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# Blood Pressure and Personality Differences in MZ Twins

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Our starting point was Franz Alexander's well-known hypothesis about the hypertensive personality. According to Alexander (1939), hypertensive patients are characterized by a neurotic conflict between passive dependent tendencies and overcompensatory, competitive, hostile impulses. Hypertensive patients seem to be anti-aggressive, submissive, polite, and reserved. At the same time, they show no direct neurotic symptoms such as anxiety, obsessive ideas, or conversion symptoms. Hypertension may be looked upon as a substitute for symptom neurosis. According to Alexander, hypertensive patients are unable to express freely aggressive impulses, and at the same time unable to repress or absorb the impulses through symptom formation. An accumulation of psychic energy takes place, which manifests itself in constant vasomotoric stimulation. In the long run, this development may be able to change the balance of the baroceptors and finally destroy the circulatory system.

A sample of MZ twins is particularly suitable for studying the influence of inhibited aggression on blood pressure. In addition to the methodological advantages of controlling the genetic and external environmental factors of childhood, one frequently finds a casting of roles with one of the twins dominant and aggressive, and the other as a submissive and timid partner.

In other words, the twin relationship may be considered a natural experiment for studying the influence of aggression dynamics on blood pressure. Strangely enough, this has not been done so far, and only a few case-histories have been published.

Hence, our hypothesis was that the submissive twin in a MZ pair will show the higher blood pressure. Implicit in this hypothesis is the assumption that the submissive twin, in order to obey his twin partner, has to repress and inhibit his self-assertive, aggressive tendencies.

This study cannot confirm or invalidate the Alexander hypothesis, since we are employing a normal sample of twins, including only few subjects with high blood pressure. However, according to George Pickering's continuity hypothesis (1961),



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**Tab. I. The relationship between intrapair differences in personality traits and systolic blood pressure in different measurement situations**

| Personality trait | N. | Sitting N.= 33 | | | Supine before rest N.= 30 | | | Supine after rest N.= 34 | | | Supine before puncture N.= 33 | | | Supine after puncture N.= 32 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Higher | Equal | Lower | Higher | Equal | Lower | Higher | Equal | Lower | Higher | Equal | Lower | Higher | Equal | Lower |
| *Childhood* | | | | | | | | | | | | | | | | |
| Submissive | 40 | 16 | 13 | 11 | 16 | 16 | 8 | 20* | 12 | 8* | 20* | 13 | 7* | 20* | 12 | 8* |
| Least ardent | 38 | 15 | 10 | 13 | 17 | 14 | 7 | 17 | 9 | 12 | 19 | 10 | 9 | 14 | 13 | 11 |
| Most obedient | 23 | 7 | 8 | 8 | 11* | 10 | 2* | 8 | 8 | 7 | 8 | 8 | 7 | 8 | 8 | 7 |
| Least active | 33 | 10 | 12 | 11 | 13 | 13 | 7 | 15 | 9 | 9 | 15 | 10 | 8 | 15 | 10 | 8 |
| Most quiet | 35 | 12 | 11 | 12 | 17* | 12 | 6* | 18 | 9 | 8 | 18* | 11 | 6* | 16 | 10 | 9 |
| Most reserved | 38 | 15 | 12 | 11 | 16 | 14 | 8 | 21*** | 11 | 6*** | 19** | 13 | 6** | 18* | 13 | 7* |
| Most anxious | 38 | 12 | 13 | 13 | 14 | 16 | 8 | 17 | 13 | 8 | 17** | 14 | 7 | 16 | 14 | 8 |
| Most unselfcertain | 27 | 15** | 8 | 4** | 11 | 12 | 4 | 14* | 9 | 4* | 13 | 9 | 5 | 14* | 9 | 4* |
| Most touchy | 25 | 11 | 10 | 4 | 9 | 12 | 4 | 10 | 11 | 4 | 8 | 12 | 5 | 9 | 10 | 6 |
| Least gentle, mild | 27 | 9 | 12 | 6 | 7 | 11 | 9 | 12 | 9 | 6 | 12 | 9 | 6 | 14 | 7 | 6 |
| *At present* | | | | | | | | | | | | | | | | |
| Least ardent | 31 | 10 | 10 | 11 | 9 | 10 | 12 | 11 | 7 | 13 | 12 | 9 | 10 | 10 | 8 | 13 |
| Least active | 23 | 9 | 7 | 7 | 10 | 6 | 7 | 9 | 7 | 7 | 12 | 5 | 6 | 10 | 6 | 7 |
| Most reserved | 33 | 14 | 11 | 8 | 15 | 11 | 7 | 15 | 12 | 6 | 17*** | 12 | 4*** | 15 | 10 | 8 |
| Most anxious | 37 | 14 | 10 | 13 | 16 | 14 | 7 | 19 | 9 | 9 | 19 | 9 | 9 | 17 | 10 | 10 |
| Most depressive | 38 | 18 | 11 | 9 | 18** | 15 | 5** | 20** | 11 | 7** | 21*** | 12 | 5*** | 21** | 10 | 7** |
| Most restless | 27 | 10 | 11 | 6 | 10 | 11 | 6 | 11 | 10 | 6 | 10 | 8 | 9 | 8 | 13 | 6 |
| Most stressed | 25 | 8 | 9 | 8 | 10 | 8 | 7 | 8 | 7 | 10 | 9 | 8 | 8 | 8 | 7 | 10 |
| Most impaired | 23 | 10 | 6 | 7 | 10 | 9 | 4 | 12 | 7 | 4 | 11 | 7 | 5 | 8 | 9 | 6 |

* $P < 0.05$
** $P < 0.02$
*** $P < 0.01$

both high and normal blood pressure are determined by the same continuing genetic and environmental factors in the total field of variation. If he is right, and if Alexander's viewpoints are valid, our hypothesis should be confirmed.

The sample consisted of 48 MZ twin pairs (24 ♂♂ and 24 ♀♀), in the age group 33-66 years, obtained through a National Twin Register. All the twins were born in Bergen and the adjacent districts, and most of them were still living in this area when examined.

A preliminary zygosity diagnosis was obtained by means of a mailed questionnaire (Cederlöf et al, 1961), the final diagnosis being established by employing the following blood and serum systems: ABO, MNS, Rh, Kell, Gm, and Gc.

Only few, about 10%, did not return the questionnaire, and about the same percentage refused any cooperation. Accordingly, the sample was relatively unselected. The only essential selecting factor was the claim that at least one of the twins still must be living in their native district of the country.

Blood pressure was measured first in sitting, then in lying position before and after 10 minutes of rest, before and after venous puncture. The subjects were told immediately before venous puncture that a blood sample had to be taken. The blood pressure was subsequently measured.

After this procedure an interview was carried out. The major focus was on personality differences from early childhood on. Each twin was asked to describe himself and his co-twin, and in this way the data were constantly corrected and supplemented. Information was also sought from parents and siblings.

Our hypothesis was partly confirmed. The more submissive of the twins in childhood, the less aggressive, and the more obedient had the higher systolic blood pressure. However, personality traits such as shyness, self-insecurity and passivity in childhood, and shyness and depressive traits in adulthood were just as strongly related to systolic blood pressure. Furthermore, all these personality traits were highly interrelated. Consequently, we have not demonstrated that inhibited aggression in particular is related to systolic blood pressure, but rather that "character-neurotic" traits in general are contributing in determining the blood pressure level in our measurement situation, or, more strictly speaking, related to the level of blood pressure.

Symptom-neurotic traits seemed to be unrelated to systolic blood pressure, and so seemed physical factors, such as birth order and weight and length at birth. Nor could we observe any relationship between personality and diastolic blood pressure.

It is, however, significant that the relationship between blood pressure and personality traits is most marked with regard to measurements in the lying position. Only one personality trait was significantly related to systolic blood pressure in the first measurement in sitting position. Concerning the other personality traits in this measurement situation, no tendency at all was observed.

These findings seem to be due to the fact that the more character-neurotic twin had a lower ability to relax in the measurement situation, as also Malmo and Shagass (1952) have demonstrated.

One must expect that participation in such an investigation is an emotional stress for everyone. However, the healthier individual will recover physiologically sooner during relaxing conditions. Performances of venous puncture or information about what is going to take place makes little differences. The main differentiating factor is the cardiovascular reaction to lying down.

It may also be mentioned that the same relationship between blood pressure, personality traits and measurement situation was found over the total range of blood pressure variation, also for the subjects with hypertensive high blood pressure.

In conclusion, this twin study has demonstrated that character-neurotic traits are related to the blood pressure level in the traditional measurement situation. However, this may be an artifact caused by a different ability to relax in a stressing situation. This may also perhaps explain why some investigators (e. g., Hamilton, 1942; Harburg et al, 1964) have found a significant, but low relationship between inhibited character structure and high blood pressure, as they have been eager to measure the blood pressure during so-called relaxing conditions, which in fact seem not to be so relaxing for more character-neurotic individuals.

## References

ALEXANDER F. (1939). Emotional factors in essential hypertension: presentation of a tentative hypothesis. Psychosom. Med., **1:** 173-179.

CEDERLÖF R., FRIBERG L., JONSSON E., KAIJ L. (1961). Studies of similarity diagnosis in twins with the aid of mailed questionnaires. Acta Genet. (Basel), **11:** 338-362.

HAMILTON J. A. (1942). Psychophysiology of blood pressure. I. Personality and behavior ratings. Psychosom. Med., **4:** 124-133.

HARBURG E., JULIUS S., MCGINN N. F., MCLEOD J., HOOBLER S. W. (1964). Personality traits and behavioral patterns associated with systolic blood pressure levels in college males. J. Chronic Dis., **17:** 405-414.

MALMO R. B., SHAGASS C. (1952). Studies of blood pressure in psychiatric patients under stress. Psychosom. Med., **14:** 82-93.

PICKERING G. (1961). The Nature of Essential Hypertension. Churchill, London.

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