las distorsiones auditivas y visuales-perceptivas pueden representar un estado de vulnerabilidad general que no necesariamente indica un riesgo específico de presentar alucinaciones clínicas. En general, estos resultados apoyan la idea de que las experiencias de tipo alucinatorias se acercan más a un enfoque cuasi-continuo y que los puntajes totales en estas escalas explican un estado de vulnerabilidad hacia el desorden general de la percepción.

Hallucinations are important symptoms in various clinical disorders such as schizophrenia but they are also present in other disorders, including depression, anxiety, obsessive-compulsive disorder, and posttraumatic stress disorder (Birchwood, Iqbal, & Upthegrove, 2005; Kilcommons & Morrison, 2005; Morrison & Wells, 2003; Palmer, Pankratz, & Botwick, 2005; Tien, 1991). They may also be observed in persons who do not have any psychopathological disorder and, in fact, continuity in this type of experiences, ranging from the normal population to persons with diverse psychopathological disorders, has been suggested (Barret & Etheridge, 1992; Johns & van Os, 2001; Ohayon, 2000; Posey & Losch, 1983; Serper, Dill, Chang, Kot, & Elliot, 2005; van Os, Hanssen, Bijl, & Ravelli, 2000; Verdoux & van Os, 2002).

Nevertheless, the majority of studies that have analyzed the frequency of hallucination-like experiences in the general population have not differentiated them as a multidimensional construct, with clinical and subclinical components related to vivid daydreams, intrusive thoughts, perceptual disturbance, and clinical hallucinatory experiences (Larøi, Marczewski, & van der Linden, 2004; Levitan, Ward, Catts, & Hemsley, 1996; Paulik, Badcock, & Maybery, 2006). This is a very relevant aspect for the study of the hallucination continuum, as it suggests hallucinatory experiences that do not present a psychopathological risk as such and may not require clinical attention. It can even be iatrogenic to evaluate phenomena that do not cause disturbance. Therefore, we need to determine how to differentiate the dimensions of

the hallucination-like experiences between distinct groups and when these experiences present a risk or vulnerability to develop a clinical hallucination and when they correspond to situations that do not require any major attention.

However, a variety of psychopathological symptoms could underlie or maintain hallucinatory behavior. For example, Slade (1972) hypothesized that anxiety mediated the occurrence of hallucinations in a psychiatric inpatient and was able to decrease hallucination severity by reducing anxiety via systematic desensitization techniques. Likewise, anxiety and obsessive thoughts have also been related to hallucination formation (Baker & Morrison, 1998; García-Montes, Pérez-Álvarez, Soto-Balbuena, Perona-Garcelán, & Cangas, 2006; Morrison, 2001; Morrison & Wells, 2003). Additionally, Allen et al. (2005), comparing the scores of the Launay-Slade Hallucination Scale (LSHS; Launay & Slade, 1981) and the Depression Anxiety Stress Scale (DASS) in a sample of university students, found that the total LSHS score correlated with anxiety, depression, and stress. However, when performing a regression analysis, the only measurement that predicted hallucinatory experiences was anxiety. But, using a nonclinical sample, Paulik et al. (2006) compared the DASS with a three-component factor solution of the LSHS, finding that anxiety was the most consistent measurement related to the three factors. Nevertheless, a conjoint study of all the clinical components that may affect the experience of hallucinations has not been performed and, in addition to abovementioned components, others such as obsessive-compulsive ideas, interpersonal sensitivity, or paranoid ideation may also be relevant (Cangas, García-Montes, López & Olivencia, 2003).

In this sense, the goal of the present study is twofold: (a) We wish to analyze the differences and similarities in the distribution of responses in the diverse dimensions of hallucination-like experiences in clinical (with psychosis and other psychopathological disorders) and in nonclinical populations; and (b) we wish to determine the relation of these experiences with various clinical symptoms. Specifically, our hypotheses are:

1. We expect to find different scores in the diverse dimensions of hallucinations, depending on whether or not the group is a clinical group, which will allow us to verify the possible continuity of hallucinations.
2. We expect to find diverse clinical symptoms (for example, related to anxiety, obsession-compulsion, interpersonal sensitivity, or

psychoticism) that predict hallucination-like experiences.

METHOD

Participants

We divided the sample into three groups: two clinical groups and one nonclinical group. The nonclinical group consisted of a sample of 265 university students (US) from the University of Almería and Córdoba (Spain).

The first clinical group was made up of 26 patients diagnosed with schizophrenia (according to the American Psychiatric Association, 1994) who were actively hallucinating (i.e., had had hallucinations within the past 6 months with a minimum duration of 1 month) ("Patients with Hallucinations," PH). Patients in this group were recruited from day-care hospitals of the National Health Service, from the province of Almería. Inclusion criteria for this group were based on the approach described by Serper and Berembaum (2008). This included combining information provided by the patient, medical records, collaborative information when available, and clinical interview to establish the presence of active hallucinations. All the patients were receiving antipsychotic and/or antidepressive medication at the time of assessment.

The Clinical Control Group (CCG) comprised 23 patients, receiving treatment in an ambulatory Mental Health Service with various diagnoses (depressive disorder, $n = 9$; personality disorder, $n = 4$; generalized anxiety, $n = 6$; adaptive disorder, $n = 3$; obsessive-compulsive disorder, $n = 1$). The exclusion criterion of this group was to be diagnosed as having a schizophrenia-spectrum disorder (two participants were excluded due to the possible presence of such a disorder). The sociodemographic characteristics of the three groups are specified in Table 1.

To determine whether there were any significant differences in the three groups in the diverse sociodemographic variables, chi-square and one-way analyses of variance were computed. Significant group differences were detected in age, $F(2, 283) = 75.257$, $p < .05$. Games-Howell post-hoc analysis (Levene < 0.5) showed that the nonclinical sample was significantly younger than the clinical samples but there were no differences between the latter two. The chi-square test also revealed gender differences among the groups, $\chi^2(2) = 14.721$, $p < .05$. The adjusted residual count revealed that the differences were in the

TABLE 1
Demographic information (age, sex, and years of education)

	Group					
	US		CCG		PH	
Variable	M	SD	M	SD	M	SD
Age	21.9	5.95	34.70	12.19	35.96	9.37
% Male	38		26.1		73.1	
% Female	62		73.9		26.9	
Education	12.71	0.93	13.55	2.13	10.95	3.66

US = University Students, CCG = Clinical Control Group, PH = Patients with Hallucinations.

PH group: There were significantly more men than women. Significant group differences were also detected in educational level, $F(2, 303) = 19.811$, $p < .05$. The Games-Howell post-hoc analysis (Levene < 0.5) showed that the differences were between the PH and the CCG groups, with the latter group having more years of schooling.

Measures

Revised Hallucination Scale (RHS)

The RHS (Morrison, Wells, & Nothard, 2000) was designed based on the LSHS (Launay & Slade, 1981), which measures predisposition to hallucinations in normal population. It consists of 13 four-point Likert-type formatted items, ranging from 1 (*never*) to 4 (*almost always*). Two factors were found in the original version, one related to predisposition to auditory hallucinations and the other to predisposition to visual hallucinations. This questionnaire was translated into Spanish according to the recommendations of Muñiz and Hambleton (1996), and the psychometric properties of the adapted version have been published by Cangas, Langer, and Moriana (in press), who found a four-factor structure using principal component analysis (PCA). The first factor measured visual and auditory hallucinatory experiences. The second factor contained items tapping vivid daydreams. The third factor was related to visual perceptive distortions (subclinical experiences), and the fourth factor tapped intrusive thoughts and distortions of auditory perception. These four factors accounted for 53.9% of the variance (24.4%, 11.5%, 9.7%, and 8.3%, respectively). For this study, the internal consistency of the total scale, as measured by Cronbach's alpha coefficient, was .75 (.61 for the first factor, .63 for the second factor, .54 for the third factor, and .46 for the fourth factor).

Symptom Check List (SCL-90-R, Derogatis, 1994)

This scale consists of 90 items, which the subject has to rate on a scale ranging from 0 to 4 (0 = *not at all*, 1 = *a little*, 2 = *somewhat*, 3 = *rather a lot*, 4 = *very much*). The questionnaire has nine subscales or dimensions (somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism), and three overall scores: the Global Severity Index or General Symptomatic Index (GSI), the Positive Symptoms of Distress Index (PSDI), and the Positive Symptom Total (PST). We used the Spanish adaptation by González de Rivera, de la Cueva, Rodríguez, and Rodríguez (2002), which presents good internal consistency and convergent validity, finding results similar to the original English sample ($\alpha = .85$)

Procedure

Nonclinical groups (US)

The questionnaires (RHS and SCL-90-R) were administered in this order to groups of participants who had previously been informed that the purpose of the study was to determine people's psychological experiences, but without offering further details. The groups were the classrooms where the students were receiving classes, with a mean of 35 students per classroom. Participation was voluntary and the students received no extra credit for their participation.

Clinical groups (PH and CCG)

After the participants provided written informed consent, RHS and SCL-90-R were administered. The procedure was carried out individually. Participants received no type of reward or payment for their involvement in the study.

RESULTS

Tests prior to analysis of the results

A 0.5 level of significance was adopted throughout all the analyses. Before analyzing the results of the group comparisons, we examined homogeneity of variance for each variable by means of Levene's statistic. In Factors 1 and 3, and in the total RHS

TABLE 2
Descriptive statistics and RHS group comparisons

	US	CCG	PH	F	P
Auditory and visual hallucinations	3.30[a] (0.74)	3.52[a] (0.95)	5.08[b] (2.06)	42.165	0.000
Vivid daydreams	4.86[a] (1.85)	5.22 (2.47)	6.04[b] (2.47)	4.388	0.013
Visual perceptive distortions	3.95[a] (1.18)	4.47 (1.53)	5.24[b] (1.98)	12.572	0.000
Intrusive thoughts and auditory distortions	7.32[a] (1.91)	8.43[b] (1.97)	8.32[b] (2.50)	5.861	0.003
RHS total score	19.39[a] (4.02)	21.65 (5.27)	24.68[b] (6.69)	18.362	0.000

US = University Students. CCG = Clinical Control Group. PH = Patients with Hallucinations. [a, b] indicate between which groups significant differences were revealed by post-hoc test.

score, the variance equality hypothesis was rejected ($p < .05$), whereas in Factors 2 and 4, variance equality could be assumed ($p > .05$).

Comparison of groups in hallucination-like experiences

The three groups were compared in the four factors and in the total RHS score. Using a one-way independent-sample ANOVA, a significant effect of group was found in all the variables analyzed ($p < .05$). Post-hoc analysis using Tukey (assuming variance equality) and Games-Howell (not assuming variance equality) corrections were used to determine significant differences.

With regard to Factor 1, Visual and Auditory Hallucinations (clinical items), no significant differences were observed between US and CCG, but there were differences with PH. In Factor 2, Vivid Daydreams, and Factor 3, Visual Perceptive Distortions, there were only differences between US and PH. In Factor 4, Intrusive Thoughts and Distortions of Auditory Perception, differences were observed between US and both CCG and PH. In the RHS total score, the only difference was between US and PH (see Table 2).

We also conducted analyses to detect significant gender differences in the RHS and SCl-90-R scores. There were no differences in the two clinical groups, $p > .05$. However, in the US group, the men were found to score higher in the factor Vivid Daydreams and the women scored higher in Somatization, Interpersonal Sensitivity, Depression, Anxiety, and Phobic Anxiety.

Relation between hallucination-like experiences and clinical symptoms

Analyzing the sample as a whole, Pearson's correlational analysis showed that the four factors and the total RHS score presented statistically significant correlations with the nine dimensions of

the SCL-90-R and the Global Severity Index (GSI), except for the correlation of the dimension Phobic Anxiety (PHOB) with the factor Vivid Daydreams. Among the highest correlations (near .50) was that of Psychoticism with Factor 1 (Auditory and Visual Hallucinations) and with the total RHS score; the Global Severity Index was closely related to Factor 3 (Visual Perceptive Distortions) and to the total RHS score. In contrast, Phobic Anxiety did not significantly correlate with Vivid Daydreams (Table 3).

To determine which clinical symptoms best predict hallucination-like experiences, we carried out five multiple linear regression analyses with the entire sample, using a stepwise method with the four factors and the RHS total score as dependent variables, and the nine dimensions of the SCL-90-R as independent variables. Variables included in the analysis for the first factor were Psychoticism in Step 1, Hostility in Step 2, and Phobic Anxiety in Step 3. For the second factor, only one predictor was taken into account (Psychoticism). For the third factor, Psychoticism was used in Step 1 and Somatization in Step 2. For Factor 4, we used Obsessive-Compulsive Disorder in Step 1 and Depression in Step 2, and for the RHS total score, we used were Psychoticism in Step 1 and Obsessive-Compulsive disorder in Step 2. See Table 4 for the results of the final multiple regression equation.

We found statistically significant values in all the analyses. Specifically, in Factor 1 (Auditory and visual hallucinations), $F(3, 308) = 38.481$, $p < .05$, $R^2 = .27$, showing that a moderate amount of the variance was accounted for by these predictor variables. In Step 1, when Psychoticism was entered, the multiple R was significant at .48. In Step 2, when Hostility was entered, the multiple R was .50 and significant, the adjusted R^2 was .25, and the increment in R^2 of .029 was significant, $F = 11.704$, $p < .05$. In Step 3, when Phobic Anxiety was entered, the increment in R^2 was .021 and significant, $F = 8.762$, $p < .05$.

TABLE 3
Correlations between RHS and SCL-90-R

	SCL90-R									
	Som	O-C	I-S	Dep	Anx	Hos	Phob	Par	Psy	Gsi
Auditory and visual hallucinations	.31*	.38*	.31*	.35*	.32*	.19*	.41*	.32*	.48*	.40*
Vivid daydreams	.14*	.16*	.15*	.17*	.14*	.22*	.11	.22*	.25*	.20*
Visual perceptive distortions	.40*	.41*	.36*	.37*	.40*	.32*	.39*	.34*	.42*	.45*
Intrusive thoughts and auditory distortions	.33*	.38*	.34*	.37*	.35*	.33*	.32*	.31*	.34*	.40*
RHS total score	.39*	.44*	.38*	.42*	.40*	.37*	.40*	.40*	.49*	.48*

Som = Somatization, O-C = Obsessive-Compulsive, I-S = Interpersonal sensitivity, Dep = Depression, Anx = Anxiety, Hos = Hostility, Phob = Phobic Anxiety, Par = Paranoid Ideation, Psy = Psychoticism, GSI = Global Severity Index.

For Factor 2 (Vivid Daydreams), $F(1, 307) = 20.823$, $p < .05$, $R^2 = .06$, showing that very little variance was accounted for by this predictor. For Factor 3 (Visual Perceptive Distortions), $F(2, 306) = 39.429$, $p < .05$, $R^2 = .20$, indicating that a moderate amount of the variance was accounted for by these predictor variables. In Step 1, with Psychoticism entered, the multiple R was .42 and significant, and the adjusted R^2 was .17. In Step 2, when Somatization was entered, the increment in R^2 of .032 was significant $F = 12.351$, $p < .05$. In Factor 4 (Intrusive Thoughts and Auditory Distortions), $F(2, 305) = 28.378$, $p < .05$, $R^2 = .15$, indicating that a moderate amount of the variance was accounted for by these predictor variables. In Step 1, with Obsessive-Compulsive Disorder entered, the multiple R was .38 and significant, and the adjusted R^2 was .14. In Step 2, when Depression was entered, the increment of .017 in R^2 was significant $F = 6.170$, $p < .05$, and in the total RHS score, $F(2, 302) = 49.949$, $p < .05$, $R^2 = .25$, showing that a moderate amount of the variance was accounted for by these predictor variables. In Step 1, with Psychoticism entered, the multiple R was .49 and significant, and the adjusted R^2 was .23. In Step 2, when Depression was entered, the increment of .014 in R^2 was significant, $F = 5.496$, $p < .05$.

DISCUSSION

One of the goals of this study was to analyze the differences and similarities in the distribution of responses in the diverse dimensions of hallucination-like experiences in clinical (having psychosis and other psychopathological disorders) and in nonclinical populations. The results obtained point in the direction of the hypothesis proposed for this goal, because the responses to the hallucination-like experiences questionnaire are different in the three groups. Thus, in contrast to the other two groups, the patients with hallucinations scored significantly higher in Factor 1 (Auditory and Visual Hallucinations).

However, in Factors 2 (Vivid Daydreams) and 3 (Visual Perceptive Distortions), there were differences only between the students and the patients with hallucinations, but not with regard to the clinical control group (which had intermediate scores). This result suggests that these dimensions are distributed along a continuum, going from the normal population, passing through the clinical population, until reaching patients with hallucinations.

But what differentiates the normal population from the clinical population (but not the latter from patients with hallucinations) is Factor 4 (Intrusive Thoughts and Auditory Distortions). In this sense, as noted by Morrison (Morrison & Baker, 2000; Morrison & Wells, 2003), there seems to be some parallelism between patients with psychosis who experience hallucinations and the presence of intrusive thoughts in other mental patients (as, for example, in the case of Obsessive-Compulsive Disorder).

So, although the differences in the total RHS score are mainly between the group of students and the patients with psychosis and hallucinations, these results depend on the dimension analyzed. Thus, there will be some common dimensions in both the clinical and the general populations (such as Factors 2 and 3), some dimensions that are more specific to the population with psychosis that presents hallucinations (Factor 1) and, lastly, some other dimensions that are typical of the clinical population in general (with or without psychosis) but not so habitual in the general population (Factor 4).

These results are also related to the work carried out by Yung et al. (2009), who classified four subtypes of psychotic experiences using the Community Assessment of Psychotic Experiences

TABLE 4
Multiple regression analysis for RHS

	SCL90-R	Partial R	β	T	P
Factor 1. Auditory and visual hallucinations	Som	.050	.063	.871	.384
	O-C	.075	.101	1.312	.191
	I-S	−.095	−.132	−1.668	.096
	Dep	−.003	−.005	−.058	.954
	Anx	−.094	−.152	−2.755	.099
	Hos	−.214	−.250	−3.824	.000
	Phob	.167	.196	2.960	.003
	Par	.008	.011	.137	.891
	Psy	.360	.508	6.739	.000
Factor 2. Vivid daydreams	Som	−.021	−.026	−.371	.711
	O-C	−.036	−.052	−.629	.530
	I-S	−.069	−.101	−1.206	.229
	Dep	−.042	−.063	−.736	.462
	Anx	−.068	−.098	−1.185	.237
	Hos	.077	.099	1.346	.179
	Phob	−.086	−.112	−1.511	.132
	Par	.058	.082	1.016	.311
	Psy	.252	.252	4.563	.000
Factor 3. Visual perceptive distortions	Som	.198	.231	3.514	.001
	O-C	.085	.124	1.490	.137
	I-S	.029	.040	.503	.616
	Dep	.016	.024	.274	.784
	Anx	.047	.077	.811	.418
	Hos	−.021	−.028	−.373	.709
	Phob	.100	.130	1.752	.081
	Par	−.003	−.004	−.056	.956
	Psy	.231	.272	4.142	.000
Factor 4. Intrusive thoughts and auditory distortions	Som	.075	.099	1.298	.195
	O-C	.152	.220	2.685	.008
	I-S	.009	.015	.158	.875
	Dep	.141	.203	2.484	.014
	Anx	.037	.060	.640	.523
	Hos	.094	.119	1.648	.100
	Phob	.076	.095	1.331	.184
	Par	.015	.020	.254	.800
	Psy	.038	.059	.666	.506
RHS total score	Som	.070	.085	1.213	.226
	O-C	.134	.176	2.344	.020
	I-S	−.031	−.046	−.537	.592
	Dep	.026	.040	.458	.647
	Anx	.014	.020	.244	.807
	Hos	.027	.033	.473	.637
	Phob	.077	.092	1.328	.185
	Par	.018	.025	.311	.756
	Psy	.264	.355	4.739	.000

(CAPE)—bizarre experiences, perceptual abnormalities, persecutory ideas, and magical thinking—but only the first three factors were strongly associated with distress, depression, and poor functioning (Magical Thinking was only weakly associated with these variables). The authors suggested that Magical Thinking may be a normal personality variant. A similar conclusion

may be reached with regard to the factor Vivid Daydreams, which displayed the lowest relation to clinical symptoms. This kind of experience is fairly common in the population in general (both clinical and nonclinical) and is not, therefore, associated with strictly clinical symptoms.

These results are also in accordance with the studies that indicate that in nonclinical samples, most of the responses are given to subclinical items (Paulik et al., 2006), in contrast to clinical samples, where people tend to respond more to the clinical items (Levitan et al., 1996; Serper et al., 2005).

In contrast, with regard to the diverse clinical symptoms (measured with the SCL-90-R), the best predictor of hallucination-like experiences was Psychoticism (which explained Factors 1, 2, and—to a lesser degree—3, and the total RHS score). Likewise, Factor 1, along with Psychoticism, was explained by Hostility and Phobic Anxiety. Factor 3 was explained by Psychoticism and Somatization. Factor 4 was explained by Obsession-Compulsion and Depression. Finally, the total RHS score is explained by Psychoticism and Obsession-Compulsion. This suggests that, in hallucination-like experiences, other psychopathological symptoms such as somatization, obsessive-compulsive symptoms, depression, hostility and phobic anxiety are involved, which would have an important effect by considerably increasing the distress and disability derived from hallucinatory-like experiences.

Ultimately, in order to understand hallucinatory behaviors, it should be taken into account that perceptual visual disturbance or vivid daydreams are very common, both in normal and in clinical populations. Intrusive thoughts and auditory distortions are, however, more characteristic of clinical disorders. And, lastly, there is also a typically hallucinatory dimension (Factor 1) that is common in patients with psychosis, and that is different from the experience of the general clinical population and, of course, from that of the population in general.

Among the limitations of this study is the fact that the three samples analyzed were not uniform, with significant differences in sex and educational level. Clinical diagnoses were clinically derived and not confirmed with structured clinical interviews. Likewise, the mental status of the sample of students was not verified, so some cases could be affected by some mental pathology.

In summary, the results are coherent with the continuum-threshold or quasi-continuum approach to hallucinations. Likewise, positive scores on the global score of the scale are not,

in themselves, a specific element or predictor of clinical hallucinations or of a state of high risk for psychosis.

REFERENCES

Allen, P., Freeman, D., MacGuire, P., Garety, P., Kuipers, E., Fowler, D., et al. (2005). The prediction of hallucinatory predisposition in nonclinical individuals: Examining the contribution of emotion and reasoning. *British Journal of Clinical Psychology, 44*, 127–132.

American Psychiatric Associaton (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: APA.

Baker, C., & Morrison, A. P. (1998). Metacognition, intrusive thoughts and auditory hallucinations. *Psychological Medicine, 28*, 1199–1208.

Barret, T. R., & Etheridge, J. B. (1992). Verbal hallucinations in normals I: People who hear "voices". *Applied Cognitive Psychology, 6*, 379–387.

Birchwood, M., Iqbal, Z., & Upthegrove, R. (2005). Psychological pathways to depression in schizophrenia-studies in acute psychosis, post psychotic depression and auditory hallucinations. *European Archives of Psychiatry and Clinical Neurocsience, 255*, 202–212.

Cangas, A. J., Langer, A. I., & Moriana, J. A. (in press). Hallucinations and related perceptual disturbance in a non-clinical Spanish population. *International Journal of Social Psychiatry*.

Cangas, A. J., García-Montes, J. M., López, M., & Olivencia, J. (2003). Social and personality variables related to the origin of auditory hallucinations. *International Journal of Psychology and Psychological Therapy, 3*, 181–194.

Derogatis, L. R. (1994). *Symptom checklist-90-R (SCL-90-R): Administration, scoring and procedures manual*. Minneapolis, MN: National Computer Systems.

García-Montes, J. M., Pérez-Álvarez, M., Soto-Balbuena, C., Perona-Garcelán, S., & Cangas, A. J. (2006). Metacognitions in patients with hallucinations and obsessive-compulsive disorder: The superstition factor. *Behaviour Research and Therapy, 44*, 1091–1104.

González de Rivera, J. L., de la Cueva, C., Rodríguez, M., & Rodríguez, P. (2002). *Cuestionario de 90 síntomas (SCL90-R): Manual de aplicación* [Checklist-90-R (SCL-90-R): Procedures manual]. Madrid, Spain: Ediciones TEA.

Johns, L. C., & van Os, J. (2001). The continuity of psychotic experiences in the general population. *Clinical Psychology Review, 21*, 1125–1141.

Kilcommons, A., & Morrison, A. P. (2005). Relationships between trauma and psychosis: An exploration of cognitive and dissociative factors. *Acta Psychiatrica Scandinavica, 112*, 351–359.

Larøi, F., Marczewski, P., & van der Linden, M. (2004). Further evidence of the multi-dimensionality of hallucinatory predisposition: Factor structure of a modified version of the Launay-Slade Hallucination Scale in a normal sample. *European Psychiatry, 19*, 15–20.

Launay, G., & Slade, P. D. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences, 2*, 221–234.

Levitan, C., Ward, P. B., Catts, S. V., & Hemsley, D. R. (1996). Predisposition toward auditory hallucinations: The utility of the Launay-Slade Hallucination scale in psychiatric patients. *Personality and Individual Differences, 21*, 287–290.

Morrison, A. P. (2001). The interpretation of intrusions in psychosis: An integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy, 29*, 257–276.

Morrison, A. P., & Baker, C. A. (2000). Intrusive thoughts and auditory hallucinations: A comparative study of intrusions in psychosis. *Behaviour Research and Therapy, 38*, 1097–1106.

Morrison, A. P., & Wells, A. (2003). A comparison of metacognitions in patients with hallucinations, delusions, panic disorder and non-patient controls. *Behaviour Research and Therapy, 41*, 251–256.

Morrison, A. P., Wells, A., & Nothard, S. (2000). Cognitive factors in predisposition to auditory and visual hallucinations. *British Journal of Clinical Psychology, 39*, 67–78.

Muñiz, J., & Hambleton, R. K. (1996). Directrices para la traducción y adaptación de los test [Guidelines for translating and adapting psychological tests]. *Papeles del Psicólogo, 66*, 63–70.

Ohayon, M. M. (2000). Prevalence of hallucinations and their pathological associations in the general population. *Psychiatry Research, 97*, 153–164.

Palmer, B. A., Pankratz, V. S., & Botwick, J. M. (2005). The lifetime risk of suicide in schizophrenia – A reexamination. *Archives of General Psychiatry, 62*, 247–253.

Paulik, G., Badcock, J. C., & Maybery, M. T. (2006). The multifactorial structure of the predisposition to hallucinate and associations with anxiety depression and stress. *Personality and Individual Differences, 41*, 1067–1076.

Posey, T. B., & Losch, M. E. (1983). Auditory hallucinations of hearing voices in 375 normal subjects. *Imagination, Cognition and Personality, 2*, 99–113.

Serper, M., & Berenbaum, H. (2008). The relation between emotional awareness and hallucinations and delusions in acute psychiatric inpatients. *Schizophrenia Research, 101*, 195–200.

Serper, M., Dill, C. A., Chang, N., Kot, T., & Elliot, J. (2005). Factorial structure and classification of hallucinations: Continuity of experience in psychotic and normal individuals. *Journal of Nervous and Mental Disease, 193*, 265–272.

Slade, P. D. (1972). The effects of systematic desensitization on auditory hallucinations. *Behaviour Research and Therapy, 10*, 85–91.

Tien, A. (1991). Distributions of hallucinations in the population. *Psychiatric Epidemiology, 26*, 287–292.

van Os, J., Hanssen, M., Bijl, R. V., & Ravelli, A. (2000). Strauss (1969) revisited: A psychosis continuum in the general population? *Schizophrenia Research, 45*, 11–20.

Verdoux, H., & van Os, J. (2002). Psychotic symptoms in non-clinical populations and the continuum of psychosis. *Schizophrenia Research, 54*, 59–65.

Yung, A. R., Nelson, B., Baker, K., Buckby, J. A., Baksheev, G., & Cosgrave, E. M. (2009). Psychotic-like experiences in a community sample of adolescents: Implications for the continuum model of psychosis and prediction of schizophrenia. *Australian and New Zealand Journal of Psychiatry, 43*, 118–128.