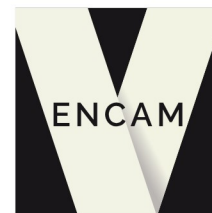




27 A 30 DE MAIO DE 2026

V ENCONTRO DE COGNIÇÃO E ARTES MUSICAIS

UNIVERSIDADE FEDERAL DE SERGIPE



Investigação da relação entre o processamento musical e numérico na Síndrome de Williams

Marília Nunes-Silva¹, Ricardo Moura², Vitor Geraldi Haase³

¹Universidade Federal de Minas Gerais, ²Universidade de Brasília, ³Universidade Federal de Minas Gerais

marilianunespsi@gmail.com, ricardoojm@gmail.com, vitao.haase@gmail.com

RESUMO

PROBLEMA/QUESTÃO

A Síndrome de Williams (SW) é um transtorno genético do neurodesenvolvimento caracterizado por habilidades relativamente preservadas nas áreas social, musical, verbal e de reconhecimento de faces, juntamente com prejuízos no processamento visuoespacial e numérico (Kozel et al., 2021; Mervis et al., 2000). Em relação às habilidades numéricas, estudos mostram que crianças e adultos com SW apresentam déficits na representação de magnitudes, com dificuldades em tarefas de contagem e comparação de números (Ansari et al., 2007; Van Herwegen & Simms, 2020). Por outro lado, pesquisas relatam que indivíduos com SW demonstram elevado engajamento e interesse musical (Thakur et al., 2018) e, em alguns casos, desempenho semelhante ao de controles em tarefas de percepção musical (Levitin, 2005; Levitin et al., 2004), sustentando a hipótese de dissociação entre cognição musical e numérica. No entanto, a associação entre percepção musical e acuidade de magnitude numérica na SW permanece pouco investigada.

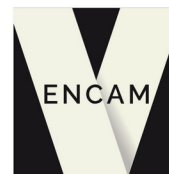
OBJETIVOS

Este estudo teve como objetivo investigar a relação entre percepção musical e processamento não simbólico de magnitude numérica em crianças e adolescentes com Síndrome de Williams.

MÉTODO

Trinta participantes foram avaliados e divididos em três grupos (n = 10 por grupo, 7 de sexo masculino): um grupo com SW (idade média = 13,8, DP = 3,5), um grupo controle pareado por idade cronológica (CA) e um grupo controle mais jovem com





desenvolvimento típico (YD; $M = 7,8$, $DP = 2,9$). Os participantes realizaram uma tarefa de comparação de magnitudes não simbólicas e uma avaliação de percepção musical por meio da Montreal Battery of Evaluation of Amusia e da Montreal Battery of Evaluation of Musical Abilities.

RESULTADOS

Não foram encontradas diferenças significativas entre o grupo SW e o grupo YD em todos os domínios musicais ($p > .05$). Em contraste, o grupo CA apresentou desempenho significativamente superior ao grupo SW em todos os domínios musicais ($p < .01$). Similarmente, na tarefa de magnitude numérica, não houve diferença significativa entre os grupos SW e YD ($t(14) = 1.86$, $p = .085$, $d = 0.93$), enquanto houve diferença significativa entre os grupos SW e CA ($t(14) = 5.15$, $p < .001$, $d = 2.57$). Considerando todos os participantes, o desempenho nas tarefas de percepção musical apresentou forte associação com a acuidade numérica, indexada pela fração de Weber ($r = -0.81$, $p < .001$).

CONCLUSÕES

Observou-se que indivíduos com SW apresentaram desempenho semelhante ao de participantes com desenvolvimento típico mais jovens em tarefas musicais e numéricas, mas diferenças marcantes em comparação com controles pareados por idade cronológica. Considerando todos os participantes, houve forte correlação negativa entre os valores da fração de Weber e a pontuação total nas tarefas musicais, indicando que limiares mais baixos para discriminação de magnitude numérica estão associados a melhor desempenho musical. Esse resultado apoia a associação entre processamento de magnitude numérica e percepção musical no desenvolvimento. Além disso, embora as habilidades musicais sejam descritas como relativamente preservadas na SW, os achados sugerem que essa preservação não é primariamente explicada por uma vantagem na discriminação analítica de características musicais.

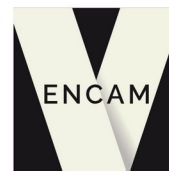
PALAVRAS-CHAVE

Síndrome de Williams, Música, Dificuldades de Aprendizagem, Discalculia, Cognição

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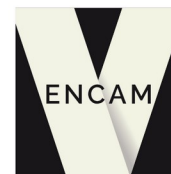
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Investigation of the relationship between musical and numerical processing in Williams Syndrome

Marília Nunes-Silva¹, Ricardo Moura², Vitor Geraldi Haase³

¹Universidade Federal de Minas Gerais, ²Universidade de Brasília, ³Universidade Federal de Minas Gerais

marilianunespsi@gmail.com, ricardoojm@gmail.com, vitao.haase@gmail.com

ABSTRACT

RESEARCH QUESTION/PROBLEM

Williams Syndrome (WS) is a genetic neurodevelopmental disorder characterized by relatively preserved social, musical, verbal, and face recognition abilities alongside impairments in visuospatial and numerical processing (Kozel et al., 2021; Mervis et al., 2000). Regarding numerical skills, studies show that children and adults with WS have deficits in the representation of magnitudes, presenting difficulties in counting and number comparison tasks (Ansari et al., 2007; Van Herwegen & Simms, 2020). On the other hand, studies have reported that individuals with WS exhibit heightened musical engagement and interest (Thakur et al., 2018), and in some cases, performance comparable to controls in musical perception tasks (Levitin, 2005; Levitin et al., 2004, supporting the hypothesis of dissociation between musical and numerical cognition. However, the association between musical perception and numerical magnitude acuity in WS remains poorly investigated.

OBJECTIVES

The present analytical group comparison study aimed to investigate the relationship between musical perception and nonsymbolic numerical magnitude processing in children and adolescents with Williams Syndrome.

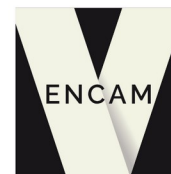
METHOD

Thirty participants were evaluated and divided into three groups (n=10 per group, 7 males per group): a group of individuals with WS (M age = 13.8, SD = 3.5), a typically developing chronological age-matched control group (CA), and a younger typically developing group (YD; M = 7.8, SD = 2.9). Participants completed a nonsymbolic magnitude comparison task and musical perception assessment using the Montreal Battery of Evaluation of Amusia and the Montreal Battery of Evaluation of Musical Abilities.

RESULTS

No significant differences were found between the WS group and the YD control group across musical domains ($p > .05$ for all). In contrast, the CA control group performed significantly better than the WS group across all musical domains ($p < 0.01$). Similarly, no significant difference was observed between the WS group and the YD





group ($t(14) = 1.86$, $p = .085$, $d=0.93$), and a significant difference between the WS and CA groups ($t(14) = 5.15$, $p < .001$, $d=2.57$), indicating lower discrimination acuity in the WS group. Across all participants, performance on musical perception tasks was strongly associated with numerical acuity, as indexed by the Weber fraction ($r = -0.81$, $p < .001$).

CONCLUSIONS

We observed that individuals with WS performed similarly to younger typically developing participants across musical and numerical tasks, but showed marked differences when compared to age-matched controls. These findings suggest that the performance of individuals with WS in tasks assessing musical perception and nonsymbolic number processing resembles that of typically developing children at earlier developmental stages, rather than that of age-matched peers. Considering all participants, there was a strong negative correlation between the Weber fraction values and the total score in musical tasks, indicating that lower thresholds for nonsymbolic numerical magnitude discrimination were associated with better musical performance. This finding supports an association between numerical magnitude processing and musical perception across development. Although musical abilities are described as relatively preserved in WS, the present findings suggest that this preservation is not primarily driven by enhanced analytical discrimination of musical features.

KEYWORDS

Williams Syndrome, Music, Learning Disabilities, Dyscalculia, Cognition

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