Should be cited as: Psychiatria Polska
2012, tom XLVI, numer 6
strony 933–946

Dysfunctional meta-cognitive beliefs and anxiety, depression and self-esteem among healthy subjects with hallucinatory-like experiences

Łukasz Gawęda[1], Paweł Holas[1] , Andrzej Kokoszka[1,2]

[1] II Department of Psychiatry Medical University of Warsaw
Head of the Department: prof. dr hab. n. med. A. Kokoszka
[2] University of Social Sciences and Humanities
Dean of the Faculty of Psychology: prof. dr hab. J. Karyłowski

Summary

Aim. This study focuses on the relationship between dysfunctional meta-cognitive beliefs, depression, anxiety and self-esteem and hallucinatory-like experiences among healthy subjects.

Methods. 198 (149 females) healthy participants, mostly recruited from university students, took part in the study. Hallucinatory-like experiences were assessed with Polish version of Revised Hallucinations Scale (RHS). Based on two subscales of RHS that measure visual and auditory hallucinatory-like experiences, two groups were distinguished: 1 – participants with no auditory and visual hallucinatory-like experiences (n=35) and 2 – participants with high frequent hallucinatory-like experiences (n=40). Meta-cognitive beliefs were assessed with the Metacognitions Questionnaire. Beck Depression Inventory (BDI), State and Trait Anxiety Inventory (STAI) and Rosenberg Self-Esteem Scale (R-SES) were used for emotional processes assessment. Further correlations between meta-cognitive beliefs, hallucinatory-like experiences and emotional processes were calculated.

Results. Persons with frequent hallucinatory-like experiences tended to exhibit higher dysfunctional meta-cognitive beliefs in comparison to those who had no psychotic-like experiences. Moreover, those who had more frequent hallucinatory-like experiences revealed subclinical depression, were more anxious and exhibit lower level of self-esteem. Apart from the total score in the RHS scale, dissociative experiences and auditory and visual perceptual alternations were found to be related to more dysfunctional meta-cognitive beliefs.

Conclusions. Hallucinatory-like experiences among healthy subjects are related to dysfunctional meta-cognitive beliefs. In addition, hallucination like experiences were found to be linked to emotional dysfunctions, which implies that psychotic-like experiences observed in healthy persons may be of clinical interest.

Keywords: hallucinatory-like experiences, emotions, meta-cognitive beliefs

Introduction

Short-term and transient psychotic-like experiences are a heterogeneous group of mental experiences lying on a continuum of psychosis [3]. It is difficult to une-

quivocally define psychotic-like experiences. Researchers refer to such concepts as perceptual aberrations, unusual thinking styles, altered states of consciousness [5], or hallucinatory-like experiences.

The occurrence of single psychotic symptoms in general population is now well documented [1]. In the study of Romme et al [2] from the 173 people experiencing auditory hallucinations as many as 78 did not seek psychiatric help and had never been treated psychiatrically. Van Os et al [3] conducted a clinical interview on a sample of 7076 individuals from the general population. Results of the study indicate the presence of auditory hallucinations that had no clinical significance in approximately 6.2% people. In addition, 1.7% of those persons experienced auditory hallucinations similar to those observed in the clinical context.

Also, recent studies conducted in Poland [4] indicate the occurrence of visual hallucinatory-like experiences in persons psychiatrically untreated (n = 213). 21% of the subjects reported incidence of experiencing „seeing shapes and shades, when they were not present", and 7.1% of those persons experienced seeing human face, while in reality it was not present.

The most commonly examined hallucinatory-like experiences are the auditory ones. In the study of Bentall and Slade [6], 17.7% of students answered positively to the question „Have you ever heard a voice that utters your thoughts?". Similar results were obtained by other researchers [7, 8]. Using the Revised Hallucination Scale by Morrison, which assesses hallucinatory-like-experiencers, Gawęda and Kokoszka [4] obtained comparable results. 21.6% of people admitted that they happened to hear the voice uttering their thoughts out loud. However, only 1.4% of those persons admitted that this experience is present in their lives very often, for the rest of the people it was a rare experience.

Studies on psychotic-like experiences in the general population are motivated by looking for factors that predispose to psychosis. The study results show however, that not all psychotic-like experiences are associated with risk of developing psychosis [9], which may suggest that the mere presence of such experiences is not a sufficient factor for the development of psychosis [10].

A significant contribution to the understanding of factors predisposing to the development of psychosis have the cognitive concepts. According to them, psychotic -like experiences in themselves are not significant risk factors for the development of psychosis. The key to the development of the discomfort associated with these experiences are the assigned to them dysfunctional meanings [11, 12]. Dysfunctional ways of assigning meaning to thought content processes may as a result, in accordance with cognitive concepts, lead to delusions and hallucinations.

According to the cognitive concepts, hallucinations are caused by incorrect, external attribution (e.g. foreign powers) of internal psychological states (e.g., intrusive thoughts) [13]. There is empirical evidence supporting this hypothesis, both among people with schizophrenia who have auditory hallucinations [14, 15, 16], as well as among healthy persons having hallucinatory-like experiences [17, 18]. Morrison, Haddock and Tarrier [19] hypothesized that in the process of erroneous attribution the metacognitive beliefs are involved and that they are also important in developing and/ or maintaining hallucinations. These beliefs are the judgment and the knowledge that a

person has about his/her own cognitive processes [20]. In other words, metacognitive beliefs are responsible for assigning meanings to one own mental processes. Morrison, Haddock and Tarrier [19] believe that perceiving dissonance between intrusive mental experience (e.g., the intrusive thought, „I hate him") and dysfunctional metacognitive beliefs (e.g., „I should control my own thoughts") is a source of distress. According to the authors' hypothesis, this distress is reduced by an external attribution (It is not me thinking that „I hate him" - it is a voice that says, „I hate him").

Although preliminary studies suggest the importance of dysfunctional metacognitive beliefs in auditory hallucinations and hallucinatory-like experiences, to date it has been failed to clearly identify which of metacognitive beliefs play a major role in them. Morrison and Wells [21] using the Meta-Cognitions Questionnaire [20] have indicated that people with diagnosed schizophrenia, who experience auditory hallucinations, achieve higher results in comparison with a group of people with schizophrenia who do not experience voices and with a group of healthy subjects, on a scale of beliefs about the uncontrollability of their thoughts, positive beliefs about worry and characterized by beliefs of low cognitive confidence. Baker and Morrison [22] demonstrated the presence of more severe, dysfunctional beliefs about worry („Worrying helps me avoid difficulties in the future") in patients experiencing hallucinations compared to people who did not have them. Dysfunctional metacognitive beliefs were also observed among healthy individuals who showed a predisposition to hallucinatory-like experiences [23, 24]. Interesting, confirming the hypothesis of the role of dysfunctional metacognitive beliefs in the erroneous attribution, are the results of the study by Laroi and colleagues [23] showing the relationship between beliefs about cognitive confidence and about the ability to control own thoughts with false attribution in subjects having hallucinatory-like experiences. It seems, therefore, that these two groups of metacognitive beliefs may be the most important for the formation and/or maintenance of hallucinations and experiences similar to them. So far, however, it has been failed to clearly determine whether there is a specific profile of dysfunctional metacognitive beliefs that predispose to them.

It was also found that - apart from the cognitive processes - emotional processes are strongly associated with experiencing hallucinations [25]. Emotional dysfunctions can precede their occurrence [9, 26, 27] and may accompany the experience of hearing voices [28]. Intensification of anxiety [29] and depression may precede psychotic symptoms. In addition, some authors report that low self-esteem, which is often seen in people experiencing hallucinations [52], may be associated with an increased risk of psychotic episode [30].

Intensification of emotional dysfunctions was observed in individuals exhibiting psychotic-like experiences. These individuals are characterized by a higher levels of anxiety and depression [31]. Some reports also suggest relationship of low self-esteem with hallucinatory-like experiences [32].

Concluding, hallucinatory-like experiences in healthy persons are associated with (meta) cognitive and emotional dysfunctions, similar to those found in clinical syndromes. Still, however, little is known whether there is a specific group of metacognitive beliefs, which is associated with hallucinatory-like experiences.

Aim

The main aim of the study was to determine the differences in metacognitive beliefs and emotional variables (severity of anxiety, depression and self-esteem) between psychiatrically untreated persons who do not have auditory and visual hallucinatory-like experiences, and those who have such experiences quite often. Moreover, the aim of this study was to determine relationships of dysfunctional metacognitive beliefs and emotional variables with various hallucinatory-like experiences .

Material and method

Participants of the study

The study involved 198 people (149 females), who had never been treated psychiatrically. Most of the persons were recruited for the study from university students (stationary and non-stationary mode). The mean age of the sample was 24.63 years (SD = 6.68), while the mean number of years of education, including higher education, was 14.28 years (SD = 1.75). After giving consent to participate in the study, the participants anonymously and voluntarily completed the set of questionnaires (approx. 30 min.). The study was approved by the Bioethical Committee of the Medical University of Warsaw.

Division of the studied group and methodology

The purpose of the division of the studied group was to create two extreme subgroups in terms of the severity of occurrence of hallucinatory-like experiences. Only for two types of hallucinatory-like experiences it was possible to distinguish one subgroup of persons who had never experienced them, and a second subgroup that experienced them quite frequently.

To identify the subgroups, the following experiences were selected - auditory and visual perceptual aberrations and auditory hallucinatory-like experiences. The experiences chosen to divide the groups are the closest to hallucinations. Below is the description of the two subgroups. The group without hallucinatory-like experiences was selected on the basis of the result of 12 points, which indicates that these persons acknowledged that such psychic phenomena had never occurred in them. People in whom the discussed experiences occurred were selected from among those receiving scores above 66 percentile.

However, the RHS scale contains two additional subscales (RHS scale description below). Therefore, an additional analysis of correlations was conducted of all subscales of RHS with metacognitive beliefs and emotional variables.

Persons with high incidence of hallucinatory-like experiences

People in this group accounted for 15.4% of the studied population (9 males and 31 females). Mean total score for the two subscales of RHS - auditory and visual perceptual aberrations and auditory hallucinatory experiences - was 20.25 points. (SD = 2.40). The mean age of the group was 24.6 years (SD = 7.6) and mean years of education- 14.30 (SD = 1.75).

Persons without hallucinatory-like experiences

This group consisted of 17.9% of all persons (6 males and 29 females). People in this group received mean total score for the two subscales of RHS - auditory and visual perceptual aberrations and auditory hallucinatory-like experiences - equal to 12 points (SD = 0). Mean age of the group was 26.17 years (SD = 6.26) and the mean duration of education - 14.66 years (SD = 1.67).

Tools

The following set of questionnaires was used in the study:

1. Polish version of the Revised Hallucination Scale [4]. This scale is used to examine the incidence of visual and auditory hallucinatory-like-experiences. It was established on the basis of the most frequently used scale to study the experienced hallucinations among healthy people - Launlay-Slade Hallucinatory Scale [33]. The tool consists of 24 questions, which are answered on a 4-point scale denoting the frequency of hallucinatory-like-experiences (1-never, 2-sometimes, 3-often 4-almost always). In a study of psychometric properties of Polish version of the RHS scale, carried out by our team [4], four factors were identified: 1 - Imagery vividness, 2 - Auditory and visual perceptual anomalies, 3 - Experience of dissociation, 4 - Auditory hallucinatory-like-experiences. The scale has good psychometric properties (Cronbach's alpha ranging from 0.7 to 0.88).
2. The Meta-Cognitions Questionnaire, MCQ [20]. This scale allows for examination of metacognitive beliefs, which are often defined as „cognition about cognition". The scale consists of 65 items constituting 5 separate subscales: 1) Positive worry beliefs, example „Worrying helps me sort out things in my mind", 2) Beliefs about uncontrollability and danger, example: „My worry is dangerous for me" and 3) Beliefs about cognitive confidence, example: „I have little trust in my memory to words and names", 4) General negative beliefs, including a sense of responsibility, superstition, punishment, example: „If I do not stop to worry, the fears will become real", 5) Cognitive self-consciousness; example „ I pay a lot of attention to how my mind works „.
3. Beck Depression Inventory (BDI) [34]. This self-report scale was used to examine severity of depression symptoms. The result over 9 points indicates a slight depressive episode.
4. State-Trait Anxiety Inventory (STAI) [35]. The scale is used to assess anxiety as a state and as a trait. The first subscale serves to assess severity of experiencing anxiety at the moment the test (20 questions), the second assesses the subject's readiness to respond by anxiety (20 questions).
5. Rosenberg's Self-Esteem Scale (R-SES) [36]. This tool allows for testing self-esteem. The scale consists of 10 questions to which person examined responds on a 4-point scale from 1 (strongly agree) to 4 (strongly disagree).

Results

Distribution of most of the measured variables in the sample was different from the normal (based on Kolmogorov-Smirnov test). Nonparametric equivalent of the t-test

for independent groups - Mann-Whitney U test was applied. In case of correlations analysis, nonparametric Spearman rank correlations were performed.

Groups did not differ significantly with respect to age: U = 608, p> 0.05, and years of education: U = 541, p> 0.05. There were significant differences between groups in terms of mean score on RHS scale: U = 0.5, p <0.001.

Differences between groups in metacognitive beliefs

A group of people with a high incidence of hallucinatory-like experiences obtained higher scores than the group with a low incidence of hallucinatory-like experiences in the subscale of MCQ measuring positive beliefs about worry: U = 501, p <.05 (M = 35.23, SD = 9.74 vs. M = 30.77, SD = 8.77), beliefs about the inability to control thoughts: U = 375.5, p <0.001 (M = 33.79, SD = 8.76 vs. . M = 26.94, SD = 8.49), beliefs about cognitive confidence: U = 380, p <0.001 (M = 20.56, SD = 5.98 vs. M = 16.34, SD = 4 , 34), general negative beliefs about thoughts: U = 433, p <.01 (M = 25.95, SD = 7.81 vs. M = 20.94, SD = 5.20), and beliefs about cognitive self-awareness: U = 397.5, p <0.001 (M = 18.15, SD = 4.02 vs. M = 14.68, SD = 3.65). The results are presented in Table 1.

Table 1. **Differences between groups in metacognitive beliefs**

	High freqency of hallicinatory-like experiences n = 40	Lack of hallucinatory-like experiences n = 35		
MCQ subscale	M (SD)	M (SD)	U	p
1. Positive beliefs about worry	35.23 (9.74)	30.77 (8.77)	501	< 0.05
2. Beliefs about uncontrollability of thoughts	33.79 (8.76)	26.94 (8.49)	375.5	< 0.001
3. Beliefs about cognitive confidence	20.56 (5.98)	16.34 (4.34)	380	< 0.001
4. Negative beliefs about thoughts in general	25.95 (7.81)	20.94 (5.20)	433	< 0.01
5. Beliefs about cognitive self-consciousness	18.15 (4.02)	14.68 (3.65)	397.5	< 0.001
Total result	132.14 (28.04)	109.68 (23.9)	316	< 0.001

M – mean; SD – standard deviation; t – Student's t-statistic; df – degrees of freedom; p – level of significance

Differences between groups in emotional variables

In the next stage, the research groups were compared in terms of the severity of depression, anxiety measured as state and trait and global self-esteem. Comparisons between groups indicated significantly higher depression severity measured by BDI

in the group with a higher incidence of hallucinatory-like experiences in comparison to the group with a lower frequency of these experiences: U = 480, p <.05 (M = 9.57, SD = 8.56 vs. M = 4.91, SD = 4.73). Similarly higher results in bot: the subscale of state: U = 424.5, p <0.01 (M = 39.51, SD = 10.14 vs. M = 33.11, SD = 7.43) as well as trait anxiety: U = 506.5, p <.05 (M = 43.82, SD = 8.87 vs. M = 39.77, SD = 7.85) and lower global self-esteem at the level of trend: U = 549, p = 0.1 (M = 28.95, SD = 6.32 vs. M = 31.25, SD = 4.73) obtained the group with a higher frequency of hallucinatory -like experiences, as compared to the persons with low frequency of occurrence of hallucinatory-like experiences. The results are shown in Table 2.

Table 2. **Differences between groups in severity of depression, anxiety and global self-esteem**

	High frequency of hallucinatory-like experiences n = 40	Lack of hallucinatory-like experiences n = 35		
	M (SD)	M (SD)	U	p
BDI	9.57 (8.56)	4.91 (4.73)	480	< 0.05
STAI Total	83.33 (17.43)	72.88 (14.08)	549	< 0.01
STAI X1	39.51 (10.14)	33.11 (7.43)	424.5	< 0.01
STAI X2	43.82 (8.87)	39.77 (7.85)	506.5	< 0.05
R-SES	28.95 (6.32)	31.25 (4.73)	549	0.11

M – mean; SD – standard deviation; t – Student's t-statistic; df – degrees of freedom; p – level of significance ; BDI – Beck Depression Inventory; STAI – State (X1)-Trait (X2) Anxiety Inventory; R-SES – Rosenberg's Self-Esteem Scale

Correlations of hallucinatory-like-experiences with metacognitive beliefs

In addition to auditory and visual hallucinatory-like experiences, the RHS scale has another two subscales that measure the frequency of occurrence of vivid images and dissociative experiences. In this part of analysis the relationships of all RHS subscales with particular metacognitive beliefs measured by MCQ scale were tested. All subtypes of metacognitive beliefs significantly, positively correlated to the overall severity of hallucinatory-like experiences (RHS overall result; rho from 0.243 for positive beliefs about worry to 0.424 for beliefs about the uncontrollability of thoughts), although statistically significant, majority of correlations was relatively weak. Detailed results are presented in Table 3

Table 3**. Correlations of hallucinatory-like-experiences with particular metacognitive beliefs**

	RHS 1 – Imagery vividness	RHS 2 – Auditory and visual perceptual anomalies	RHS 3 – Experience of dissociation	RHS 4 – Auditory hallucinatory experiences	RHS Total result
1. Positive beliefs about worry	0.170*	0.205**	0.242**	0.097	0.243**
2. Beliefs about uncontrollability of thoughts	0.310**	0.314**	0.387**	0.254**	0.424**

table continued on next page

3. Beliefs about cognitive confidence;	0.096	0.258**	0.251**	0.204**	0.247**
4. Negative beliefs about thoughts in general	0.170*	0.286**	0.224**	0.152*	0.258**
5. Beliefs about cognitive self-consciousness	0.274**	0.300**	0.134	0.156*	0.288**

Nonparametric Spearman's rank correlation Rho. * – significance level $p < 0.05$; ** – significance level $p < 0.01$.

Correlations of hallucinatory-like-experiences with severity of depression, anxiety and self-esteem

In the next step, all four factors in the RHS scale were correlated with the results obtained by means of scales: BDI, STAI--X1, X2 STAI- and R-SES. All emotional variables were significantly related to the overall result on the scale RHS. The strongest relationships were indicated between dissociative experiences and depression (rho = 0.389), anxiety as a state (rho = 0.365), anxiety as a trait (rho = 0.385) and self-esteem (rho = -0.368). Relations between auditory hallucinatory-like experiences and self-esteem and anxiety as a trait proved to be weak and not statistically significant. Also, self-esteem relationships with imagery vividness, and visual and auditory perceptual aberrations were not significant. Detailed results are presented in Table 4

Table 4**. Correlations of hallucinatory-like-experiences with severity of depression and anxiety symptoms and self-esteem**

	RHS 1 – Imagery vividness	RHS 2 – Auditory and visual perceptual anomalies	RHS 3 – Experience of dissociation	RHS 4 – Auditory hallucinatory experiences	RHS Total result
BDI	0.192**	0.226**	0.389**	0.141*	0.291**
STAI X1	0.194**	0.284**	0.365**	0.159*	0.306**
STAI X2	0.169*	0.257**	0.385**	0.116	0294**
R-SES	-0.106	-0.131	-0.368**	0.112	0.226**

BDI – Beck Depression Inventory; STAI – State (X1)-Trait (X2) Anxiety Inventory; R-SES – Rosenberg's Self-Esteem Scale; Nonparametric Spearman's rank correlation Rho. * – significance level $p < 0.05$; ** – significance level $p < 0.01$.

Discussion

The results of the presented study suggest that people experiencing relatively frequent auditory and visual hallucinatory-like experiences are characterized by severe dysfunctional metacognitive beliefs. In other words, they assign dysfunctional meaning to their own mental sensations. Moreover, intensification of depressive symptoms measured by the Beck Depression Inventory (BDI) may indicate a subclinical or mild

exacerbation of depressive symptoms in persons having relatively frequent psychotic-like experiences (BDI> 9). Result in the group without hallucinatory-like experiences on the BDI scale was within the normal range (BDI <9). In the group of people with hallucinatory-like experiences higher severity of anxiety and low self-esteem was also indicated compared to those without hallucinatory-like experiences.

In all subtypes of metacognitive beliefs, the people indicating relatively frequent visual and auditory hallucinatory-like experiences gained higher score (more dysfunctional beliefs) than people without such experiences. The greatest differences between the investigated groups were observed for the belief about uncontrollability of thoughts, beliefs about cognitive self-awareness and beliefs about cognitive confidence. This result suggests an overall increase in dysfunctional assigning meaning to cognitive processes in individuals with visual and auditory hallucinatory-like experiences. Similar results were obtained in other studies of people with hallucinatory-like experiences [23, 37, 38]. Greater severity of dysfunctional metacognitive beliefs was also demonstrated among persons with diagnosed schizophrenia experiencing auditory hallucinations, compared to those non-experiencing them. [21]. However, in the study of Garcia-Montes et al [39] there were no such differences observed. It should be noted that the severity of dysfunctional metacognitive beliefs need not be associated only with hallucinatory experiences. The results of some previous studies also suggest the relationship of beliefs about worry with delusions [40, 41].

In addition to visual and auditory hallucinatory-like experiences, the RHS scale also allows for examining the frequency of other experiences that may lie on a continuum of psychotic symptoms. Therefore, further correlations of all the experiences measured by RHS scale with metacognitive beliefs, and then with emotional variables, were analyzed. All subtypes of metacognitive beliefs were significantly positively associated with the overall RHS scale scores. Beliefs about the controllability of thoughts were most strongly associated with the overall result of the RHS scale (rho = 0.42). In the analysis of relationships between metacognitive beliefs and particular subscales of RHS it was indicated that the beliefs about the possibility to control thoughts moderately positively correlated with the dissociative experiences, auditory and visual perceptual distortions and the clarity of the imagination. The weakest link of beliefs about the possibility to control thoughts was observed with auditory hallucinatory-like experiences (rho = 0.25). Such result may be due to the relatively low incidence of auditory hallucinatory-like experiences in the studied population (these experiences are most closely related to auditory hallucinations). It was also shown that there is a relationship between beliefs about cognitive self-awareness and the auditory and visual perceptual distortions and with the imagery vividness, in the absence of correlation of these beliefs with dissociative experiences. Increased tendency to focus attention on the process of thinking, which characterizes greater cognitive self-awareness, can reduce the threshold of perception of intrusive experience and consequently increase perceptual anomalies. Baker and Morrison [22] obtained a similar result of higher cognitive self-awareness in individuals experiencing auditory hallucinations. Similar results were obtained in a study of healthy persons with high frequency of hallucinatory -like experiences [24, 37].

The obtained results suggest no specific profile of dysfunctional metacognitive beliefs that would be associated with hallucinatory-like experiences. People diagnosed with schizophrenia exhibit more dysfunctional metacognitive beliefs [21, 38, 42]. However, some studies show a similar profile of metacognitive beliefs in schizophrenia and obsessive-compulsive disorder [42] and panic disorder [21]. One of the reasons for the similarities in the profile of metacognitive beliefs in various mental disorders can be the general level of discomfort. Some studies have shown that the differences between people experiencing hallucinatory-like experiences and those without them disappear in controlling the level of anxiety and depression [43]. Also other studies suggest a stronger relationship of dysfunctional beliefs with depression and anxiety than with the intensification of auditory hallucinations in people with a diagnosis of schizophrenia [44]. These observations seem to be consistent with the proposed by some inseparable association of emotional dysfunctions and psychotic symptoms [45].

Further analyses confirmed the relationship of hallucinatory-like experiences with emotional discomfort. Referring the obtained in the present study results on the Beck Depression Inventory to norms, the group of people exhibiting frequent hallucinatory -like experiences was characterized by subclinical depression, and the group without such experiences scored within the norms These results are consistent with previous reports showing relationship of hallucinatory-like experiences -like experiences with higher levels of anxiety and depression [31, 46]. Although only on the verge of statistical significance, the results of this study, consistent with previous reports, also suggest a lower self-esteem among people with high frequency of auditory and visual hallucinatory-like experiences [32].

Next, associations of all RHS subscales with emotional variables were analyzed. The severity of depression, anxiety and low self-esteem were positively associated with the dissociative experiences, which is consistent with previous reports [47, 48]. At the same time it was the strongest relationship of emotional variables with RHS subscale. Simultaneously; the level of self-esteem was associated only with the dissociative experiences and with the overall result of RHS scale. The weakest relationship of emotional variables was found with the auditory hallucinatory-like experiences. This may be due to the fact that this subscale of RHS represents the most similar to clinical hallucinatory-like experiences, and their incidence in the studied population was relatively the lowest. There was, in turn, observed relationship, though relatively weak, of state and trait anxiety and depression with and the auditory and visual perceptual anomalies. Even weaker, but statistically significant relationship was observed between the severity of the state and trait anxiety and depression with the subscale of clarity of imagination.

Psychotic-like experiences in healthy people are often discussed in the context of factors predisposing to clinical psychotic syndromes [9]. It seems that the mere presence of psychotic- like experiences does not have to be a significant factor predisposing to psychosis. However, as shown in this study, psychotic-like experiences of people from the general population may be associated with psychological distress and dysfunctional metacognitive beliefs. This result is particularly important in the context of factors that predispose to the development of psychosis. In fact it was previously

shown that it is not the mere presence of psychotic-like experiences [10, 27], but the psychological distress (anxiety and depression) may be a predictor of the development of a psychotic episode.

The clinical relevance of increased distress among individuals with observed psychotic-like experiences is best seen in the need to seek help by these people [49]. The observed emotional and cognitive dysfunctions in individuals with hallucinatory-like experiences may suggest their involvement in the process of psychiatric diagnosis and preventive measures. Currently, such activities are conducted in many centers in the world, resulting in therapeutic programs for those at risk of psychosis (at risk state) or for people in the first psychotic crisis. [50] These interventions are often based on studies of relationships of cognitive and emotional processes, and psychotic experiences, using the model of cognitive-behavioral therapy.

The final conclusions of the study should be considered in the context of the limitations of the methodology used. As lack of mental disorders was assumed no contact in the past with a psychologist and/or psychiatrist. However, the lack of seeking appropriate help need not be tantamount to a lack of mental disorders. In the future, this problem can be solved using the structured clinical interview (e.g. M.I.N.I). The applied methodology (comparisons between groups and correlations) do not allow for cause-and-effect reasoning. It is therefore difficult to draw conclusions whether emotional distress and dysfunctional metacognitive beliefs precede or are a consequence of hallucinatory-like experiences. Only longitudinal studies with several measuring points would allow for cause and effect concluding.. The authors are planning application of such a procedure in the future.

Conclusions

1. Occurrence of hallucinatory-like experiences among healthy persons is associated with dysfunctional metacognitive beliefs.
2. Higher incidence of these is associated with higher intensity of symptoms of depression, anxiety, and lower global self-esteem.
3. In people exhibiting hallucinatory-like experiences subclinical symptoms of depression can be observed In subjects without such experiences the mood was within the norms.
4. These experiments, because of their relationship with dysfunctional metacognitive beliefs and intensification of emotional discomfort, may also of mental health clinical interest.

References

1. van Os J, Lonscott, LJ, Myin-Germays, I, Delespaul, P, Krabbendam, L. *A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness–persistence –impairment model of psychotic disorder*. Psychol. Med. 2009; 39: 179–195.
2. Romme MA, Honig A, Noorthoorn EO, Escher AD. *Coping with hearing voices: an emancipatory approach*. Br. J. Psychiatry 1992; 161: 99–103.

3. van Os J, Hanssen M, Bijl RV, Ravelli A. *Straus (1969) revisited : a psychosis continuum in the general population?* Schizophr. Res. 2000; 45: 11–20.
4. Gawęda Ł, Kokoszka A. *Polska wersja Zmodyfikowanej Skali Halucynacji (RHS) Morrison'a i wsp. (2002). Analiza czynnikowa skali oraz częstotliwość występowania doświadczeń podobnych do omamowych wśród osób zdrowych psychicznie*. Psychiatr. Pol. 2011; 4: 527–543.
5. Kokoszka, A. *Altered States of Consciousness: models for psychology and psychotherapy. New York: Springer; 2007.*
6. Bentall RP, Slade PD. *Reality testing and auditory hallucinations: a signal detection analysis*. Br. J. Clin. Psych. 1985; 24: 159–169.
7. Posey TB, Losch ME. *Auditory hallucinations of hearing voices in 375 normal subjects*. Imagin. Cogn. Pers. 1983; 3: 99–113.
8. Tien AY. *Distributions of hallucinations in the population*. Soc. Psych. Psych. Epid. 1991; 26: 287–292.
9. Yung AR, Nelson B, Baker K, Bucby JA, Baksheev G, Cosgrave EM. *Psychotic like experiences in a community sample of adolescents: implications for the continuum model of psychosis and prediction of schizophrenia*. Aust. N. Z. J. Psychiatry 2009; 43: 118–128.
10. Johnstone EC, Ebmeier KP, Miller P, Owens DG, Lawrie SM. *Predicting schizophrenia: findings from the Edinburgh High-Risk Study*. Br. J. Psychiatry 2005; 186: 18–25.
11. Beck AT, Rector N. *Delusions: a cognitive perspective*. J. Cogn. Psychoth. 2002; 16: 455–468.
12. Morrison AP. *The interpretation of intrusions in psychosis : an integrative cognitive approach to hallucinations and delusions*. Behav. Cogn. Psychoth. 2001; 29: 257–276.
13. Bentall RP. *Illusion of reality: a review and integration of psychological research on auditory hallucinations*. Psychol. Bull. 1990; 107: 82–95.
14. Brebion G, Gorman J, Amador X, Malaspina D, Sharif Z. *Source monitoring impairments in schizophrenia: characteristics and associations with positive and negative symptomatology*. Psychiatry Res. 2002; 112: 27–39.
15. Allen PP, Johns LC, Fu CHY, Broome MR, Vythelingum GN, McGuire PK. *Misattribution of external speech in patients with hallucinations and delusions*. Schizophr. Res. 2004; 69: 277–287.
16. Brunelin J, Combris M, Poulet E, Kellen L, D'Amto T, Dalery J, Saoud M. *Source monitoring deficits in hallucinating compared to non-hallucinating schizophrenia patients*. Eur. Psychiatry 2006; 21: 259–261.
17. Allen P, Freeman D, Johns L, McGuire P. *Misattribution of self-generated speech in relation to hallucinatory proneness and delusional ideation in healthy volunteers*. Schizophr. Res. 2006; 84: 281–288.
18. Laroi F, Collignon O, van der Linden M. *Source monitoring for actions in hallucinations proneness*. Cogn. Neuropsychiatry 2005; 10: 105–123.
19. Morrison AP, Haddock G, Tarrier N. *Intrusive thoughts and auditory hallucinations: a cognitive approach*. Behav. Cogn. Psychother. 1995; 23: 265–280.
20. Cartwright-Hatton S, Wells A. *Beliefs about worry and intrusions: the metacognitions questionnaire and its correlates*. J. Anxiety Disord. 1997; 11: 279–296.
21. Morrison AP, Wells A. *A comparison of metacognition in patients with hallucinations, delusion, panic disorder and non-patient controls*. Behav. Res. Ther. 2003; 41: 251–256.
22. Baker C, Morrison AP. *Cognitive processes in auditory hallucinations: attributional biases and metacognition*. Psychol. Med. 1998; 28: 1199–1208.
23. Laroi F, Van der Linden M, Marczewski, P. *The effects of emotional salience, cognitive effort and meta-cognitive beliefs on a reality monitoring task in hallucination-prone subjects*. Br. J. Clin. Psychol. 2004; 43: 221–233.

24. Morrison AP, Wells A, Nothard S. *Cognitive factors in predisposition to auditory and visual hallucinations*. Br. J. Clin. Psych. 2000; 39: 67–78.
25. Myin-Germeys I, van Os J. *Stress-reactivity in psychosis: evidence for an emotional pathway to psychosis*. Clin. Psychol. Rev. 2007; 27: 409–424.
26. Bebbington PE, Wilkins S, Jones P, Forester A, Murray RM, Toone B, Lewis S. *Life events and psychosis: results from the Camberwell Collaborative Psychosis Study*. Br. J. Psychiatry 1993; 162: 72–79.
27. Yung AR, Buckby JA, Cosgrave EM, Killackey EJ, Baker K, Cotton SM, McGorry PD. *Association between psychotic experiences and depression in a clinical sample over 6 months*. Schizophr. Res. 2007; 91: 246–253.
28. Nayani TH, David A. *The auditory hallucination: a phenomenological survey*. Psychol. Med. 1996; 26: 177–189.
29. Delespaul P, Vries M, van Os J. *Determinants of occurence and recovery from hallucinations in daily life*. Soc. Psych. Psych. Epid. 2002; 37: 97–104.
30. Krabbendam L, Janssen I, Bak M, Bilj RV, de Graaf R, van Os J. *Neuroticism and low self-esteem as a risks factors for psychosis*. Soc. Psych. Psych. Epid. 2002; 37: 1–6.
31. Paulik G, Badcock JC, Maybery MT. *The multifactorial structure of the predisposition to hallucinate and associations with anxiety, depression and stress*. Pers. Indiv. Differ. 2006; 41: 1067–1076.
32. Jones SR, Frenyhough C. *The roles of locus of control and self-esteem in hallucination- and delusion-proneness in a non-clinical sample*. Pers. Indiv. Differ.. 2007; 43: 1087–1097.
33. Launay G, Slade PD. *The measurement of hallucinatory predisposition in male and female prisoners*. Pers. Indiv. Differ. 1981; 2: 221–234.
34. Parnowski T, Jernajczyk W. *Inwentarz Depresji Becka w ocenie osób zdrowych i chorych na choroby afektywne (ocena pilotażowa)*. Psychiatr. Pol. 1977; 11: 417–25.
35. Wrześniewski K, Sosnowski T, Matusiak D. *Inwentarz stanu i cechy lęku. Polska adaptacja STAI.* Warszawa: PTP; 2002.
36. Dzwonkowska I, Tabaczek-Lachowicz K, Łaguna M. *Samoocena i jej pomiar: Polska adaptacja skali SES M. Rosenberga*. Warszawa: PTP; 2008.
37. Stirling J, Barkus E, Lewis S. *Hallucination proneness, schizotypy and meta-cognition*. Behav. Res. Ther. 2007; 45: 1401–1408.
38. Morrison AP, French P, Wells A. *Metacognitive beliefs across the continuum of psychosis: comparisons between patients with psychotic disorders, patients at ultra-high risk and non-patients*. Behav. Res. Ther. 2007; 45: 2241–2246.
39. Garcia-Montes JM, Perez-Alvarez M, Balbuena CS, Garcelan PS, Cangas AJ. *Metacotnitions in patients with hallucinations and obsessive-compulsive disorder: The superstition factor*. Behav. Res. Ther. 2006; 44: 1091–1104.
40. Startup H, Freeman D, Garety PA. *Persecutory delusions and catastrophic worry in psychosis: developing the understanding of delusions distress and persistence*. Behav. Res. Ther. 2007; 45: 523–537.
41. Morrison AP, Wells A. *Relationships between worry, psychotic experiences and emotional distress in patients with schizophrenia spectrum diagnoses and comparisons with anxious and non-patient groups*. Behav. Res. Ther. 2007; 45: 1593–1600.
42. Moritz S, Peters MJV, Laroi F, Lincoln TM. *Metacognitive beliefs in obsessive compulsive patients: A comparison with healthy and schizophrenia participants*. Cogn. Neuropsychiatry 2010; 15: 531–548.
43. Lobban F, Haddock G, Kinderman P, Wells A. *The role of metacognitive beliefs in auditory hallucinations*. Pers. Indiv. Differ. 2002; 32: 1351–1363.

44. Gawęda Ł, Holas P, Kokoszka A. *Factor structure of the Meta-cognitions Questionnaire in schizophrenia and its relation to psychological characteristics of auditory hallucinations and delusions: Do depression and anxiety matter?* (manuskrypt w przygotowaniu)
45. Freeman D, Garety P. *Connecting neurosis and psychosis: a direct influence of emotion on delusions and hallucinations*. Behav. Res. Ther. 2003; 41: 923–947.
46. Cella M, Cooper A, Datmond SO, Reed P. *The relationship between dysphoria and proneness to hallucinations and delusions among young healthy*. Compr. Psychiatry 2007; 49: 544–550.
47. Cann DR, Harris JA. Assessment of Curious Experiences Survey as a measure of dissociation. Pers. Indiv. Differ. 2003; 35: 489–499.
48. Kennedy F, Clarke S, Stopa L, Bell L, Rouse H, Ainsworth C, Fearon P, Waller G. *Towards a cognitive model and measure of dissociation*. J. Behav. Ther. Exp. Psychiatry 2004; 35: 25–48.
49. Bak M, Myin-Germeys I, Delespaul P, Vollebergh W, de Graff R, van Os J. *Do different psychotic experiences differentially predict need for care in the general population?* Compr. Psychiatry 2005; 46: 192–199.
50. McGorry PD, Yung AR, Phillips LJ, Yuen HP, Francey S, Cosgrave EM I in. *A randomized controlled trial of interventions designed to reduce the risk of progression to first-episode psychosis in a clinical sample with subthreshold symptoms*. Arch. Gen. Psychiatry 2002; 59: 921–928.
51. Yung AR, Nelson B, Thompson AD, Wood SJ. *Should a 'Risk Syndrome for Psychosis' be included in the DSM-V?* Schizophr. Res. 2010; 120: 7–15.
52. Fannon D, Hayward P, Thompson N, Green N, Surguladze S, Wykes T. *The self or the voice? Relative contribution of self-esteem and voice appraisal in persistent auditory hallucinations*. Schizophr. Res. 2009; 112: 174–180.

The study was not sponsored

Address: Łukasz Gawęda
II Department of Psychiatry Medical University of Warsaw
03-242 Warsaw, Kondratowicza Street 8

Translated by Katarzyna Cyranka, MA

Received: 13.10.2011
Reviewed: 19.10.2012
Received after correction: 04.11.2012
Accepted for publication: 08.11.2012
Edited by: A. K.