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In this online supplement, additional information on data analysis are provided.

1. Individual scores not included in analyses

In the two tasks (the Go/No-go task and the Simon task) scores were excluded for those subjects who obtained less than 50% accuracy in the control condition (the condition not engaging inhibition processes). In other words, scores were only included for children who responded correctly in at least 50% of the 'Go' condition in the Go/No-go task and in 50% of trials in the congruent condition of the Simon task. Based on these criteria, the scores of two hearing children on the Go/No-go task were excluded.

In the Corsi blocks task, three deaf children and one hearing child obtained zero scores, indicating that these subjects did not complete even the simplest level. Data of children obtaining zero scores were not included in the analysis.

2. Additional scores from the EF tasks

Data collected on EF with 5 tasks were very complex and we calculated a great variety of scores. The main article contains the most representative scores that are commonly used to investigate the components of EF. In this online supplement, additional scores from the same 5 tasks have been presented to fully analyse the EF construct and also to show the richness of the data. These scores (as dependent variables) were included in the ANOVA with hearing status (deaf, hearing) and age (younger, older) as between-participant factors in order to investigate group differences between deaf (younger, older) and hearing (younger, older) children. Group means and standard deviations in additional scores of all EF tests for the deaf and hearing children are reported in Table 1.

<Insert Table S1>

The online supplement contains graphs of the scores included in the main part of the article as well as graphs of additionally calculated scores.

3. Simon task

In the main article, the Simon effect, defined as the difference between congruent and incongruent conditions, was chosen as an indicator of interference control. Simon scores (accuracy and reaction time (RT)) in incongruent and congruent conditions by groups are presented in Figure S1.

<Insert Figure S1>

4. Go/No-go task

As discussed in the main part of the article, false alarms (erroneous tapping of the spacebar in the No-go trials, also called commission errors) were calculated as an indicator of inhibitory skills. Additionally, we measured: misses (failing to tap the spacebar in the Go trials) and RT for hits (RT for correct tapping in the Go condition). These are usually not interpreted as indicators of inhibitory skills (Meule, 2017); in correct Go-trials the number of misses (%) is considered as a measure of lack of attention, and RT as an indicator of behavioral execution (Schulz et al., 2007). The two measures from the Go/No-go task have been added in the online supplement to enrich the analysis and to satisfy the curiosity of readers.

All measures by groups from the Go/No-go task are presented in Figure S2.

<Insert Figure S2>

4.1. ***Misses in the Go/No-go task (%)***

We used a 2-way ANOVA with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. There was no significance for main effect of hearing status (F (1,34) = .643, p = .428, partial $\eta 2$ = .019), or main effect of age (F (1,34) = .007, p = .935, partial $\eta 2$ < .001). However, the 2-way interaction between hearing status and age was significant (F (1,34) = 6.040, p = .019, partial $\eta 2$ = .151). It is worth mentioning that the homogeneity of variance measured by Levene's test was violated; however, ANOVA is robust for violation of this assumption when the sizes of groups are similar (Field, 2013).

In order to unpack the two-way interaction, separate t-tests were conducted for younger and older subgroups. The data for misses were normally distributed for all subgroups (younger deaf, older deaf, younger hearing, older hearing). Neither younger deaf and hearing children ($t(15)= 1.337$, $p = .201$, *Cohen's d* = .650), nor older children ($t(10.605)= -2.099$, $p = .061$, *Cohen's d* = - .956) differed on misses . For the older subgroup the assumption of homogeneity of variance measured by Levene's test was not met in this analysis, so the degree of freedom ($df = 10.605$) and other *t*-test parameters did not assume homogeneity of variance.

4.2. ***RT in Go trials in the Go/No-go task***

We used a 2-way ANOVA with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. The main effect of hearing status was not significant (F (1,34) = 2.820, $p = .102$, partial $\eta 2 = .077$); however, the main effect of age was significant (F (1,34) = 7.515, $p = .010$, partial $\eta 2 = .181$), showing that younger children had longer RTs than older children. The 2-way interaction between hearing status and age was not significant (F (1,34) = .157, $p = .694$, partial $\eta 2 = .005$).

5. Working memory (WM) – Corsi blocks

In the main article we have used last sequence length as a measure of WM. This indicator has been frequently used as a measure of WM span as it provides information about the maximum length that the child was able to reproduce accurately in reverse order (e.g. Brunetti et al., 2014; Kessels et al., 2000). An additional three measures were calculated as indicators of WM: 1) number of correct sequences (the number of correctly recalled sequences); this is not a measure of backward span but it shows the ability to perform the task correctly; 2) summary of sequence length (addition of the length of all correctly repeated sequences, for example if the child correctly recalled one sequence of two blocks and two sequences of three blocks, the score was calculated as 2+3+3 = 8); this measure included not only sequence length, but also

accuracy in the Corsi task; and 3) total score (the last block length multiplied by the number of correct sequences; for example if the number of correctly recalled sequences was 3 and the last sequence length was 4, then the total score was 3 x 4 = 12, as proposed by Kessels et al. (2010)). This way of computing scores was proposed by Kessels et al (2010) as it takes into consideration accuracy of performance on both trials of an equal sequence length.

All measures by groups from the Corsi blocks are presented in Figure S3.

<Insert Figure S3>

5.1. Number of correct sequences in the Corsi blocks

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. Neither the main effect of hearing status ($F(1,32) = 1.756$, $p = .195$, $\eta 2 = .052$), the main effect of age ($F(1,32) = 4.009$, $p = .054$, $\eta 2 = .111$), nor the two-way interactions between hearing status and age ($F(1,32) = .190$, $p = .666$, $\eta 2 = .006$) were significant.

5.2. Summary of sequence length in the Corsi blocks

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. Neither the main effect of hearing status significant ($F(1,32) = .889$, $p = .353$, $\eta 2 = .027$), were the main effect of age ($F(1,32) = 3.934$, $p = .056$, $\eta 2 = .109$), nor the two-way interactions between hearing status and age ($F(1,32) = .295$, $p = .591$, $\eta 2 = .009$) were significant.

5.3. Total score in Corsi block

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. The main effects of hearing status ($F(1,32) = .589$, $p = .448$, $\eta 2 = .018$), main effect of age ($F(1,32) = 3.494$, $p = .071$, $\eta 2 = .098$) and the 2- way interaction between hearing status and age ($F(1,32) = .428$, $p = .518$, $\eta 2 = .013$) were not significant.

6. Wisconsin card sorting task.

In the main article, the ability to choose 10 correct responses in a row was used as the indicator of cognitive flexibility. In this online supplement we present two additional measures of cognitive flexibility: extent of perseveration with a previous category and block length.

All measures from the WCST by groups are presented in Figure S4.

<Insert Figure S4>

6.1. Perseveration in the Wisconsin card sorting task

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. There was no statistical significance in the main effect of hearing status ($F(1,36) = .287$, $p = .595$, $\eta 2 = .008$), main effect of age ($F(1,36) = 1.776$, $p = .191$, $\eta 2 = .047$); and in the two-way interaction between hearing status and age ($F(1,36) = .958$, $p = .334$, $\eta 2 = .026$).

6.2. Block length in the Wisconsin card sorting task

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. The main effect of hearing status ($F(1,36) = .138$, $p = .712$, $\eta 2 = .004$); the main effect of age ($F(1,36) = .037$, $p = .849$, $\eta 2 = .001$); and the 2-way interaction between hearing status and age ($F(1,36) = .344$, $p = .561$, $\eta 2 = .009$) were no significant.

7. Tower of London.

The number of correctly resolved items was analyzed in the main article. In this online supplement, we present an additional indicator of planning: the total score, calculated as the sum of scores awarded for each item.

All measures from the ToL by groups are presented in Figure S5.

<Insert Figure S5>

7.1. Total score in the Tower of London

A 2-way ANOVA was computed with hearing status (deaf, hearing) and age (younger, older) as between-participant factors. Neither the main effect of hearing status ($F(1,36) = 1.361$, $p = .251$, $\eta 2 = .036$) main effect of age ($F(1,36) = .241$, $p = .627$, $\eta 2 = .007$); nor the 2-way interaction between hearing status and age ($F(1,36) = 2.142$, $p = .152$, $\eta 2 = .056$) were significant.

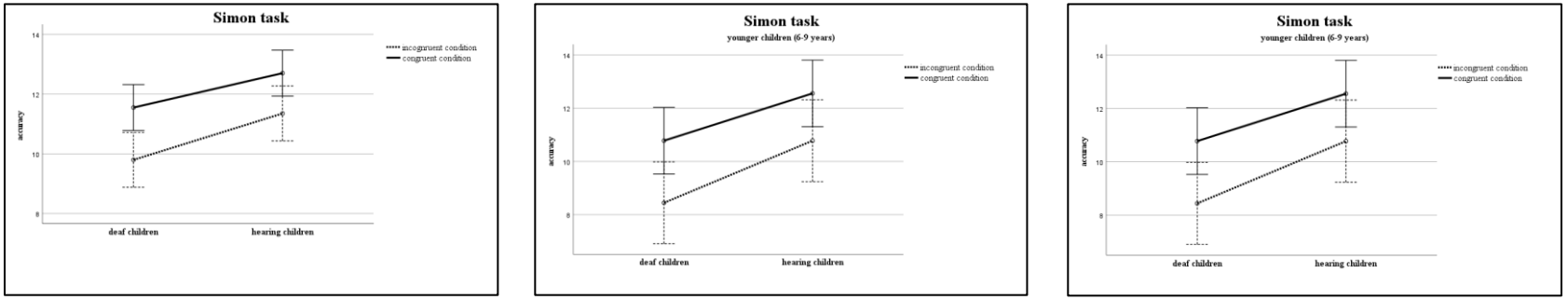
8. Correlation between executive function composite score and age in deaf group

In the main article, the simple regression analysis was used in order to investigate relation between EF composite score and PJM RST. Age was not entered in the model for reasons expressed in the main part. Here, the relation between EF composite score and age was additionally analysed. As the variables: general EF and age had normal distribution in deaf group, Pearson correlation was applied. Age correlated with EF composite scores ($r = .599$, $p = .005$).

Supplement Figure S1

Mean scores by group on the Simon task: A) Accuracy B) Reaction time. Error bars indicate 95% confidence intervals.

A



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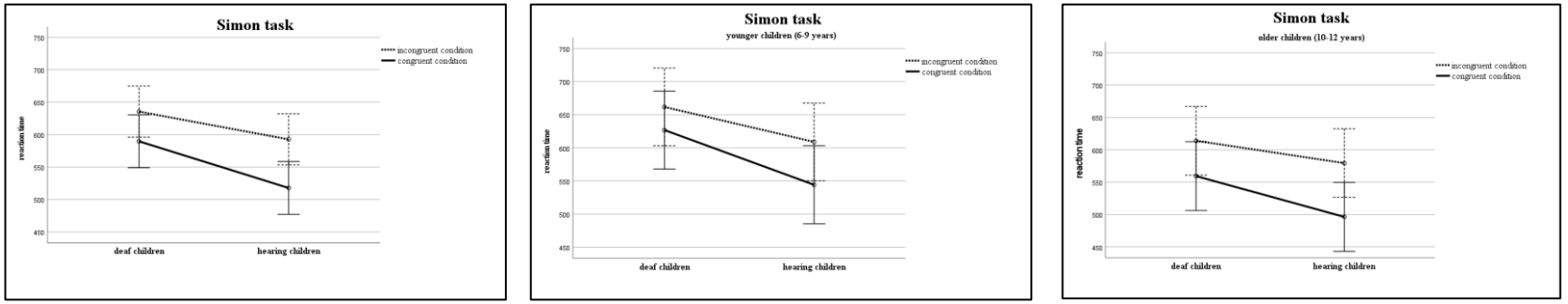
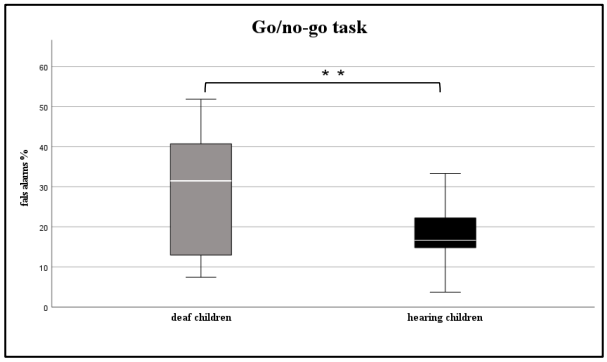
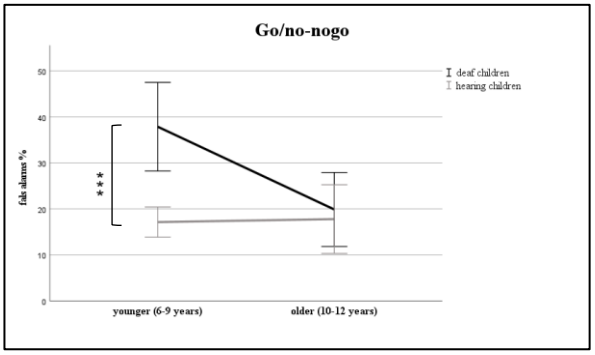


Supplement Figure S2

Mean scores by group on the Simon task: A) False alarms (%). B) Misses (%). C) RT in Go trials. On the figures with younger and older groups, error bars indicate 95% confidence intervals. Differences between groups are indicated with asterisks . **p ≤ .01, ***p ≤ .001

A





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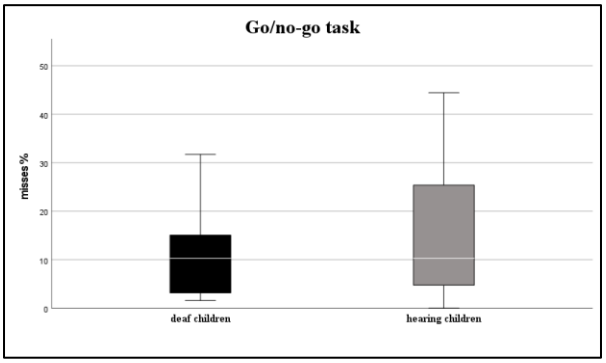

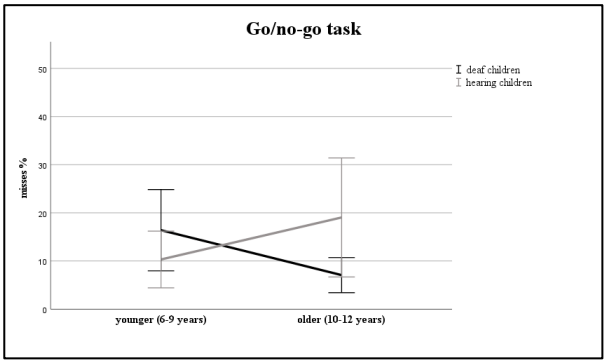

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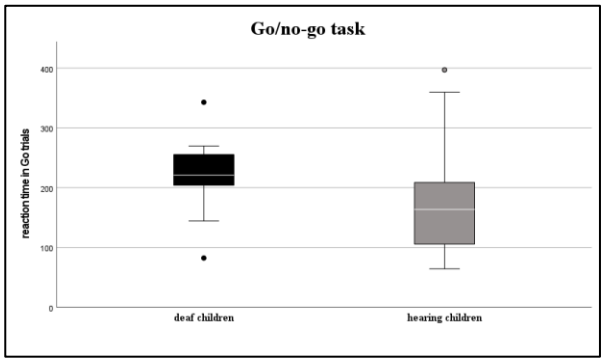

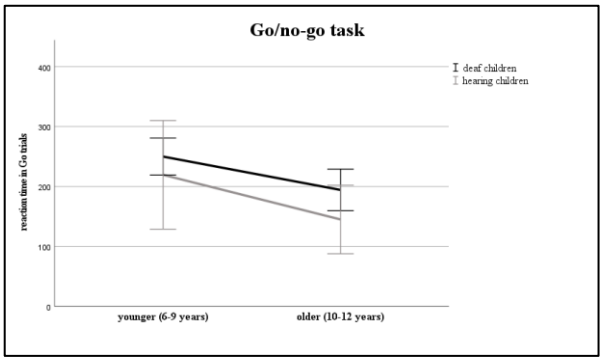

Supplement Figure S3

Mean scores by group on the Corsi Block Task: A) Last sequence length. B) Number of correct sequences. C) Summary of sequence length. D)Total score. On the figures with younger and older groups, error bars indicate 95% confidence intervals.

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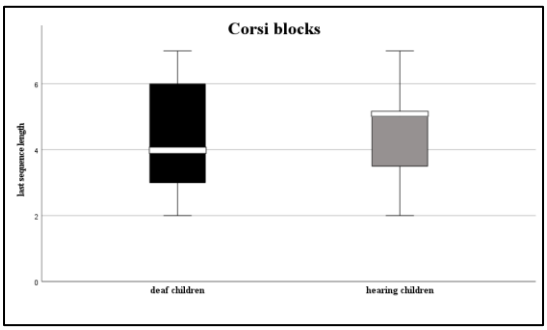

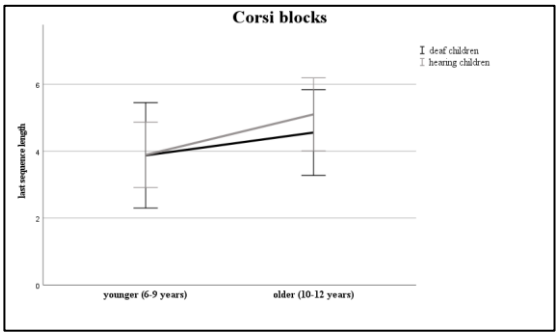

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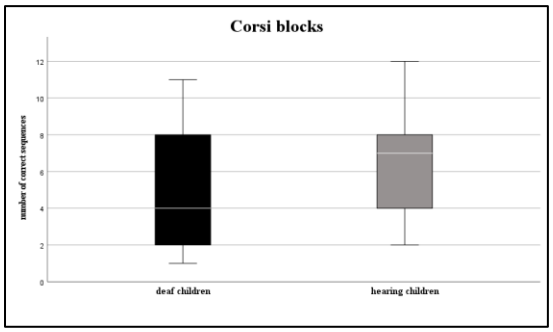

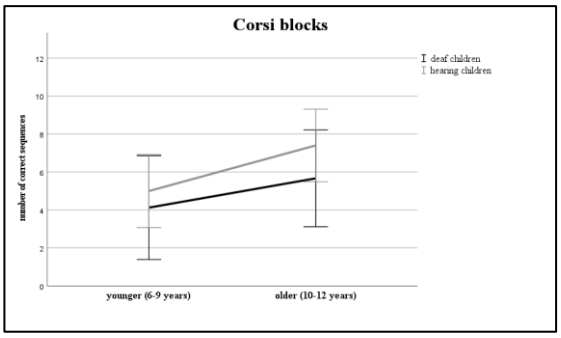

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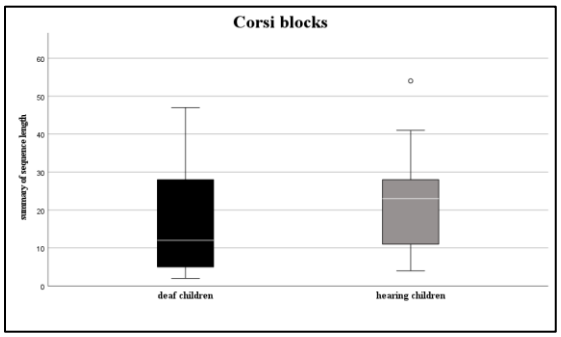

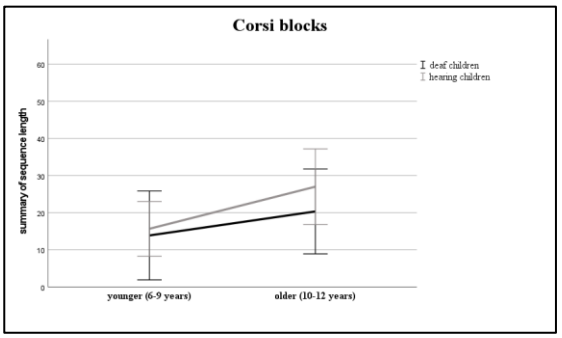

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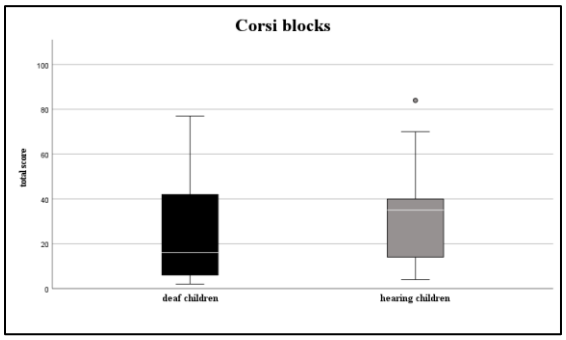

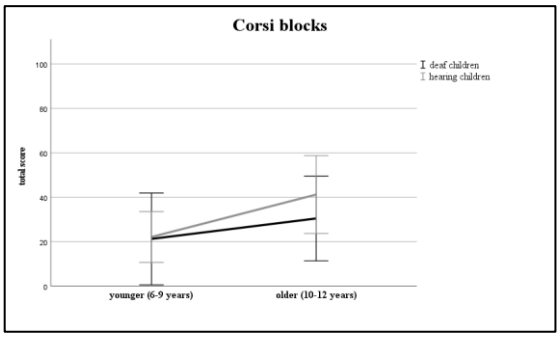

Supplement Figure S4

Mean scores by group on the Wisconsin card sorting task: A) Number of blocks. B) Perseveration. C) Block length. On the figures with younger and older groups, error bars indicate 95% confidence intervals.

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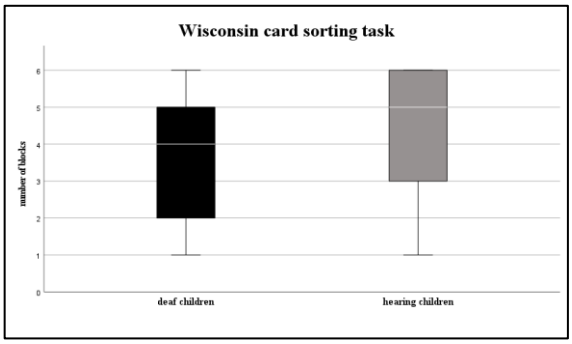

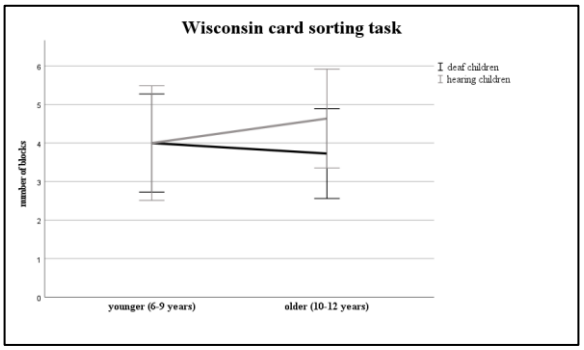

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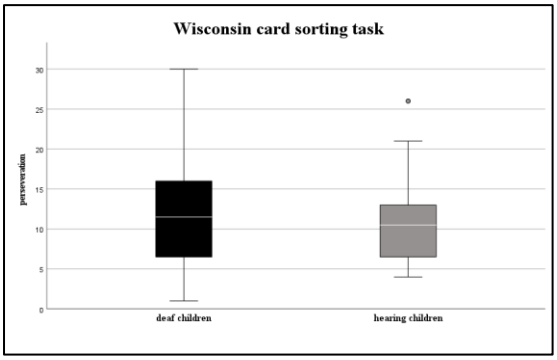

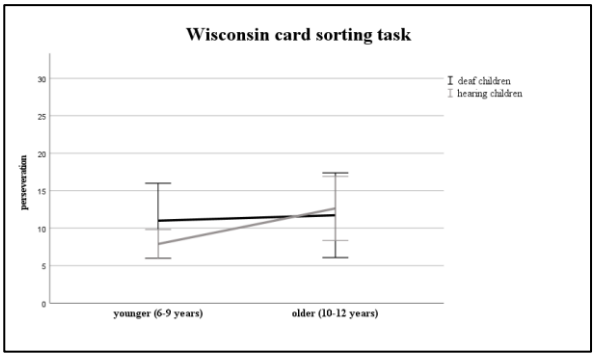

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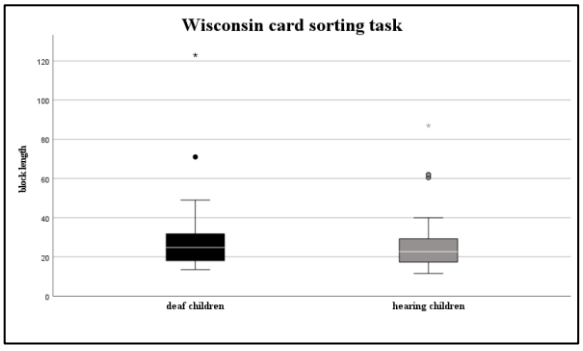
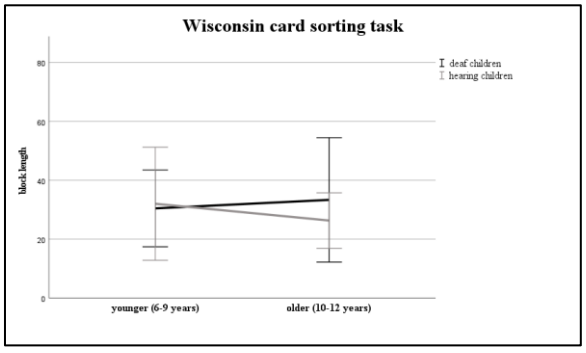
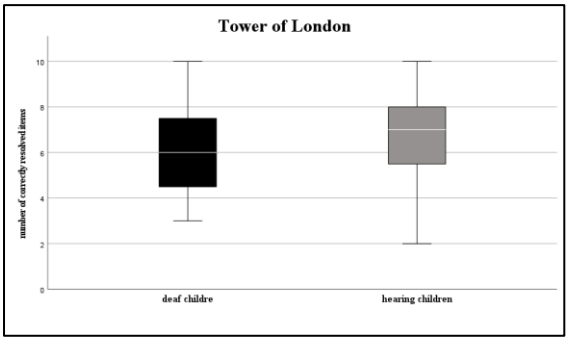


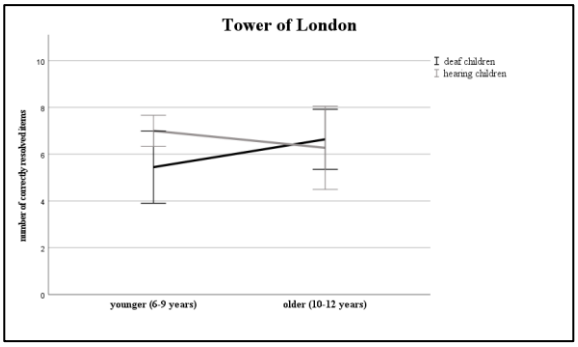


Supplement Figure S5

Scores by group on the Tower of London: A) Number of correctly resolved items. B) Total score. On the figures with younger and older groups, error bars indicate 95% confidence intervals.

A





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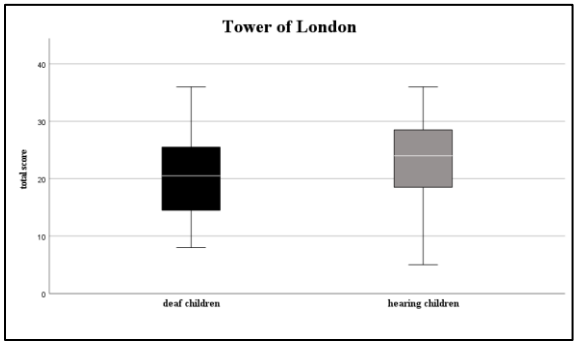

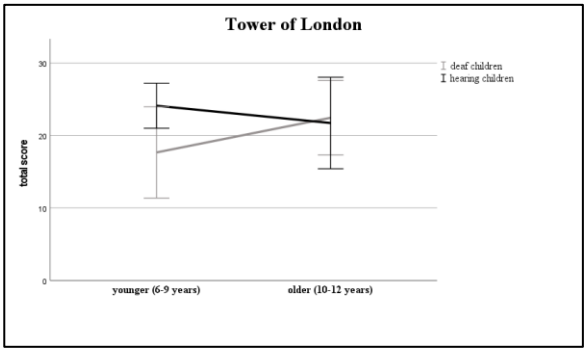

Table S1 Descriptive statistics of EF variables by groups and by age.

task	measure	deaf			hearing		
		all	younger	older	all	younger	older
		mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)
Go/No-go							
	misses %	11.27 (9.44)	16.40 (11.0)	7.07 (5.42)	15.17 (14.10)	10.32 (7.05)	19.05 (17.29)
	RT in Go trials	219.36 (53.84)	249.98 (40.31)	194.306 (51.70)	178.137 (98.36)	219.52 (108.45)	145.03 (79.92)
Corsi block							
	No. of sequence	4.94 (3.29)	4.13 (3.27)	5.67 (3.32)	6.26 (2.81)	5.00 (2.50)	7.40 (2.68)
	sum of sequence	17.29 (14.53)	13.87 (14.32)	20.33 (14.86)	21.63 (13.26)	15.67 (9.58)	27.00 (14.23)
	total score	26.12 (24.45)	21.25 (24.70)	30.44 (24.83)	32.16 (22.24)	22.11 (14.90)	41.20 (24.50)
Wisconsin card sorting task							
	perseveration	11.40 (7.43)	11.00 (6.50)	11.73 (8.42)	10.50 (5.47)	7.89 (2.52)	12.64 (6.38)
	block length	32.03 (25.38)	30.43 (16.97)	33.33 (31.45)	28.87 (19.37)	32.01 (25.01)	26.30 (14.01)
Tower of London							
	total score	20.30 (8.07)	17.67 (8.20)	22.45 (7.66)	22.80 (7.41)	24.11 (4.05)	21.73 (9.40)

Note. For the Corsi task - total score - the last block length multiplied by the number of correct sequences. For the Tower of London - total score - the sum of scores awarded for each item.

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