

## Some Psychological Test Characteristics of Klinefelter's Syndrome

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### INTRODUCTION

Males with chromatin positive Klinefelter's syndrome are observed to have one or more extra X chromosomes within their cells. Diagnosis is by buccal mucosa smear and chromosome analysis. Clinically they have delayed puberty, abnormal physique, small testicles and little facial hair. This paper presents some observed differences between Klinefelter patients who were being treated in subnormality units and other patients not having the condition but with similar I.Q.s.

Pasquini *et al.* (1957) had shown a significant difference between performance and verbal intelligence quotients on the Wechsler Adult Intelligence Scale in a non-hospitalized Klinefelter group. Also Money (1963) showed that patients attending a sub-fertility clinic with Turner's syndrome, a chromosome abnormality in females, were abnormal in some of their scores on Wechsler tests. There was some expectation, therefore, that Klinefelter patients might show unusual test results when compared with suitable controls. The present study was aimed at discovering the presence of any special features in psychological test results of a group of Klinefelter patients who were residing permanently or temporarily in subnormality units. The selection of test items was mainly influenced by the low intelligence of the subjects and partly by a desire to discover whether subnormal Klinefelter patients had any special inferiority feelings arising out of their physical and sexual abnormalities.

### SUBJECTS

(a) Klinefelter Group: 14 patients with Klinefelter's syndrome detected by the buccal smear technique amongst patients in subnormality units within the Sheffield Regional

Hospital Board area. The age range was from 17 to 53 years and the median age 43 years.

(b) Control Group: 14 patients without observable chromosome abnormality. One control patient was selected to match each Klinefelter patient. The control was drawn from the same hospital, and in most cases from the same hospital ward as the Klinefelter patient. They were matched for age and I.Q., without reference to other aspects of behaviour. The age range was from 17 to 58 years, and the median age 43.5 years.

### PROCEDURE

The following tests were used:

1. Wechsler Adult Intelligence Scale.
2. Porteous Maze Test.
3. Rorschach.
4. Draw a Person.
5. Word Association Test.
6. Simplified Semantic Differential Test.
7. Vineland Social Maturity Scale.

The tests 1, 2, and 7 were administered according to their respective manuals. The Rorschach, item 3, was administered as in Klopfer *et al.* (1954). With the Draw a Person Test, the subject was simply asked to draw a person and when he had finished he was asked whether he had drawn a man or a woman.

With Item 5, the Word Association Test, the following words were used:

(a) Six words believed to have frustrating implications: no, shut, blocked, tease, tied, stop; and six words believed to have non-frustrating implications: yes, open, free, loose, start, give.

(b) Six words with active implications: dive, fast, climb, jump, run, work; and six words with passive implications: sleep, rest, float, slow, stand, sit.

(c) Words which could be interpreted as linked with sexual body parts or slang names for them: balls, prick, breast, hairy, tit, hole.

(d) Five words with implications of power or "potency": big, strong, hard, rough, heavy; and five words with opposing implications: small, soft, weak, smooth, light.

(e) Five words implying positive evaluation: clean, nice, good, straight, new; and five words implying negative evaluation: dirty, nasty, bad, broken, crooked.

(f) Six words with affiliative implications: friend, brother, sister, baby, father, mother.

The words were recorded on tape in randomized order, obtained by shuffling a pack of cards with the words printed on them. The same recording of stimulus words was used for each two patients, Klinefelter and corresponding control; the order of words was changed for each fresh pair of subjects. The latter procedure was adopted so that the influence of the order of the presentation of the words was minimized. Thus, any statistically significant results ensuing could be held to apply to any order of presentation of the words or concepts. The instructions given to the subjects were as follows: "This machine is a tape recorder. When I switch it on you will hear a word. When you hear it I want you to say the first thing you think of. Just say straight away the first word that comes into your head. After a little while you will hear other words. Do the same again, say the first thing you think of. Keep going on like that." Repetition of the instructions and further instructions was allowed where necessary. The patients' responses were recorded on a second tape recorder.

In Test 6, the simplified Semantic Differential, the patient was asked to say whether various words or concepts seemed to him nice or nasty, clean or dirty, straight or crooked, good or bad, right or wrong (evaluation); fast or slow, busy or lazy, hot or cold (activity); big or small, heavy or light, rough or smooth, strong or weak (potency). The following words and concepts were used, mother, father, sister, brother, baby, friend, woman, man, other patients, doctor, boss, farmer, policeman, nurse, soldier, thief, men interested in women, men and women kissing and cuddling, men wearing women's clothes, men kissing, something hairy, woman's breast, hunchback, broken nose, false teeth, yourself, your body, your name, food and money. The same order of words was used for each two patients, Klinefelter and corresponding control, otherwise the order of words was varied, the order being decided by shuffling a pack of cards bearing the words and concepts.

With the Vineland Social Maturity Scale the informant was usually the Charge Nurse in charge of the patient, but sometimes another nurse was employed if he had special knowledge of the patient.

#### SCORING

The tests were scored according to the appropriate manuals. With the Rorschach blind scorings were made on traditional lines following Klopfer *et al.* (1954), and on the Severe Disturbance Scale (Burnand, 1964). The tests were administered by one of the authors and scored by another, under conditions where it was not known which records were obtained from the Klinefelter patients and which were obtained from the control patients.

With the Word Association Test the patients' responses were played back and two of the authors independently rated the patients' responses to each of the words as "disturbed" or "not disturbed". Such signs as failure to respond, long reaction time, stimulus word repetition and far-fetched associations were taken into account, but the raters were allowed to score any sort of "disturbance" that they believed they perceived. Where both raters agreed that disturbance was shown the word was finally scored as such.

With the Semantic Differential Test, an "evaluation" score was obtained for each concept by scoring a response, "nice" +1, "nasty" -1, "clean" +1, "dirty" -1, "good" +1, "bad" -1, "right" +1, "wrong" -1, and summing. "Activity" and "potency" scores were obtained by a similar method.

#### RESULTS

The results presented in Table I show the ranges and medians of the scores on some of the tests for the Klinefelter and control groups. The table shows that in respect of intelligence, the Rorschach Severe Disturbance Scale scores and Vineland Social Maturity scores the two groups

TABLE I  
*Medians and Ranges of Scores in the Klinefelter and Control Groups*

	N*	Klinefelter		Control	
		Median	Range	Median	Range
WAIS Total IQ .. ..	14	58.5	<45-82	57.5	<45-74
Verbal IQ .. ..	14	60.5	<45-81	59.5	<45-81
Performance IQ .. ..	14	61	<45-89	63.0	<45-89
Porteous Test Age .. ..	12	6.5	<3-11	9.0	<3-13.5
Mazes Qualitative Score.. ..	9	51	42-290	38	13-243
Rorschach Severe Disturbance Score (total all cards)	12	64	57-67	64	56-73
Vineland Raw Score .. ..	11	74	43-88	76	43-93
Scale					

\* N is the number of cases with test results in each of the two groups. Three cases in both groups were below the lower limits of the WAIS and Porteous Mazes but were included as IQ less than 45 and Test Age less than 3 years respectively in the above table.

resembled one another closely. The two groups were matched for intelligence, so that agreement here would be expected. There were some differences between the scores of the two groups on the Porteous Mazes. The median test age, which reflects the general level of success with the mazes, was slightly lower for the Klinefelter group, the difference not being statistically significant. The qualitative score, which is known to be raised in delinquent and disturbed personality types, was raised for the Klinefelter group and the median score for the control group lay below the range of the Klinefelter scores. When the scores for the two groups are dichotomized about a score of 40 the frequencies of the resulting  $2 \times 2$  table were significantly different from chance at  $P < .02$  (exact test one tail). When tested by other methods, however, the difference between the two groups was not significant.

The data of Table II were obtained by comparing each Klinefelter patient with his own matched control. Those items which repeatedly discriminated between the Klinefelter and his control at significant or nearly significant levels were included in the table, together with the most discriminating items from each test and two additional findings on the figure drawing test which seemed of interest. These discriminating items might be regarded as selected out of about eighty trial items. The number of pairs of patients involved in each comparison was always less than fourteen. The main reason for this was that the intellectual demands of the tests were beyond the capabilities of some patients. This applied particularly with the Semantic Differential test, in spite of the simplified form in which it was given, and, to a lesser extent, the word association test, the Porteous Mazes and the figure drawing. In a few cases tests were omitted because of the discharge of patients before the work could be completed. This particularly affected the Vineland Social Maturity Scale.

#### DISCUSSION

Previous research on a non-institutional sample had shown that Klinefelter males tend to have greater performance than verbal I.Q.s (Pasquilini, 1957). Test results of this sort tend

to accompany "acting out" "personality traits (Wechsler, 1958). Although the group of chromatin positive Klinefelters examined here did show a very slightly higher performance I.Q. than verbal I.Q., there was a greater difference in the control groups. An inspection of the detailed WAIS results suggested that the expected difference between performance and verbal IQs might have been obscured by the presence of more organic deterioration in the Klinefelter group. However, such differences did not reach significant levels. The only just significant difference observed was with the similarities subtest. This might suggest ideational tendencies in Klinefelter men.

In spite of the failure to replicate Pasquilini's result for the WAIS on this population, the findings with other tests support the same general interpretation, that the Klinefelter subjects were of a more "acting out", "delinquent" or "psychopathic" personality than their controls. The results shown in Table I suggest that Klinefelter men show a greater "Qualitative Score" on the Porteous Mazes and this is a correlate of delinquency. They also suggest that the control subnormal patients were more variable in their qualitative scores than their chromatin positive counterparts. This may explain the failure of the Qualitative Score to show a significant discrimination when each Klinefelter male was compared with his control.

Some Rorschach scores appeared to differentiate between the two groups. Amongst the pairs who both gave four or more responses the Klinefelters had more responses involving colour and indeterminate form, or shading used as colour. This suggests greater impulsiveness or lability. While Table I shows that the Severe Disturbance scale, which correlates with the presence of psychosis and poor prognosis in psychiatric patients, gave similar results for the two groups, suggesting that the Klinefelters had about the same general level of disturbance as the controls, Table II shows that the scores on individual cards, which tend to be related to personality deviations, were sometimes reliably different for the two groups. It might be noted that because of the broader definition of what constitutes a response on the Severe Disturbance Scale than in the traditional Rorschach scoring

TABLE II  
Results of Comparing each Klinefelter Male with his Matched Control, in Pairs

Research Tool	No. of pairs of patients on which satisfactory data obtained	Klinefelter greater than control <sup>1</sup>	Klinefelter less than control <sup>1</sup>	Significance binomial test (two tail)	Significance other tests (two tail)
WAIS: Similarities score .. .. .	11	5	2	—	T test P < .05
Picture Completion score .. .. .	11	3	8	—	—
Word association: Disturbance on active words .. .. .	10	1	6	.11	—
Disturbance on frustrating words .. .. .	10	5	0	.07	—
Disturbance on sex words .. .. .	10	6	1	.11	—
Porteous mazes: Total of cut corners crossed and wavy lines .. .. .	9	6	2	—	—
Figure drawing: Calls drawing female .. .. .	10	0	2	—	—
Conflicting indications of sex of drawing .. .. .	2	2	0	—	—
Additions denoting sex .. .. .	8	5	0	.07	—
Profile drawings rather than full face drawings .. .. .	8	6	1	.11	—
Rorschach: Colour and shading responses <sup>2</sup> (C+CF+C') .. .. .	7	7	0	.02	—
Severe Disturbance Scale score card II minus average card score .. .. .	12	8	4	—	Wilcoxon test P < .05
Severe Disturbance Scale score card IV minus average card score .. .. .	12	8	4	—	„ P < .05
Severe Disturbance Scale score card IX minus average card score .. .. .	12	1	11	.01	„ P < .01
Severe Disturbance Scale score card X minus average card score .. .. .	12	0	12	.001	—
Semantic Differential: Sex body part words, <sup>3</sup> evaluation .. .. .	8	6	0	.04	—
Sex body part words, activity .. .. .	8	6	0	.04	—
Heterosexual role taking concepts, <sup>4</sup> evaluation .. .. .	8	5	1	—	—
Heterosexual role taking concepts, <sup>4</sup> activity .. .. .	8	5	1	—	—
Vineland Social Maturity Scale:					
Locomotion items better .. .. .	11	0	4	—	—
Communication items better .. .. .	11	4	2	—	—
Self direction better .. .. .	11	1	7	.07	—

<sup>1</sup> The sum of the third and fourth columns is less than the number shown in column 2 when some Klinefelter cases had exactly the same result as their controls.

<sup>2</sup> excluding pairs of subjects where one of the records had less than four responses.

<sup>3</sup> "breast", "something hairy".

<sup>4</sup> "men and women kissing and cuddling" and "men interested in women".

it was possible to include in the analysis all the pairs of patients who had had Rorschach tests, rather than limiting the comparisons to pairs of patients who each gave four or more "traditional" responses. The data of Table II shows that the Klinefelter group had lower scores on cards IX and X and raised scores on cards II and IV. A relatively low Severe Disturbance Scale score on card X occurs more amongst

psychiatric patients diagnosed psychopathic, and a raised score on card X is associated with neurotic or delusional somatic complaints. Raised scores on card II are associated with behaviour disturbance, tension and psychomotor symptoms, while low scores are obtained mainly by non-anxious hysterics. High card IV scores are linked with female sex, behaviour disturbance involving property offences, para-

noid symptoms towards authority figures and shows a negative association with the diagnosis of inadequate personality (Burnand, 1964; Craft *et al.*, 1962). The low card X scores and the raised card II and IV scores of the Klinefelter cases thus point towards a more "psychopathic" and less "hysterical" or "inadequate" personality picture. The scores on card IX are known to be positively correlated with those of card X and the special correlates of a high score here seem less well established. The general personality picture provided by these results supports that obtained from the Porteous Mazes. Also the Word Association Test results tended to show that the Klinefelter men had greater disturbances with "frustrating" words whereas controls had more difficulty with "active" words. This would suggest that the Klinefelters had more problems with aggressive impulses, and the controls may have had inadequate traits of being unable to deal with active situations.

The only results which do not wholly seem to belong with this general interpretation were those from the Vineland Social Maturity Scale. Here there was some evidence of better self-direction in the controls than in the Klinefelter patients. This finding, which is less reliable than some of the others, does not seem either to support the general picture or conflict with it greatly.

The results of the Semantic Differential, Draw a Person and Word Association tests suggest there are differences between the Klinefelter men and their controls in the response to sexual stimuli. Over half the Klinefelter men showed greater disturbance with sex words in the word association test. Sex parts and activities were on the whole more highly evaluated by the Klinefelter men in the Semantic Differential test. This might be interpreted as a reflection of feelings of deprivation in the Klinefelter group. The Draw a Person test results further suggest conflict in this area. For example Klinefelter males showed more frequent additions denoting sex. This might indicate a preoccupation with or a defensive attitude towards sex matters. The data would support a hypothesis that Klinefelter men have inferiority feelings about their sexual deprivation.

The results tabulated in Table II can be

regarded as drawn from a population of about eighty test items. It is possible that when such a large number of tests are used one or two will always yield significant results by chance alone. However, the internal consistency of the present findings and the agreement of their interpretation with Pasquolini's results argue against their being accidental.

#### CONCLUSION

A hospitalized group of chromatin positive Klinefelter men with subnormal intelligence were compared with controls of normal chromosome complement on certain psychological tests. The results for the Klinefelters showed only slightly greater performance IQ than verbal IQ on the WAIS. The difference was not significant and was less than that shown by the control group.

Responses to the Porteous Maze Test, Rorschach and Word Association Test tended to show Klinefelter males to be of psychopathic type of personality with difficulties concerning aggressive impulses.

In Word Association, Semantic Differential and Draw a Person tests differences were also seen in response to sexual stimuli. These differences suggest that defensive and inferiority feelings about sex matters have greater importance with Klinefelter patients than with other subnormality unit patients.

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