

# 3.10

## Gottesman and Shields (1966)

Study in detail: To test if there is a genetic basis to schizophrenia

### Aims

The main aim of this study was to see if whether schizophrenia had a genetic basis. Using a twin study methodology, Gottesman and Shields planned to test different twin pairs to investigate the concordance rates of schizophrenia in twins. They also wanted to replicate other studies that had indicated a genetic basis to the disorder, to find if their findings would be similar (to test for reliability).

### Procedure

Researchers looked at patient records from a short-stay psychiatric hospital with a large outpatients department. The records covered a sixteen year history from 1948 to 1964. Over that time, 392 patients were seen who said that they had a twin of the same sex, and of those 68 had a diagnoses of schizophrenia or a related psychosis – although six patients were discounted either because their twin counterparts were overseas or it was unclear whether they were monozygotic (MZ) or dizygotic (DZ) twins. This left 62 patients: and 5 twin pairs were *both* on the register, leaving 57 study pairs. The other 52 patients’ twin counterparts were tracked down to participate in the study.

	Monozygotic	Dizygotic	Total
Female	11	16	27
Male	13	17	30
<b>Total</b>	<b>24</b>	<b>33</b>	<b>57</b>

Of the 62 patients in the participant sample, exactly half were male, and half were female. Their ages ranged from 19 to 64 when they were last assessed, with the average patient age being 32. Zygosity was determined using three methods: fingerprint testing, blood testing and resemblance assessments (this was done before DNA testing was around).

Multiple data collection methods were used, involving both primary and secondary resources. These included:

- hospital notes
- case histories based on self-report questionnaires and interviews with the twins and their parents
- tape-recorded 30 minute samples of verbal behaviour from semi-structured interviews
- personality testing
- testing to measure disordered thinking, conducted both on the twin sets and their respective parents

The researchers wanted to look at **concordance rates**. If the one twin had been diagnosed with schizophrenia, they wanted to know how often their counterpart twin would also be diagnosed with schizophrenia, or a related psychosis. The patient who had been admitted to the psychiatric hospital initially first coming to attention was called the **proband**. The data was analysed between each proband and their twin, with twin pairs being categorised in four ways.

### Findings

The tables below display the main results from Gottesman and Shields’ study. The four categories were:

- **category 1** – both the proband and co-twin had been hospitalised and diagnosed with schizophrenia
- **category 2** – both had hospitalisation, but the co-twin had been given another diagnosis related to schizophrenia
- **category 3** – the co-twin had some psychiatric abnormality, but nothing related to schizophrenia
- **category 4** – proband had schizophrenia, but the co-twin was diagnosed as clinically normal

Category:	Monozygotic twins		Dizygotic twins	
	Number	%age	Number	%age
1	10	42	3	9
1 and 2	13	54	6	18
1, 2 and 3	19	79	15	45
4	5	21	18	55
<b>Total:</b>	<b>24</b>	<b>100</b>	<b>33</b>	<b>100</b>

Categories 1, 2 & 3:	MZ	DZ
Males	69%	29%
Females	91%	62%

It is recommended that you learn those figures highlighted in red, as learning them all is not realistic

Concordance rates:	MZ	DZ
Severe schizophrenia	75%	22%
Mild schizophrenia	17%	0%

Note: **severe** means having longer than two years’ hospitalisation, **mild** means less than two years

In summary, the results showed:

- There was a significant difference found between MZ and DZ twins in all measures
- MZ twins were always more similar in diagnosis than DZ twins in each case where the co-twin had some diagnosis
- Similarity was greater between female twins compared to male twins (for both MZ and DZ twins)
- Concordance rates were higher for both MZ and DZ twins for severe schizophrenia compared to mild schizophrenia

## Conclusions

The findings suggested that the closer the genetic relationship between two people, the greater the likelihood that if one of them is diagnosed with schizophrenia, the co-twin is also going to develop schizophrenia or a related psychotic disorder. The study also suggested that this relationship was more prevalent among females than males.

However, as twins in the monozygotic twin pairs did not have 100% concordance rates, the implication is that schizophrenia is *not* caused entirely by genes. Instead, the results led Gottesman and Shields to believe that genetic factors do **predispose** someone to schizophrenia, by lowering their threshold for coping with stress, but **environmental triggers** may also be needed to actually start the development of the disorder. They said the **diathesis-stress model** best fit this explanation, taking on board a biological and environmental explanation.

Gottesman and Shields also looked at 11 other studies, and concluded that their results did support each other, although they thought there were some methodological issues, such as with the sampling techniques. This is how they concluded their results were reliable, and that there is a genetic element to schizophrenia.

## Evaluation

### Strengths

- The results are supported and backed up by other studies which have produced similar findings, such as **Inouye (1961)** who found a 74% concordance rate of twins with a progressive chronic schizophrenia disorder, and a 39% concordance rate for mild schizophrenia
- One of the findings of their analysis of the other studies was that the sampling techniques were questionable, but a strength of Gottesman and Shields' study is that the sampling was carefully controlled using multiple measures to make sure that twins were correctly allocated either MZ or DZ twin status, and a lot of data was gathered using multiple research methods to check the diagnoses were correct

### Weaknesses

- It would have been useful to know more about what 'related psychosis' meant when describing the schizophrenia scale to take into account the related disorders, as they failed to make this clear
- Gottesman and Shields suggested that there are different types of schizophrenia and some might be caused by life events (so environmental stimuli), such as being a prisoner of war, and it was hard to distinguish between such types in the results of the study