

Is language spared in Williams syndrome? Developmental timing as a lens

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One of the holy grails for cognitive science is understanding the complex causal chain from gene to mind over development. Understanding how language is learned under conditions of genetic variation can provide us with key facts about the nature of language as a computational system, its interface with other non-linguistic systems, and how the system might be compromised under different types of genetic deficit. At present, however, we are far from understanding the complex causal chain between genetic deficits and their effects on brain and cognitive structure, including the ultimate achievements of language learners. In this talk, I will argue that to truly understand the effects of genetic deficits on language learning, we must broaden the lens, examining language relative to other cognitive domains, and paying close attention to the developmental timing profiles that occur across these domains. To illustrate, I will use the case of Williams syndrome—a genetic syndrome that gives rise to an unusual profile of severely impaired spatial representation together with highly fluent and well-structured language. A first-pass hypothesis about the WS cognitive phenotype emphasized the apparent dissociation of language from spatial representation, suggesting that the genetic deficit targets one system (space) while leaving the other intact (language), consistent with strong modularity. However, detailed studies of language and spatial representation in people with Williams syndrome, along with comparative studies of typically developing children, reveal a very different picture-- one which suggests that modularity should be considered along with a specific mechanistic explanation for the apparent dissociation. This mechanism focuses on developmental timing of different cognitive functions in the *typically* developing individual, along with variation in this timing in the case of WS. This picture radically changes the conversation about how and why genetic deficits result in atypical cognitive profiles, including language, and invites us to consider nuanced explanations of whether, and how language is affected in cases of genetic deficit or experiential deprivation.