



# Is previous hyperthyroidism associated with long-term cognitive dysfunction? A Twin Study.

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## Introduction

Hyperthyroidism has been suggested to adversely affect cognitive function. However, this association could also be caused by genetic and environmental factors affecting both the development of hyperthyroidism and cognitive function (fig. 1). By investigating twin pairs discordant for hyperthyroidism, this potential confounding can be minimized. The aim of this study is to examine if hyperthyroidism is associated with long-term cognitive dysfunction.

## Methods

Discordant twin pairs were identified by record-linkage between The Danish National Patient Registry and 3036 twin pairs from The Danish Twin Registry, who had participated in nationwide surveys on health conditions. Among other questions, survey participants had carried out cognitive tests including a Mini-Mental State Exam (MMSE) and six separate cognitive tests. Based on 5 of these tests a cognitive composite score was calculated.

## Results

55 out of 3036 twin pairs were discordant for hyperthyroidism. The mean time from diagnosis until survey participation was 7.3 years (range: 0-24.1). In both the intra-pair and individual level analyses, the hyperthyroid twin scored significantly better in the MMSE ( $p=0.023$  and  $p=0.038$ , respectively). The same tendency was found in the other cognitive tests, although none were statistically significant. When stratified for time since diagnosis, no significant association could be shown in both the MMSE and the cognitive composite score

## Conclusion

- Hyperthyroidism does not seem to adversely affect long-term cognitive dysfunction
- In the individual level analysis, as well as the intrapair analysis, the hyperthyroid twin scored significantly higher in the MMSE among the monozygotic twins
- This association attenuated when stratifying for time since diagnosis.

Figure 1: Potential confounding variables

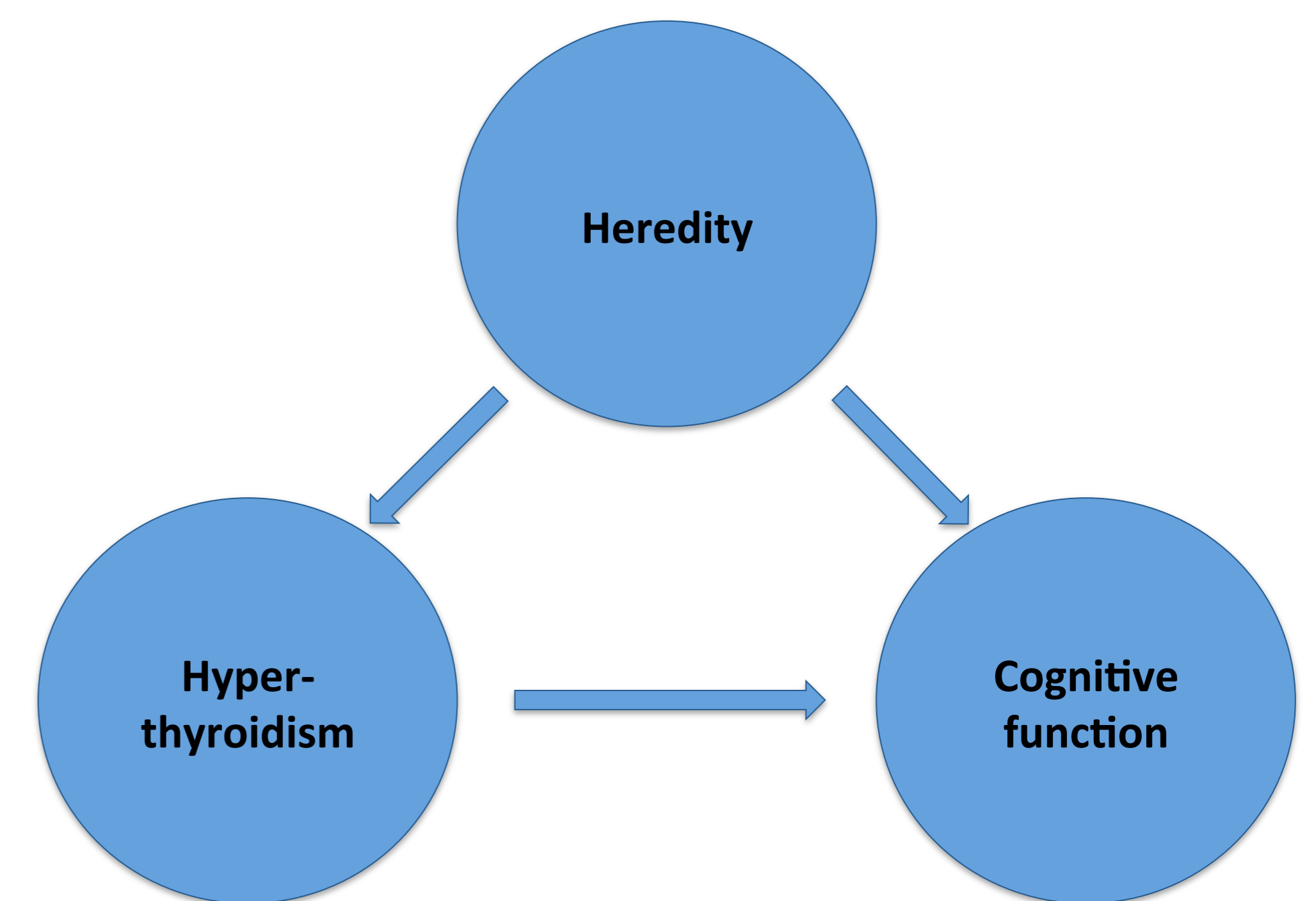


Figure 2: Cognitive composite score (All twins)



Figure 3: MMSE score (monozygotic twins)

