Procedural validity of standardized symptom questions for the assessment of psychotic symptoms—A comparison of the DIS with two clinical methods

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The study examines to what degree well-documented present and life-time psychotic symptoms in a group of former psychiatric inpatients are ascertained when using the Diagnostic Interview Schedule (DIS). The Inpatient Multidimensional Psychiatric Scale (IMPS) and the Manual for the Assessment and Documentation of Psychopathology/Diagnostische Sichtlochkartei (AMDP/DiaSika) Interview-Checklist approach were used for the "clinical" evaluations of symptoms. The results indicate fair concordance between the two clinical approaches and the DIS with regard to the presence of any delusional or hallucination symptoms. Low to poor agreement was found in the assessment of many of the rather specific hallucinations and delusions. Generally, the concordance found was higher when compared to the more clinical AMDP/DiaSiKa approach than to the IMPS. More detailed comparisons with diagnostic subgroups of schizophrenic and schizoaffective patients substantiated the findings in the overall sample. Overall it was reconfirmed that the DIS approach is limited to those patients who are cooperative and at least partly remitted.

TO INCREASE THE RELIABILITY of diagnostic evaluations for large scale epidemiological studies, a fully structured diagnostic instrument, the National Institute of Mental Health (NIMH)-Diagnostic Interview Schedule (DIS), [1-3] was developed by the NIMH in 1979. The DIS is fully standardized and includes algorithms for diagnoses according to three different diagnostic systems (International Classification of Diseases [ICD-91]; Research Diagnostic Criteria [RDC]; Diagnostic and Statistical Manual of Mental Disorders [DSM-III]).[4-7]

One unique feature of the DIS is that it relies (except for the four observer observation items) exclusively on the subject's self-report. As every relevant diagnostic symptom question is explicitly spelled out and should be asked as written, the DIS does not require clinical judgements. In addition to the symptom questions, the DIS also includes a set of well defined "probe-questions" to ascertain, for example, the psychosocial severity and to exclude the possibility that symptoms are side effects of alcohol, drug, or medication use or exclusively due to physical illnesses or injuries. However, the interviewer is not allowed to deviate from the questions as spelled out. The DIS assesses both the lifetime- and the present occurrence of a wide range of psychiatric symptoms in different time frames (last year, the last 6 months, last 4 weeks, etc.).

The DIS has been used extensively in many studies by clinicians and trained lay interviewers in general population surveys[3,8-11] and more frequently in psychiatric

in- and outpatients.[8,10,12,13] Although in general, sufficient reliability has been found in a number of these studies[1,2,8,14,15] the DIS approach has also been criticized. A number of more clinically oriented researchers[9,16,17] objected to the DIS approach because it does not explicitly allow for clinical judgements and thus might not be "valid" for the assessment of more severe mental disorders, especially schizophrenia or other psychotic disorders. This negative judgement towards the DIS seems to be supported by studies of Anthony et al.[9] and Canino et al.,[10] and by at least two larger studies.

One is a study on the comparability of two diagnostic systems, the ICD-8 and the DSM-III, as assessed with the DIS (version II).[8] In this study, the diagnosis of DSM-schizophrenia (as well as the diagnoses of DIS/DSM-III panic disorder) was found to have the lowest concordance with the psychiatrists' diagnoses. The sensitivity (proportion of correctly identified schizophrenic patients) was low (57.9%). The results of this study could only partly be explained by differences in the diagnostic systems such as different time criteria for schizophrenia in ICD and DSM-III. Difficulties in the DIS approach to assessing psychotic symptoms were identified. These included problems in assessing residual symptoms with the DIS questions by relying completely on the patient's self-report, as well as the patients denial of any psychotic experiences once they are remitted. Eleven out of 75 schizophrenic patients with no florid symptoms at the time of the interview denied having had any psychotic symptoms, despite their well-documented illness history, and the clinicians judgement of residual symptoms during the interview session. Seven of them received positive scores in the four-item section "observer observation" in which the interviewer can judge four symptoms: neologisms, flat affect, agitation, and thought disorder. Furthermore, the study reported about another six out of 75 chronic schizophrenics hospitalized at the time of the interview, who could not be properly interviewed because of the severity of their disorder. As these patients answered in a stereotyped and non-meaningful way to the DIS, the DIS interview was discontinued. They could, however, successfully be interviewed by a less standardized clinical interview on the basis of the Manual for the Assessment and Documentation of Psychopathology (AMDP) checklist. Because this paper was not specifically addressing the psychotic section of the DIS, and referred only to the results on the *diagnostic level,* it seems necessary to specify the findings more extensively.

Another study was done by Pulver and Carpenter.[17] They analyzed the DIS on a *symptom level* for some specific delusions and hallucinations only. By using data from the long-term follow-up investigation (5 to 11 years) of the International Pilot Study of Schizophrenia (IPSS)[18] they compared the lifetime diagnoses of the DIS with well established clinical data derived from the Present State Examination (PSE)[19] and the Psychiatric Assessment Scale (PAS).[20] Their sample consisted of 32 schizophrenics, four manic-depressive patients, and 11 patients with neuroses or personality disorders. By using the DIS approach with trained lay interviewers they underestimated considerably the number of psychotic symptoms, missing 36% of the well-ascertained hallucinations and 14% of the delusions. The authors discussed four possible reasons for difficulties in assessing psychotic symptoms: (1) psychotic symptoms are often characterized by a lack of insight; (2) bizarre and odd experiences are difficult to communicate, especially when they occurred a long time ago; (3) suppression, repression, denial, retrospective falsification, and other psycho –

logical processes have to be presumed to cope with these burdening experiences; and (4) fear of social stigmatization.

The data of Pulver and Carpenter, [17] however, are not conclusive, due to a number of reasons: (1) the authors did not stratify their heterogeneous sample with regard to diagnoses; (2) their analysis was restricted to symptoms during the course of life, not taking into account a cross-sectional modus; (3) they used just a single criterion against which to measure the DIS-items (the codings from the PSE/PAS, see above); (4) kappa-statistics, Yule's Y, specificity as well as the cross-tabulation were not reported; (5) the sample for the re-examination consisted of only 43 patients; (6) many of the DIS re-evaluation interviews were done by telephone; and (7) the examined symptoms included only some of the hallucinations and delusions assessed with the DIS and no other DIS questions for psychotic symptoms, such as neologisms, etc. Helzer and Robins[21] also argued that both cases and patients were examined exclusively with the DIS. Thus, it is not possible to judge whether a clinical examination or any other diagnostic instrument could have done any better after such a long-time period as used in the Pulver and Carpenter study.[17] This agreement could also be applied to the Wittchen et al. study.[8] The implicit methodological difficulties in both studies suggested that the current state of knowledge about the DIS's ability to screen lifetime and present psychotic symptoms and disorders is inconclusive and demands further examinations.

AIM OF THE STUDY

The aim of this study is to examine a sample of former inpatients with a well-documented history of symptoms and the agreement between psychotic symptoms as assessed, evaluated and coded by psychiatrists using structured clinical assessment procedures, the Inpatient Multidimensional Psychiatric Scale (IMPS)[22,23] and the Diagnostische Sichtlochkartei (DiaSiKa),[24] with symptom codings derived from the DIS. Specifically the following three questions will be examined:

1. What is the concordance of DIS items for the assessment of psychotic symptoms with comparable items from these two clinical approaches?
2. Are there differences in the concordance rates between different diagnostic subgroups of patients?
3. Are there differences in the concordance of judgements with regard to Present and lifetime symptoms?

METHODS

Design and Instruments

The data for the investigation is derived from the Munich Follow-up Study (MFS),[25] a comprehensive 7 year prospective and retrospective follow-up investigation of 291 former inpatients of the Max- Planck-Institute for Psychiatry. Of these 291 former inpatients, 218 (74.9%) were followed-up successfully. At the *index examination,* which took place between 1973 and 1975, 61 of the inpatients received a probable or definite ICD-8 diagnosis of schizophrenia (ICD no. 295.) 46 of an affective psychosis (296.), 40 patients had a severe anxiety disorder (300.0 or 300.2), 37 a depressive neurosis (300.4), and 59 a personality disorder (301.).

Assessment at the Index-Treatment

Every patient in the MFS was examined intensively by trained research psychiatrists with a number of psychopathological instruments at the time of admission. These included the IMPS (originally developed

by Lorr and Klett,[22] German version by Hiller et al.[23]) and the AMDP/DiaSiKa.[24] The DiaSiKa is a slightly modified version of the AMDP-system.[26]

Reliability and validity of the IMPS can be regarded as sufficiently high.[23,27,28] The concordance of the AMDP/DiaSiKa-checklist with clinical judgements can also be judged as high.[29] Since this diagnostic clinical procedure was applied during the patients' index treatment(admission), when the presence or absence of symptoms was more evident, these judgements can be regarded as relatively valid. Both clinical approaches, the IMPS and the AMDP/DiaSiKa, are cross-sectional (4-week time frame) and allow comprehensive ratings of the subjects' behavior and answers: The DiaSika item 43("delusion of reference"), for instance, allows the codings I(slight), II(moderate), III(severe). The IMPS item 2("irrelevant answers"), for example, allows a coding ranging from "0" (not present) to "8" (extreme).

Assessment at Follow-up

In wave II, 7 years later, both clinical instruments were used again to diagnose the cross-sectional psychopathological state of the former inpatients. This time the DIS, version II[30] was independently administered in addition to the other instruments to explore the lifetime and present symptomatology (see for details Wittchen et al.[8]).

According to a standardized follow-up interview guide the DIS was administered first to all the 218 former inpatients, followed by other social and psychological instruments. At the end of this assessment session the DiaSiKa/AMDP and the IMPS (4 weeks cross-sectional) were completed after a semi structured clinical interview. This procedure allowed comparison of the symptom results from the DIS and the symptom ratings from the more clinical psychiatric instruments in two ways:

1. It allows the determination of agreement between the presence (last 4 weeks) of any delusions and any hallucinations as assessed by the structured clinical examination with the AMDP/DiaSiKa and the IMPS during the follow-up investigation with the presence of delusions and hallucinations as assessed by the respective items in the *fully standardized* DIS (patient's self-report).

2. It allows determination of what degree the patient's *past* psychotic symptoms as assessed by the clinical approaches (at the time of the index examination), DiaSiKa and IMPS, are also coded in the retrospective DIS questions for the assessment of *lifetime* symptomatology.

Table 1 gives an example of the different modes of comparisons. The comparisons are not simple because of two major restrictions. One is the imperfect correspondence of DIS items with items of the clinical instruments (see below). The second restriction is that the DIS does not allow a simple determination of present symptoms as it only determines the most recent occurrence of any of these symptoms (Table 1, item 119) once their lifetime occurrence has been ascertained. We assume in our comparison that if the patient indicates the presence of a symptom in the past 4 weeks, it corresponds sufficiently to a symptom rated on "present in the last four weeks" in the clinical instruments. Due to these restrictions we limited our analysts to the following most comparable DIS items and groups of items (Item numbers refer to the most recent DIS, version III).

Present psychotic symptoms. Recent (that is present during the last 4 weeks) delusion and hallucination syndrome (DIS-items 113 and 119) and the DIS-rater items for neologisms, thought disorders, agitation, and flat affect (DIS-items 231, 232, 246, and 253). These four psychotic so-called "observation items" are the only items that do not require the standard DIS probe-questions but are based on observations of the patient's behavior during the interview.

Lifetime psychotic symptoms. Delusion of persecution, delusion of control, delusion of reference, visual, auditoria], and "other" hallucinations (olfactory and gustatory hallucinations), as well as the delusion and hallucination syndrome (DIS-items 103 to 117), which are an aggregation of the specific symptoms and are referred to as "any delusions/hallucinations."

One further complication resulting from this procedure involves the DIS-questions for any present delusions and hallucinations (113 and 119). Because of the specific skip rules for these questions, that are applied, when the respondent has not admitted psychotic experiences in the screening items, these additional open questions are skipped. We dealt with this problem by assuming that the respondents' answers to the respective questions would have been "no."

Analysis of Results for Different Diagnostic Groups

In addition to the analysis of the overall sample of 218 former inpatients two diagnostic subgroups were analyzed separately: Patients with a diagnosis of schizophrenia (ICD 295., except 295.7) and patients with a diagnosis of schizoaffective disorder (295.7). For this additional subgroup comparison only those patients with a definite 295. ICD diagnosis at the time of follow-up examination were used.

Table 1 Examples for the Correspondence Between DIS Items and the Codings in the Clinical Rating Scales

DIS (at follow-up only)*	AMDP/DiaSiKa (administered at index and follow-up)	IMPS (administered at index and follow-up)
Item 114 (lifetime visual hallucinations) Have you ever had the experience of seeing something or someone that others who were present could not see—that is, had a vision when you were completely awake?†	Item 57 Visual hallucinations Visual perceptions without corresponding external stimuli	Item 57 How often . . . did he have visual hallucinations?
Rating: 1 No 2 Below criteria 3 Due to drugs or alcohol 4 Medical explanation 5 Yes	Rating: 1 Mild 2 Moderate 3 Severe	Rating: 0 Never 1 One or two times 2 Sometimes 3 Frequent 4 Very frequent
Item 119 (present visual hallucinations) When was the last time you (saw, heard, felt, smelled) something others thought was not there?‡	Items 54-59 were summarized: Comenting voices; insulting voices; other auditory hallucinations; visual bodily, olfactory and gustatory hallucinations	IMPS-factors Paranoia and Grandiosity were summarized: delusional ideas; delusions of reference, persecution, control, conspiracy, external control; unusual power; great personality; divine mission; ideas of change
Rating: 1 Within last 2 wks 2 Within last mo 3 Within last 6 mos 4 Within last yr 5 More than 1 yr ago	Rating: 1 Mild or Never 2 Moderate 3 Severe	
Items 103-105 (lifetime delusions of persecution) -Have you ever believed that other people were spying on you? -Was there ever a time when you believed that people were following you? -Have you ever believed that someone was plotting against you or trying to hurt you or poison you?§	Item 47 Delusion of persecution: Conviction that persons or organizations are attempting to do harm to the patient. He sees himself as focus of animosity. He feels that he is threatened, offended, insulted, mocked, or derided by others, who are striving to take his money, property, health, or even his life. (Includes querulous delusions)	Items 60/61 Does he believe that . . . . . . he is being blocked, cheated, deprived, discriminated against, or persecuted? . . . certain people are plotting or conspiring against him?
Rating: 1 No 2 Below criteria 3 Due to drugs or alcohol 4 Medical explanation 5 Yes	Rating: 1 Mild 2 Moderate 3 Severe	Rating: 0 Never 1 Yes

*DIS-numbers always refer to the version II of the DIS.

†For the comparison of lifetime symptoms of the DIS code "5" symptoms were compared to the DiaSiKa code "1," "2," or "3" symptoms, respective code "2," "3," or "4" symptoms in the IMPS.

‡For the comparison of present symptoms "age of onset" codes "1" or "2" in the DIS were compared to DiaSiKa code "1," "2," or "3" symptoms in at least one of the items, respective IMPS percentile above 95% in either Paranoia or Grandiosity.

§For the comparison of lifetime delusion symptoms the DIS code "5" symptoms were compared to the DiaSiKa code "1," "2," or "3" symptoms and the code "1" symptoms in the IMPS.

This resulted in 27 patients with a diagnosis of schizophrenia (295, without 295.7) and 25 with a diagnosis of schizoaffective psychosis (295.7).

Measures of Concordance

Overall percentage agreement, sensitivity, specificity, kappa, and Yule's Y were calculated for the total sample. Kappa ($_k$) is a coefficient determined by the sensitivity, the specificity, and the base-rate, varying between - 1 and + 1. Values above + .50 can be regarded as acceptable, values above + .70 as exce11ent.[31,32] Additionally, the Yule's Y[33] parameter was used. Unlike $_k$, the Y-coefficient is independent of the base-rate.[34] However, when a single cell in the cross-tabulation becomes zero, Y reaches the endpoints of its range (+ 1) (- l), indicating perfect agreement or perfect disagreement, although percentage agreement actually is neither 0% nor 100%. To overcome this disadvantage we used the regulating pseudo-Bayes estimation procedure where necessary.[35]

RESULTS

Taking the two structured clinical approaches (DiaSiKa and IMPS) as a yardstick to measure the performance of the DIS, the results shown in Table 2 were obtained. If compared to the cross-sectional AMDP/DiaSiKa ratings at wave I for all but the DIS-lifetime question for "other hallucinations" ($_k$ = .16), significant Kappa-values were found. High Kappa values were found for "any delusional symptoms" ($_k$ = .77), acceptable values for auditory hallucinations ($_k$ = .54), delusion of persecution ($_k$ = .52), and delusions of reference ($_k$ = .47). The concordance rates for hallucinations are more difficult to interpret due to the lower base-rates. Yule's Y indicates at least acceptable values over 50 for all but "other" hallucinations. When examining the cross-tabulation in more detail, the DIS generally seems to *overestimate* slightly delusions (83:77)-except for delusions of reference and hallucinations (66:45). Since this slight overestimation might be due to the fact that the DIS identified additional new symptoms not assessed by the

Table 2. Concordance of Lifetime DIS Psychotic Symptoms With the Results of the Past Cross-sectional Examination With Respective Items From the Diasika Approach (Wave I) (N – 218)*

Symptoms	DIS-Item No.	Diasika-item No.	Cross-tabulation		Agreement (%)	Kappa	Yule's Y	Sensitivity
			Diasika	DIS				
			−	+				
			− 114	17				
Any delusion symptoms	103–111	53	+ 11	66	86.5	.77†	.73	.86
Any delusion of persecution	103–105	47	− 130	30	81.0	.52†	.61	.80
			+ 9	36				
Any delusion of control	106–109	62	− 161	24	85.3	.39†	.58	.68
			+ 6	13				
Any delusion of reference	107/110	43	− 146	17	82.9	.47†	.54	.57
			+ 18	24				
Visual hallucinations	114	57	− 180	15	91.1	.32‡	.63	.63
			+ 3	5				
Auditory hallucinations	115	54-56	− 165	13	89.9	.54†	.67	.67
			+ 8	16				
Any other hallucinations	116-117	58-59	− 179	13	89.2	.16	.36	.25
			+ 9	3				

*Different numbers of missing values in each analysis.
† < .001.
‡ < .05.

clinical approach in wave I, we examined whether this result changed, when the wave I and the wave II symptoms were combined and then compared to the DIS lifetime ratings. Although the ratings for delusions slightly increased, no significant result was found.

The comparison of the IMPS with the DIS resulted in slightly lower concordance rates, although, the same rank order of concordance was found (Table 3). Highest concordance was obtained for the presence of any delusional symptoms and for auditory hallucinations. Particular low k-values were found for delusions of control, reference, and any hallucinations.

A less biased way of examining agreement between the two approaches is the examination of present symptoms (Table 4). For this analysis the present psychotic symptoms of the AMDP/DiaSiKa at the time of the follow-up interview were compared to the DIS codings. Since the DIS does not allow a differentiated determination of the presence of each single psychotic symptom (but only for presence of any delusions and any hallucinations), the DIS questions in the schizophrenia section were collapsed into two groups, "any hallucinations" and "any delusions," present or not present in the last 4 weeks.

For the presence of any hallucinations, a high k-value, as well as a high Yule's "Y" value, was found. For delusions, however, a very low sensitivity was found. The DIS approach thus seriously underestimated the presence of delusions (17:42). As compared to the lifetime analysis this is a serious disagreement; there is no indication of an overestimation, but definite signs for an underestimation of

Table 3. Concordance of Lifetime DIS Psychotic Symptoms With the Results of the Past Cross-sectional Examination With Respective Items From the IMPS Approach (Wave I) (N = 218)*

Symptoms	DIS-Item	IMPS-Item/-Factor	Cross-tabulation IMPS	Cross-tabulation DIS	Agreement (%)	Kappa	Yule's Y	Sensitivity
			−	+				
Any delusion symptoms	103-111	PAR	− 102	25	76.7	.51†	.52	.71
		GRN	+ 24	59				
Any hallucination symptoms	114-117	PCP	− 155	35	80.8	.31†	.54	.72
			+ 5	13				
Any delusion of persecution	103-105	60-61	− 125	40	73.6	.34†	.41	.65
			+ 15	28				
Any delusion of control	106-109	62-63	− 160	29	81.7	.25§	.42	.53
			+ 9	10				
Any delusion of reference	107/110	59	− 142	24	76.9	.28†	.36	.43
			+ 24	18				
Visual hallucinations	114	57	− 183	16	90.9	.35‡	.65	.67
			+ 3	6				
Auditory hallucinations	115	53-56	− 171	19	88.4	.44†	.65	.71
			+ 5	12				
Any other hallucinations	116-117	58	− 183	13	89.2	.16	.36	.25
			+ 8	4				

Abbreviations: PAR, Paranoid Projection; GRN, Grandiosity; PCP, Perceptual Distortion.
*Different numbers of missing values in each analysis.
†<.001
‡<.01
§<.05

Table 4. Concordance of Present DIS Psychotic Symptoms (Most Recent Occurrence of Any Psychotic Symptoms in the Last Four Weeks) With Respective Items From the Diasika Approach (Wave II) (N = 218)*

Symptoms	DIS-Item	Diasika-Item	Cross-tabulation				Agreement (%)	Kappa	Yule's Y	Sensitivity	Specificity
			Diasika		DIS						
			−	+							
					−	+					
Any delusion symptoms	103–111/113*	53	− 164		3		85.2	.41*	.69	.33	.98
			+ 28		14						
Any hallucination symptoms	114–117/119†	54-59	− 195		3		97.1	.65*	.84	.67	.98
			+ 3		6						

'Present' refers to most recent occurrence of any psychotic symptoms in the last 4 weeks.
*Different numbers of missing values in each analysis.
†113 assesses the recency of these symptoms.
‡119 assesses the recency of these symptoms.
§ <.001

psychotic symptoms. Since almost identical results were found for the IMPS/DIS comparison they further will not be reported here.

Diagnostic Subgroups Patients With a Definite Schizophrenia

Restricting the analysis to the subsample of definite schizophrenic patients (according to ICD-8) a rather high concordance was found for lifetime DIS codings of any delusional or hallucinational symptoms with the cross-sectional rating in both the AMDP/DiaSiKa (Table 5) and the IMPS (not shown because of the similarity of findings). Taking the clinical ratings as the "yardstick," relatively few patients were "wrongly" classified by the DIS with regard to the presence of any delusional symptoms or visual hallucinations; the DIS lifetime codings, however, revealed again more "delusions of persecution" (21:14) and "delusions of control" (12:5) than the AMDP/DiaSiKa. This indication for a slight trend of an "overestimation" was not found for current psychotic symptoms. For current delusions (DiaSiKa/ IMPS) at the time of the follow-up examinations (wave II) a generally good agreement was found. Only four patients with current, clinically rated delusions were not detected by the DIS with no "false positives."

High agreement coefficients with K-values of .83 (and .85 for the IMPS) were obtained for present hallucinations in the AMDP/DiaSiKa comparison. With regard to the results in schizophrenic and schizoaffective patients differences were found only concerning any present delusions. Whereas in the schizophrenic subgroup all analyses show almost perfect agreement, in the schizoaffective sample the DIS missed 15 of the 18 patients with a DiaSiKa diagnosis of any present delusions. Both approaches, however, show almost perfect agreement with regard to the presence of any hallucinations (Table 6).

COMMENTS

One major aim of this study was an attempt to replicate the findings of Pulver and Carpenter[17] with a more refined methodology. Using basically the same approach by re-examining with the DIS former psychotic inpatients with a well established illness history, our findings are only partly similar. Analogous to Pulver and Carpenter we found that (1) a certain proportion of former psychotic patients that were negative in the respective DIS items; (2) the underestimation of psychotic symptoms was more pronounced in the assessment of hallucinations as compared to delusions; and (3) the most serious underestimation resulted for "other" hallucinations (e.g., gustatory hallucinations).

However, the extent of this underestimation was generally less pronounced in our study. Especially for visual hallucinations, agreement coefficients were very high (80%) as compared to 44.4% in the paper by Pulver and Carpenter. With regard to the past occurrence of any delusions, a good overall percentage agreement of 81% with a sensitivity of 91% was found. The sensitivity for any hallucinations (72%) was, however, only slightly higher than in the original Pulver and Carpenter study (64%). Given the similarity of the patient population studied as well as a general design, these differences could possibly be explained by methodological differences. First, in our study, the application of the DIS was conducted according to the "rules" with a face-to-face interview for all patients. Secondly, it might play an important role that only clinicians administered the DIS in our study. Although, they were not free to deviate from the interview probes and questions as spelled out,

Table 5. Concordance of Lifetime and Present (Follow-up) DIS Psychotic Symptoms With Respective Items From the Diasika Approach: Schizophrenia Sample (N = 27)*

			Cross-tabulation		Agreement (%)	Sensitivity	Specificity†
		Diasika-Item	Diasika	DIS (+)			
(A) DIS Lifetime Symptoms							
Any delusion symptoms	103–111	53	− 1 + 2	3 21	81.5	.91	
Any delusion of persecution	103–105	47	− 4 + 2	9 12	59.3	.86	
Any delusion of control	106–109	62	− 13 + 2	9 3	59.3	.60	
Any delusion of reference	107/110	43	− 8 + 9	1 9	63.0	.50	
Visual hallucinations	114	57	− 19 + 1	2 4	88.5	.80	
Auditory hallucinations	115	54–56	− 11 + 4	5 6	65.4	.60	
Any other hallucinations	116–117	58–59	− 18 + 4	3 2	74.1	.33	
(B) Present Symptoms							
Any delusion symptoms	103–111/113‡	53	− 14 + 4	0 8	84.6	.67	1.00
Any hallucination symptoms	114–117/119§	54–59	− 19 + 1	1 5	92.3	.83	.95

*Different numbers of missing values in each analysis.
†Specificity only calculated for present symptoms.
‡113 assesses the recency of these symptoms.
§119 assesses the recency of these symptoms.

Table 6. Concordance of Lifetime and Present DIS Psychotic Symptoms (Follow-up) With Respective Items From the Diasika Approach (Wave I): Schizoaffective Sample (N = 25)*

			Cross-tabulation		Agreement		
		Diasika-Item	Diasika	DIS (+)	(%)	Sensitivity	Specificity†
(A) DIS Lifetime Symptoms							
Any delusion symptoms	103–111	53	− 0 / + 0	4 / 20	83.9	1.00	
Any delusion of persecution	103–105	47	− 2 / + 3	5 / 13	65.2	.81	
Any delusion of control	106–109	62	− 6 / + 2	8 / 6	54.5	.75	
Any delusion of reference	107–110	43	− 5 / + 2	8 / 8	56.5	.80	
Visual hallucinations	114	57	− 13 / + 0	8 / 1	63.6	1.00	
Auditory hallucinations	115	54–56	− 11 / + 3	0 / 8	86.4	.73	
Any other hallucinations	116–117	58–59	− 13 / + 2	6 / 1	63.6	.33	
(B) Present Symptoms							
Any delusion symptoms	103–111/113‡	53	− 7 / + 15	0 / 3	40.0	.17	1.00
Any hallucination symptoms	114–117/119§	54–59	− 22 / + 1	2 / 0	88.0	.00	.92

*Different numbers of missing values in each analysis.
†Specificity only calculated for present symptoms.
‡113 assesses the recency of these symptoms.
§119 assesses the recency of these symptoms.

there were at least two additional options; one is by coding lifetime delusions denied by a patient in the appropriate DIS questions for "other" delusions/hallucinations. Another, however up to now not properly tested possibility, might be that an experienced clinical interviewer might have been better able to establish a good rapport with the patient; this might have included very subtle changes, for example in the intonation of the question as spelled out, and thus was able to get more accurate answers. Since we have not taped the interviews, however, we are not able to exclude these assumptions.

The second aim of our study was to expand this examination of the DIS from a retrospective approach to the assessment of agreement with regard to current psychotic symptoms during the follow-up examination. This is a more strict test of the DIS' ability to screen for psychotic symptoms because the two clinical approaches, the AMDP/DiaSiKa as well as the IMPS, are administered independently on the same day as the DIS. Due to the fact that the DIS incorporates only overall items for the presence of any delusions and hallucinations (questions 113 and 119), only general judgements as to whether any hallucination or delusion were present are possible. In these analyses the concordance between the clinical instruments and the DIS did not seem to be higher than the results obtained for past symptoms. In the overall sample of 218 former inpatients, k for any delusions was even slightly lower with .41, and for any hallucinations $k = .65$, with a sensitivity of 33% for the first and 67% for the second. The insufficient kappa for delusions, however, seemed to be caused by a base-rate problem, as indicated by the satisfactorily high Y-values of .69 and .84. That the low k-values might be due to the base-rate problem is substantiated by the tendency, that the results for the schizophrenic subgroups were markedly higher with a percentage agreement of 92.3% for past hallucinations and a sensitivity of 83%.

The differential disagreement for past and present symptoms, and especially the low sensitivity for present delusions, might be explained by a phenomenon, that had also been found for other, possibly stigmatizing symptoms, for example symptoms of current alcohol and medication abuse; some patients admit more easily *having had* the symptoms, but deny its presence.[15,36] This finding is substantiated by the result that a closer examination of the most recent occurrence of psychotic symptoms revealed that almost 2/3 of the "false negative" DIS respondents would be positive if the definition for "current" is expanded to the 6-month-criterion, that is optionally available in the DIS.

A third aspect of our study, not dealt with in the Pulver and Carpenter paper, is the number of patients with "false positive" codings in the DIS in psychotic items. A closer examination of these "false positives" with regard to their ratings in the AMDP/DiaSiKa revealed that there are two major groups of patients that might be held responsible for this finding. One group is patients with a predominantly affective syndrome with mood-congruent delusions, where the clinician was not confident enough to give a full AMDP-rating of persecutory delusions. A second smaller group refers to severely disturbed neurotic women who indicate visual or "other" hallucinations that were interpreted by the clinician as neurotic or psychosomatic signs.

There were also no clear indications of a differential validity effect in the diagnostic subgroups examined. Although, there are some indications that psychotic symptoms were reported with more accuracy by the group of schizoaffective

patients, this did not significantly affect the concordance rates, neither when compared to the schizophrenic group nor to the overall group of patients.

Finally, the low concordance measures for "other" hallucinations might be explained by differences in the instruments' coverage of psychopathological phenomena. Whereas the DIS assesses olfactory and gustatory hallucinations only, the IMPS includes additionally tactile hallucinations, and the DiaSiKa even incorporates all non-visual and non-auditoria1 hallucinations.

SUMMARY

Although Pulver and Carpenter's critical comments and findings were partly confirmed, there are no indications in the DIS of a serious underestimation of psychotic symptoms as suspected by some authors. Given, however, the previously documented general difficulties in aplying fully standardized diagnostic instruments in both the residual type of schizphrenics and the acute schizophrenics,[8,9,15] specific guidelines for interviewers seem to be necessary that specify whether a DIS can be conducted at all in such patient groups.

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REFERENCES

1. Robins LN, Helzer JE, Crougham J, et al: National Institute of Mental Health Diagnostic Interview Schedule. Arch Gen Psychiatry 38381-389, 1981
2. Robins LN, Helzer JE, Ratcliff KS, et al: Validity of the Diagnostic Interview Schedule, version II: DSM-III diagnosis. Psycho1 Med 12:855-870, 1982
3. Regier DA, Myers JK, Kramer M, et al: The NIMH Epidemiological Catchment Area Programm. Arch Gen Psychiatry 41:934-941, 1984
4. Degkwitz R, Helmchen H, Kockott G, et al (Hrsg.): Diagnosenschlilssel und Glossar psychiatrischer Krankheiten: ICD-8. New York, Springer, 1975
5. Feighner JP, Robins E, Guze SB, et al: Diagnostic criteria for the use in psychiatric research. Arch Gen Psychiatry 2657-63, 1972
6. American Psychiatric Association Committee on Nomenclature and Statistics: Diagnostical and Statistical Manual of Mental Disorders. 3rd ed. Washington, DC, American Psychiatric Association, 1980
7. Spitzer RL, Endicott J, Robins E: Research Diagnostic Criteria. Arch Gen Psychiatry 35:773-782, 1978
8. Wittchen HU, Semler G, von Zerssen D: A comparison of two diagnostic methods. Clinical ICD diagnosis vs DSM-III and RDC using the DIS (version II). Arch Gen Psychiatry 42:677-684, 1985
9. Anthony JC, Folstein M, Romanowski AJ, et al: Comparison of the lay Diagnostic Interview Schedule and a standardized psychiatric diagnosis. Experiences in eastern Baltimore. Arch Gen Psychiatry 42~667-675, 1985
10. Canino G, Bird HR, Shrout P: The DIS: Reliability and concordance with clinical diagnoses in Peurto Rico (in preparation)
11. Boyd JH, Robins LN, Helzer CE, et al: Making diagnosis from DIS data, in Eaton WW, Kessler LG (eds.): Epidemiological field methods in psychiatry. The NIMH Epidemiological Catchment Area Program. San Diego, Academic, 1985
12. Burnam NA, Karno M, Hough RL, et al: The Spanish Diagnostic Interview Schedule. Reliability and comparison with clinical diagnoses. Arch Gen Psychiatry 40:1189-1 196, 1983
13. Helzer JE, Robins, LN, McEvoy LT, et al: A comparison of clinical and Diagnostic Interview Schedule diagnoses: Physician reexamination of lay-interviewed cases in the general population. Arch Gen Psychiatry 42:657-666, 1985
14. Burke JD, Regier DA: Implications of an operational approach to psychiatric diagnosis. Paper

presented at the Symposium on Classification and nosology, VIIth World Congress of Psychiatry, Vienna, 1983

15. Semler G, Wittchen HU, Joschke K, et al: Reliability of a Standardized Psychiatric Interview (DIS/CIDI). Em Arch Psychiatry Neurol Sci 236:214-222,1987

16. Ganguli M, Saul MC: Diagnostic Interview Schedule. Arch Gen Psychiatry 35:1442-1443, 1982

17. Pulver AE, Carpenter WT: Lifetime psychotic symptoms assessed with the DIS. Schizophr Bull 9~371-382, 1983

18. World Health Organization. The International Pilot Study of Schizophrenia. Geneva, WHO Press, 1973

19. Wing JK, Cooper JE, Sartorius N: Measurement and classification of psychiatric symptoms. New York, Cambridge University Press, 1974

20. Carpenter WT, Sacks MH, Strauss JS, et al: Evaluating signs and symptoms: Comparison of structured interview and clinical approaches. BrJ Psychiatry 128:397-403, 1976

21. Helzer JE, Robins LN: Lifetime psychotic symptoms assessed with the DIS. Letter to the editor. Schizophr Bull lO:l, 1984

22. Lorr M, Klett CI: Manual for the Inpatient Multidimensional Psychiatric Scale (IMPS). Palo Alto, CA, Consulting Psychologists Press, 1967

23. Hiller W, von Zerssen D, Mombour W, et al: Inpatient Multidimensional Psychiatric Scale (IMPS). Manual. Weinheim und Basel, Beltz, 1986

24. von Zerssen D: Die Diagnostische Stichlochkartei (Diasika)-ein einfaches Instrument zur Standardisierung der psychiatrischen Diagnostik (in preparation)

25. Wittchen HU, von Zerssen D: Verllufe behandelter und unbehandelter Depressions-und Angststarungen. Eine klinisch-psychiatrische und epidemiologische Nachuntersuchung. Berlin, Springer, 1988

26. Guy W, Ban TA (eds): The AMDP-System. Manual for the assessment and documentation of psychopathology. New York, Springer, 1980

27. Mombour W, Gammel G, von Zerssen D: Die Objektivierung psychiatrischer Symptome durch multifaktorielle Analyse des psychopathologischen Befundes. Nervenarzt 44:352-358, 1973

28. Cairns V, Faltermaier T, Wittchen HU, et al: Some problems concerning the reliability and structure of the scales in the IMPS. Arch Psychiatr Nervenkr 232:395-406,1983

29. Schmidt W, Bronisch T, von Zerssen D: A comparative study of PSE/CATEGO and Diasika: Two psychiatric computer diagnostic systems. Br J Psychiatry 141:292-295, 1982

30. Wittchen HU, Rupp HU: Das Diagnostic Interview Schedule (Version II), German Version. Munich, Max-Planck-Institute ftlr Psychiatric, 1981

3 1. Grove WM, Andreasen NC, McDonald-Scott P, et al: Reliability studies of psychiatric diagnosis. Arch Gen Psychiatry 38:404-412, 1981

32. Bartko JJ, Carpenter WT: On the methodes and theory of reliability. J Nerve Ment Dis 163:307-317,1976

33. Yule GU: On the methods of measuring association between two attributes. J R Stat Sot 75:581-642, 1912

34. Spitznagel EL, Helzer JE: A proposed solution to the base rate problem in the Kappa statistic. Arch Gen Psychiatry 42:725-728,1985

35. Bischop YMM, Fienberg SE, Holland PW: Discrete multivariate analysis: theory and practice. Cambridge, MA, MIT Press, 1975

36. Wittchen HU, Burke JD, Semler G, et al: Recall and Dating of Psychiatric Symptoms: Test-Retest Reliability of Time-related Symptom Questions in a Standardized Psychiatric Interview (CIDI/DIS) (in press)