

# A LONGITUDINAL ASSESSMENT OF DIVERGING VERBAL AND NON-VERBAL ABILITIES IN THE WILLIAMS SYNDROME PHENOTYPE

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## ABSTRACT

Jarrold et al. (1998) presented evidence to suggest that verbal and non-verbal abilities develop at different rates in individuals with the Williams syndrome phenotype. However, this evidence was derived from cross-sectional rather than longitudinal data. The current report presents data from a series of follow up assessments which examine the development of vocabulary and pattern construction abilities in 15 of the original sample of 16 individuals, over a 40 month period. The results confirm the original predictions, as mental age equivalent scores for vocabulary increase more rapidly than scores for the pattern construction test; a finding, which appears unlikely to be due to practice effects.

Key words: Williams syndrome, vocabulary, pattern construction ability

## INTRODUCTION

Williams syndrome, a condition caused by a genetic deletion on chromosome 7, is thought to be associated with a characteristic psychological profile. It is argued that individuals with Williams syndrome have relatively strong language abilities, in marked contrast to poorer skills in other areas, most notably in the domain of visuo-spatial ability (for reviews see Bellugi and Wang, 1998; Karmiloff-Smith et al., 1995; Mervis, 1999). Having said this, a number of studies have failed to find the clear difference between verbal and non-verbal abilities in samples of individuals with Williams syndrome that this view would predict (e.g., Arnold et al., 1985; Dall'Oglio and Milani, 1995; Kataria et al., 1984; Pagon et al., 1987; Vicari et al., 1995; Volterra et al., 1996). Similarly, in our own research (Jarrold et al., 1998) we noted that not all individuals in a sample of children and young adults with Williams syndrome showed this 'characteristic' profile. Although a large discrepancy between verbal and non-verbal abilities was observed in a number of individuals, others showed less – or even no – difference between levels of performance in these domains. Further analysis indicated that this was not the result of subgroups within the sample showing qualitative differences in performance. Instead it appeared that there was quantitative variation across individuals in the extent to which verbal ability was superior to non-verbal ability. In addition, the magnitude of this discrepancy was closely related to individuals' level of verbal ability. In other words, those individuals with stronger language skills showed a larger discrepancy between verbal and non-verbal ability.

These results suggest that these skills develop at different rates in Williams syndrome, with verbal abilities increasing more rapidly than non-verbal abilities. If this is the case, then a discrepancy between these domains will become increasingly apparent with development. The absence of marked differences between verbal and non-verbal abilities in some previous studies might therefore reflect their sampling of relatively young or less 'developed' individuals. Consequently, this model of diverging developmental trajectories has the potential to reconcile apparently contradictory findings in the literature. However, one problem with this account is that it is based on an analysis of cross-sectional rather than longitudinal data. As a result it provides only indirect evidence of patterns of developmental change. In addition, the approach of relating the discrepancy between two measures of mental age to the absolute level of one of these measures is subject to a statistical concern. Although the difference between two variables can be entirely independent of these variables in isolation (for example the absolute difference between two particular individuals' ages will always be constant regardless of their actual ages), this only holds when there is no error in the measurement of these variables. In the case of the mental age assessments, error of measurement of mental age will be correlated with error in the estimate of mental age differences. This will tend to artificially inflate the association between these constructs (Lewis-Beck, 1993). Given these concerns, there is clearly a need for confirmation of the model of diverging verbal and non-verbal abilities in Williams syndrome.

The purpose of the current paper is to provide a complementary and direct test of this model, by examining the longitudinal development of two of the measures employed initially in the original sample – the British Picture Vocabulary Scale and the Pattern Construction subtest of the Differential Ability Scales. In fact the previous paper did report data on the British Picture Vocabulary Scale and the Pattern Construction test from two assessments of the sample, spaced by approximately 8 months. Although vocabulary mental age increased by a greater amount than pattern construction age during this time, the difference between the two measures of change was not significant. It was argued that this reflected the lack of power inherent in a study of such a short duration, and that a longer and more detailed assessment of the development of these abilities was needed. To this end the current study presents additional data from four further assessments of this sample, which provide a total of six time points spanning a period of approximately 40 months.

## MATERIALS AND METHODS

### *Participants*

15 of the 16 individuals in the original sample were assessed at all time points of the longitudinal study. Seven participants were male, eight were female. Individuals were aged between 6 years 11 months and 28 years 0 months at the start of the study, with a mean age of 198.5 months (s.d. = 88.1 months) at this point. All participants were recruited through the Williams Syndrome Foundation of the United Kingdom. Nine individuals had received a diagnosis of Williams syndrome, and the remaining six had been diagnosed as having infantile hypercalcaemia (IHC). These six individuals were among the seven eldest

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