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VERBAL HALLUCINATIONS IN NORMALS—II: SELF-REPORTED IMAGERY VIVIDNESS

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Summary—Two studies are reported testing the hypothesis that individuals in the general population who report frequent verbal hallucinations have vivid imagery. In each study, 31 hallucinators and 31 nonhallucinators were selected based on scores from the Verbal Hallucination Questionnaire (Barrett & Etheridge, 1992 *Applied Cognitive Psychology, 6,* 379–387). In Study 1, subjects completed the Betts QMI Vividness of Imagery Scale. In study 2, each individual completed a Control of Imagery Questionnaire. The results of these two studies suggested that verbal hallucinators have more vivid imagery than nonhallucinators, but not better control of their images. It was suggested that vivid imagery may be one of the factors underlying reports of hallucinations by individuals in the general population.

Verbal hallucinations are an intriguing type of conscious experience. They have been reported to occur at the beginning and ending of sleep periods (McKellar, 1968), during sensory isolation (Zuckerman & Cohen, 1964), and are often associated with the presence of psychopathology, particularly schizophrenia (American Psychiatric Association, 1987). Asaad and Shapiro (1986) go so far as to argue that understanding hallucinations may represent the key to an understanding of psychopathology.

Recently, Posey and Losch (1983) found that individuals in the general population report the occurrence of verbal hallucinations during a normal, awake state of consciousness. These authors found that reports of verbal hallucinations were not associated with sex or handedness of the *S*s. They also found that reports of verbal hallucinations were not related to psychopathology as measured by the MMPI. In a follow-up study, Barrett and Etheridge (1992) demonstrated that at least 25% of college students report frequent occurrences of verbal hallucinations. As with Posey and Losch (1983), these authors found that verbal hallucinations were not related to sex. In addition, these reports were not related to ACT composite scores or age of the *S*s. Finally, these reports were not motivated by a desire to conform to experimental expectancies nor were they a manifestation of an underlying psychopathology as measured by the MMPI.

The present paper reports two studies designed to investigate one theory of verbal hallucinations in normals that has often been postulated to explain the occurrence of verbal hallucinations among schizophrenics. Galton (1883) suggested that hallucinations were vivid mental images that were somehow perceived as occurring outside the head. Several contemporary authors (e.g. Hoffman, 1986; Horowitz, 1983; Siegel & Jarvik, 1975) have assumed the validity of this hypothesis. However, the empirical evidence is mixed. On the positive side, Roman and Landis (1945) found that hallucinating psychiatric patients reported vivid visual and auditory imagery. Mintz and Alpert (1972) reported that hallucinating psychiatric patients had more vivid auditory imagery than did nonhallucinating psychiatric patients. Slade (1976) demonstrated that schizophrenics, hallucinators and nonhallucinators, reported more vivid imagery than normals. Finally, Launay and Slade (1981) found a positive relationship between reports of auditory hallucinations and the reported vividness of daydream imagery.

On the other hand, several studies seem to disconfirm the hypothesis. Cohen (1938) and Seitz and Molholm (1947) reported that hallucinating schizophrenics report fewer auditory images than nonhallucinating schizophrenics and normals, respectively. In addition, Starker and his colleagues have found no evidence of increased vividness of auditory imagery in hallucinating schizophrenics (Brett & Starker, 1977; Starker & Jolin, 1982). In fact, Starker and Jolin (1982) suggested that hallucinating schizophrenics may actually have less vivid auditory imagery than schizophrenics who had never hallucinated. In a recent review of hallucination research, Slade and Bentall (1988)

suggested that, as of yet, there is no convincing data that imagery vividness and hallucinations are related.

The present series of two studies was designed to investigate the relationship between imagery vividness and the occurrence of verbal hallucinations in the general population.

STUDY 1

In this study, I wanted to determine the relationship between the reported occurrence of verbal hallucinations and the self-rated vividness of imagery.

Method

Subjects. The *S*s were 62 individuals selected from a pool of 131 introductory psychology students who completed the Verbal Hallucination Questionnaire (Barrett & Etheridge, 1992). Thirty-one were classified as nonhallucinators. These individuals scored in the bottom 25% of individuals who completed the Verbal Hallucination Questionnaire. The other 31 were classified as hallucinators. These individuals scored in the top 25% of individuals who completed the Verbal Hallucination Questionnaire. The two groups did not differ in the proportion of males to females (hallucinators: 10 males and 21 females; nonhallucinators: 12 males and 19 females) nor in mean age in years (hallucinators = 19.16; nonhallucinators = 19.87).

Materials. Two questionnaires were used. One, called the Betts QMI Vividness of Imagery Scale (Richardson, 1969), consists of 35 short, verbal descriptions. There are five descriptions related to each of seven sensory modalities; visual (e.g. the sun as it is sinking below the horizon), auditory (e.g. the mewing of a cat), cutaneous (e.g. the feel of sand), kinesthetic (e.g. reaching up to a high shelf), gustatory (e.g. the taste of oranges), olfactory (e.g. the smell of new leather), and organic (e.g. the feeling of a sore throat).

The other questionnaire was the Verbal Hallucination Questionnaire (Barrett & Etheridge, 1992). This questionnaire consists of descriptions of verbal hallucinations reported by individuals. The descriptions include cases in which individuals hear their name called when no one is there, hear their own thoughts aloud, hear voices from the back seat of a car, and hear the voice of absent or dead friends or relatives.

Procedure. All 131 individuals were given both questionnaires to complete. They were tested in small groups ranging in size from 3 to 15 individuals. *S*s completed the Verbal Hallucination Questionnaire first to minimize the possibility that they would report verbal mental images rather than verbal hallucinations. It was stressed that *S*s should only report experiences in which the person heard a voice outside of their head when no one had actually said anything. For each description, *S*s were asked to indicate whether anything similar had happened to them. If they responded 'yes', they were asked to write a brief description of the event and to rate how often the event had occurred in their life on a 7 point scale (where '1' = 'just once or twice ever'; '2' = 'once or twice a year'; '3' = 'once every six months'; '4' = 'once every three months'; '5' = 'at least once a month'; '6' = 'at least once a week'; and '7' = 'at least once a day').

The second task was the Betts QMI Vividness of Imagery Questionnaire. For each description, the *S* was asked to rate the vividness of the image obtained on a 7 point scale where '1' = 'Perfectly clear and as vivid as the actual experience' and '7' = 'No image present at all, you only 'knowing' that you are thinking of the object'. In addition to the standard instructions (Richardson, 1969), we added a paragraph stressing the importance of carefully comparing their images to actual experience in order to avoid rating their images as more vivid than they really were.

Results and discussion

The Major Verbal Hallucination Scale score (Barrett & Etheridge, 1992) was obtained by adding together the frequency of occurrence ratings for seven descriptions of verbal hallucinations. Since the 7 point rating scale that is the basis of the Major Verbal Hallucination Scale cannot be considered an interval scale, these scores are not appropriate for correlational analyses. Instead, based on these scores, 31 hallucinators and 31 nonhallucinators were selected for further analysis. These two groups represent people in the top and bottom 25% of the Major Verbal Hallucination

Scale. For the Betts QMI Vividness of Imagery Scale, seven scores were calculated; the mean vividness rating of the five items for each of the seven sensory scales.

Table 1 shows the mean ratings for each of the seven imagery vividness subscales, separately for hallucinators and nonhallucinators. A multivariate analysis of variance was performed where the independent variable was Groups (hallucinators vs nonhallucinators) and the dependent variables were the seven mean imagery vividness subscale scores (Visual, Auditory, Cutaneous, Kinesthetic, Gustatory, Olfactory and Organic). Wilks' lambda (0.75) was significant [$F(7,54) = 2.51$, $P < 0.03$] indicating that group differences account for 25% of the variance in the underlying discriminant scores. Univariate analyses indicated that four of the seven subscales produced F values with $P < 0.10$ [Visual: $F(1,60) = 2.82$, $P < 0.09$; Cutaneous: $F(1,60) = 10.95$, $P < 0.002$; Gustatory: $F(1,60) = 4.93$, $P < 0.03$; Olfactory: $F(1,60) = 4.66$, $P < 0.04$]. Table 1 shows that hallucinators rated their imagery as more vivid (lower mean) than nonhallucinators on every subscale. An examination of the 35 individual items indicated that hallucinators had more vivid ratings on 32 of the 35 items (the means were reversed on one auditory item, one kinesthetic item, and one organic item). A large sample approximation sign test yielded a significant $z = 4.90$, $P < 0.0001$ suggesting a nonrandom pattern of vividness differences in favor of hallucinators.

All of these results suggest that individuals who experience relatively frequent occurrences of verbal hallucinations have a system for representing sensory experience that produces more vivid imagery than nonhallucinators. One possibility is that these imagery vividness effects are specific to particular sensory modalities (i.e. Cutaneous, Gustatory, Olfactory, and possibly Visual). However, there is no *a priori* reason to expect this to be so. On the other hand, the imagery vividness effect might be a general one rather than being modality specific. All of the mean differences on the seven subscales indicated more vivid imagery for hallucinators than nonhallucinators. In fact, 32 of the 35 individual items showed such a pattern. Additionally, as Neisser (1970) has pointed out, imagery vividness ratings are most likely influenced by a number of variables other than the actual vividness of imagery the person experiences including the subjective criteria used by individual *S*s when they rate imagery vividness. Consequently, it should not be surprising to find that the imagery vividness ratings are not completely veridical indices of actual imagery vividness.

The idea that there is a general imagery vividness factor that underlies imagery vividness ratings gains some support in factor analytic studies of the Betts QMI Vividness of Imagery Scale. Both Sheehan (1967) and White, Ashton and Law (1974), found a major general imagery vividness factor (however, White, Ashton & Law, 1978 did not obtain a general imagery factor). In order to determine if a general imagery factor would emerge in the present study, the seven individual sensory modality scales of the Betts QMI Vividness of Imagery Scale were submitted to factor analysis. This analysis was done twice, once including all 131 individuals who filled out the imagery vividness scale, and once including only the 62 *S*s included in the multivariate analysis of variance. The principal axis extraction method was used, followed by varimax rotation (SPSS, Inc., 1983).

In each of these analyses, one factor with an eigenvalue >1 was produced. This factor had an eigenvalue of 3.55 and accounted for 50.7% of the covariation between scale scores when all 131 individuals were included. When only the 31 hallucinators and 31 nonhallucinators were included, the eigenvalue was 4.69 and accounted for 67% of the covariation between scale scores. In both analyses, all of the Betts QMI Vividness of Imagery individual sensory modality scales loaded on Factor 1 with loadings 0.60. When all 131 *S*s were included, the loadings were between 0.62

Table 1. Means and standard deviations for imagery vividness scales for hallucinators and nonhallucinators in Study 1

	Groups	
Imagery vividness scales	Hallucinators Mean (SD)	Nonhallucinators Mean (SD)
Visual	2.79 (0.91)	3.24 (1.18)
Auditory	3.09 (1.01)	3.35 (1.06)
Cutaneous	2.81 (0.80)	3.57 (0.99)
Kinesthetic	3.12 (1.04)	3.16 (1.03)
Gustatory	3.18 (1.01)	3.89 (1.47)
Olfactory	3.21 (0.89)	3.79 (1.23)
Organic	2.66 (0.82)	2.83 (0.95)

Lower means reflect more vivid imagery ratings.

(Kinesthetic Scale) and 0.82 (Cutaneous Scale). When only the 31 hallucinators and 31 nonhallucinators were included, the loadings were between 0.68 (Organic Scale) and 0.93 (Olfactory Scale). These results are quite consistent with the hypotheses that there is a general imagery vividness factor that underlies the seven subscales.

An alternative hypothesis is that the general imagery vividness factor does not represent general imagery vividness, but rather social desirability (DiVesta, Ingersoll & Sunshine, 1971; White *et al.*, 1974). One could argue that individuals who see vivid imagery as important in the specific experimental situation will produce higher imagery vividness ratings than those who are not responsive to these situational demand characteristics. This hypothesis suggests that hallucinators are those who respond to situational demand characteristics, while nonhallucinators are those who are less responsive to such variables. Not only would this hypothesis account for differences in imagery vividness ratings, but it would also account for the differential reports of verbal hallucination experiences by the two groups. This hypothesis is unlikely since Barrett and Etheridge (1992) reported no relationship between verbal hallucination scores and four measures of social desirability. Nevertheless, it was decided to test this hypothesis using a different approach.

STUDY 2

In order to test for the effects of demand characteristics, an imagery rating questionnaire was constructed to be structurally similar to the imagery vividness task used in Study 1. *S*s were presented with statements on each of the seven sensory modalities subscales and again asked to make their ratings on a 7 point scale. This time, however, the rating was one about control of the image (Gordon, 1949) rather than the vividness of the image. In terms of social desirability, this task is much the same as the vividness of imagery task and, consequently, one might expect results similar to those obtained in Study 1. On the other hand, there is no *a priori* reason, based on the vivid imagery hypothesis, to believe that control of imagery should be related to the frequency of occurrence of hallucinations.

Method

Subjects. As in Study 1, the *S*s were 62 individuals, 31 hallucinators and 31 nonhallucinators. They were selected from a pool of 124 individuals from introductory psychology classes who received extra credit for their participation. Procedures used to classify hallucinators and nonhallucinators were the same as in Study 1. The two groups did not differ significantly in the proportion of males to females (hallucinator: 8 males and 23 females; nonhallucinators: 14 males and 17 females). The two groups were significantly different in mean age, however [$F(1,60) = 4.98$, $P < 0.03$]. The nonhallucinators were slightly older (22.42) than hallucinators (19.48).

Materials. Again, two questionnaires were used. The first was the Verbal Hallucination Scale used in Study 1. The other scale was constructed to be similar in form to the imagery vividness scale used in Study 1. It was modelled after the control of imagery scale developed by Gordon (1949) and modified by Richardson (1969). For each of the seven sensory modalities represented on the vividness of imagery scale, there was a statement on the control of imagery scale that defined an image to be constructed. Then there were four statements, each representing a transformation of the original image. For example, the visual subscale began with the statement 'Imagine a green shag rug.' That was followed with the statement 'Now imagine that the green rug has caught fire. Image the green rug blazing with fire' this was followed by three additional statements that asked the *S* to imagine the rug hovering off the ground, changing color, and covered with dirt.

Procedures. The procedures were generally the same as in Study 1. On the second questionnaire, *S*s were asked to rate their ability to control their imagery on a 7 point scale. For each of the four transformations on each subscale, the *S* rated the ease of the transformation on a 7 point scale with '1' = 'so easy it was like watching it change on television' and '7' = 'impossible to transform the original image into the new one.'

Results and discussion

The Major Verbal Hallucination Scale score was calculated in the same fashion as in Study 1. In addition, the same cutoff scores were used to define the two groups. This resulted in 31

Table 2. Means and standard deviations for imagery control scales for hallucinators and nonhallucinators in Study 2

	Groups	
Imagery control scales	Hallucinators Mean (SD)	Nonhallucinators Mean (SD)
Visual	1.85 (0.81)	1.74 (1.07)
Auditory	2.23 (1.02)	2.09 (1.33)
Cutaneous	2.01 (0.85)	2.20 (1.51)
Kinesthetic	1.88 (1.25)	2.03 (1.24)
Gustatory	2.53 (1.52)	2.47 (1.42)
Olfactory	2.06 (1.44)	2.18 (0.95)
Organic	1.51 (0.63)	1.75 (0.77)

Lower means reflect higher rated control of imagery.

hallucinators and 31 nonhallucinators. To assess control of imagery, seven scores were calculated. The mean control rating of the four items for each of the seven scales was calculated. Table 2 shows the mean ratings for each of the seven imagery control subscales, separately for hallucinators and nonhallucinators. An examination of the means in Table 2 indicates they are somewhat lower than the imagery vividness ratings in Study 1. However, the standard deviations are quite comparable indicating no differential restriction of ranges for the imagery control ratings. A multivariate analysis of variance was performed where the independent variable was Groups (hallucinators vs nonhallucinators) and the dependent variables were the seven mean imagery control subscale scores (Visual, Auditory, Cutaneous, Kinesthetic, Gustatory, Olfactory and Organic). Wilks' lambda (0.92) was not significant [$F(7,54) < 1$]. All of the univariate analyses of variance produced Fs < 1. An examination of Table 2 shows no consistent pattern of mean differences between hallucinators and nonhallucinators. Finally, an examination of the 28 individual imagery control items revealed that 17 of them showed a mean difference indicating that hallucinators had a higher control rating than nonhallucinators while 11 were reversed. A large sample approximation sign test did not produce a significant z score. All of these analyses are clear in demonstrating that hallucinators and nonhallucinators do not differ in their control of imagery ratings.

To the extent that imagery ratings and verbal hallucination reports reflect social desirability, the results of the present study should be the same as the results of Study 1. In terms of social desirability, Ss in Study 1 and 2 were being asked to do the same thing; represent themselves as good imagers. To the extent that imagery vividness ratings and imagery control ratings reflect ratings of different imagery processes, the results of Study 1 and 2 would not be expected to be the same. The results of this study are quite clear. The two groups were not reliably different on any of the control of imagery ratings. Consequently, these results are consistent with the hypothesis that the findings in Study 1 are not due to social desirability.

SUMMARY AND CONCLUSIONS

In the two studies presented here, the relationship between the occurrence of verbal hallucinations and imagery vividness was investigated. In Study 1, the occurrence of verbal hallucinations was related to imagery vividness ratings. In addition, imagery vividness ratings all loaded positively on a general imagery vividness factor. In Study 2, no relationship was discovered between the occurrence of verbal hallucinations and image control ratings.

These findings, taken together, suggest that the imagery ratings of individuals in the general population who report verbal hallucinations are not differentially influenced by social desirability. Rather the data support the hypothesis that hallucinators have an imagery system that produces vivid and detailed images that may contain information from a variety of sensory modalities. However, this hypothesis does not specify the locus of the imagery effects. It could be that the imagery vividness difference between hallucinators and nonhallucinators is due to differential storage of sensory information. The reason hallucinators have more vivid images on this hypothesis is that images are built based on information in memory and hallucinators simply have more detailed sensory information in memory than do nonhallucinators. On the other hand, it might be that hallucinators and nonhallucinators do not differ in their ability to store sensory information. Instead, it could be that hallucinators have memory retrieval/image generation processes that

allow them to access more of the sensory information stored than nonhallucinators. This is an important issue that future investigations will need to address.

Of course, the major question is how does vivid imagery result in hallucinations. Recently, Slade and Bentall (1988) and Bentall (1990) have suggested that hallucinations arise through a failure of a reality discrimination process. The idea is that there is a process that continually checks the contents of consciousness to determine the origin of those contents. If the origin is deemed to be external, the contents of consciousness are dealt with as perceptual information. If the origin is deemed to be internal, the contents of consciousness are assumed to be an image. Hallucinations are thought to be images that are misidentified by the reality discrimination process as perceptions.

It seems likely that one type of information used by the reality discrimination process in making its decisions might be the amount of sensory detail present in consciousness. Much sensory information might suggest the conclusion that a perception is being experienced. Lesser amounts of sensory information in consciousness might suggest an imagery experience. Consequently, individuals who construct images rich in sensory detail are producing conscious experiences similar, in terms of sensory detail, to those produced through perception. This similarity might be expected to increase the likelihood that the reality discrimination process would categorize an image as a perception, thus producing an hallucination. Data from memory studies in which *S*s must decide on the origin of memories (i.e. Johnson & Raye, 1981) provide support for the idea that amount of sensory detail is an important source of information in making such decisions.

The present data also suggest an interesting hypothesis concerning the occurrence of other types of hallucinations in the normal population. The general imagery vividness hypothesis suggests that there is a general imagery process that transcends particular sensory modalities. It also suggests that verbal hallucinations may be related to that imagery process. Consequently, verbal hallucinators might be expected to also report hallucinations involving a variety of sensory experiences. In addition, one might expect to discover reports of hallucinations that are multi-sensory in nature.

Early studies of hallucinations among the general population (e.g. De Boismont, 1858; Parish, 1914; Sidgwick, 1894) have reported the occurrence of a variety of different types of hallucinations. For example, Sidgwick (1894) reported visual, nonverbal auditory, and tactile hallucinations, as well as verbal hallucinations. However, as far as I can tell, there is no systematic information regarding the co-occurrence of various types of hallucinations within the same individuals. This is an important issue since a correlation between the occurrence of various types of hallucinations might suggest that all hallucinations have a common cognitive mechanism. This seems to be the position taken by Slade and Bentall (1988). On the other hand, if some people report verbal hallucinations while other people report visual hallucinations, etc. that suggests different cognitive mechanisms may need to be postulated to account for different types of hallucinations. This position seems to be the one recently taken by Hoffman (1986).

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REFERENCES

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders* (3rd Edn-Revised). Washington, DC: Author.

Asaad, G. & Shapiro, B. (1986). Hallucinations: Theoretical and clinical overview. *American Journal of Psychiatry, 143*, 1088–1097.

Barrett, T. R. & Etheridge, J. B. (1992). Verbal hallucinations in normals, I: People who hear 'voices'. *Applied Cognitive Psychology, 6*, 379–387.

Bentall, R. P. (1990). The illusion of reality: A review and integration of psychological research on hallucinations. *Psychological Bulletin, 107*, 82–95.

Brett, E. A. & Starker, S. (1977). Auditory imagery and hallucinations. *The Journal of Nervous and Mental Disease, 164*, 394–400.

Cohen, L. H. (1938). Imagery and its relations to schizophrenic symptoms. *Journal of Mental Science, 84*, 284–346.

De Boismont, A.B. (1858). *On hallucinations: A history and explanation of apparitions, visions, dreams, ecstasy, magnetism and somnambulism* (translated by Robert T. Hulme). London: Henry Renshaw.

Di Vesta, F. J., Ingersoll, G. & Sunshine, P. A. (1971). A factor analysis of imagery tests. *Journal of Verbal Learning and Verbal Behavior, 10,* 471–479.
Galton, F. (1883). *Inquiries into human faculty and its development.* London: MacMillan.
Gordon, R. A. (1949). An investigation into some of the factors that favour the formation of stereotyped images. *British Journal of Psychology, 39,* 156–167.
Hoffman, R. E. (1986). Verbal hallucinations and language production processes in schizophrenia. *Behavioral and Brain Sciences, 9,* 503–548.
Horowitz, M. J. (1983). *Image formation and psychotherapy.* New York: Jason Aronson, Inc.
Johnson, M. K. & Raye, C. L. (1981). Reality monitoring. *Psychological Review, 88,* 67–85.
Launay, G. & Slade, P. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences, 2,* 221–234.
McKellar, P. (1968). *Experience and behavior.* Baltimore: Penguin Books.
Mintz, S. & Alpert, M. (1972). Imagery vividness, reality testing, and schizophrenic hallucinations. *Journal of Abnormal Psychology, 79,* 310–316.
Neisser, U. (1970). Visual imagery as process and as experience. In Antrobus, J. S. (Ed.), *Cognition and affect* (pp. 159–178). Boston: Little, Brown, & Co.
Parish, E. (1914). *Hallucinations and illusions: A study of the fallacies of perception.* New York: Charles Scribner's Sons.
Posey, T. B. & Losch, M. E. (1983). Auditory hallucinations of hearing voices in 375 normal subjects. *Imagination, Cognition and Personality, 3,* 99–113.
Richardson, A. (1969). *Mental imagery.* New York: Springer.
Roman, R. & Landis, C. (1945). Hallucinations and mental illness. *The Journal of Nervous and Mental Disease, 102,* 327–331.
Seitz, P. F. D. & Molholm, H. B. (1947). Relation of mental imagery to hallucinations. *Archives of Neurology and Psychiatry, 57,* 469–480.
Sheehan, P. W. (1967). A shortened form of Betts' Questionnaire Upon Mental Imagery. *Journal of Clinical Psychology, 23,* 386–389.
Sidgwick, H. (1894). Report of the census of hallucinations. *Proceedings of the Society for Psychical Research, 10,* 25–422.
Siegel, R. K. & Jarvik, M. E. (1975). Drug-induced hallucinations in animals and man. In Siegel, R. K. & Jarvik, M. E. (Eds), *Hallucinations: Behavior, experience, and theory* (pp. 81–162). New York: John Wiley & Sons.
Slade, P. D. (1976). An investigation of psychological factors involved in the predisposition to auditory hallucinations. *Psychological Medicine, 6,* 123–132.
Slade, P. D. & Bentall, R. P. (1988). *Sensory deception: A scientific analysis of hallucination.* Baltimore: The Johns Hopkins University Press.
SPSS, Inc. (1983). *SPSSx user's guide.* Chicago: Author.
Starker, S. & Jolin, A. (1982). Imagery and hallucinations in schizophrenic patients. *The Journal of Nervous and Mental Disease, 170,* 448–451.
White, K., Ashton, R. & Law, H. (1974). Factor analyses of the shortened form of the Betts' Questionnaire Upon Mental Imagery. *Australian Journal of Psychology, 26,* 183–190.
White, K. D., Ashton, R. & Law, H. (1978). The measurement of imagery vividness: effects of format and order on the Betts' Questionnaire Upon Mental Imagery. *Canadian Journal of Behavioural Science, 10,* 68–78.
Zuckerman, M. & Cohen, N. (1964). Sources of reports of visual and auditory sensations in perceptual-isolation experiments. *Psychological Bulletin, 62,* 1–20.