Two case studies using the Dichotic Digits difference Test (DDdT) to disentangle true dichotic deficits from cognitive disorders

Sharon Cameron, Helen Glyde, Harvey Dillon, & Jessica Whitfield

National Acoustic Laboratories

•Dichotic tests are the most commonly used test in CAPD batteries.
•Fails on dichotic tests are correlated with real-life listening difficulties (Tomlin et al., 2015).
BUT…
•Dichotic test results are also correlated with cognitive measures such as attention and memory (Tomlin et al., 2015; Cameron et al., 2016).

How can we solve this dilemma?

•The Dichotic Digits difference Test (DDdT) incorporates a diotic measure and the use of advantage scores to allow cognition to be better controlled for.

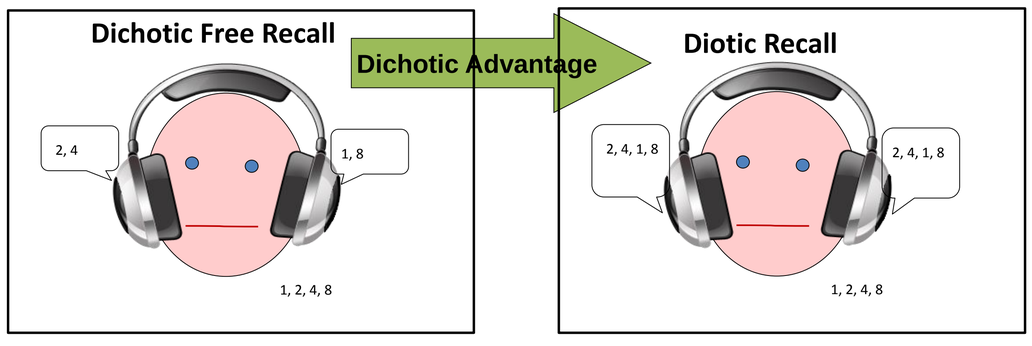

Fig. 1. The two main conditions of the DDdT and the derived advantage measure which helps to control for higher order factors.

How do the conditions relate to each other?

• The strong correlation (r = 0.71) between the two conditions demonstrates the impact that non-dichotic factors have on the dichotic scores (Cameron et al., 2016).

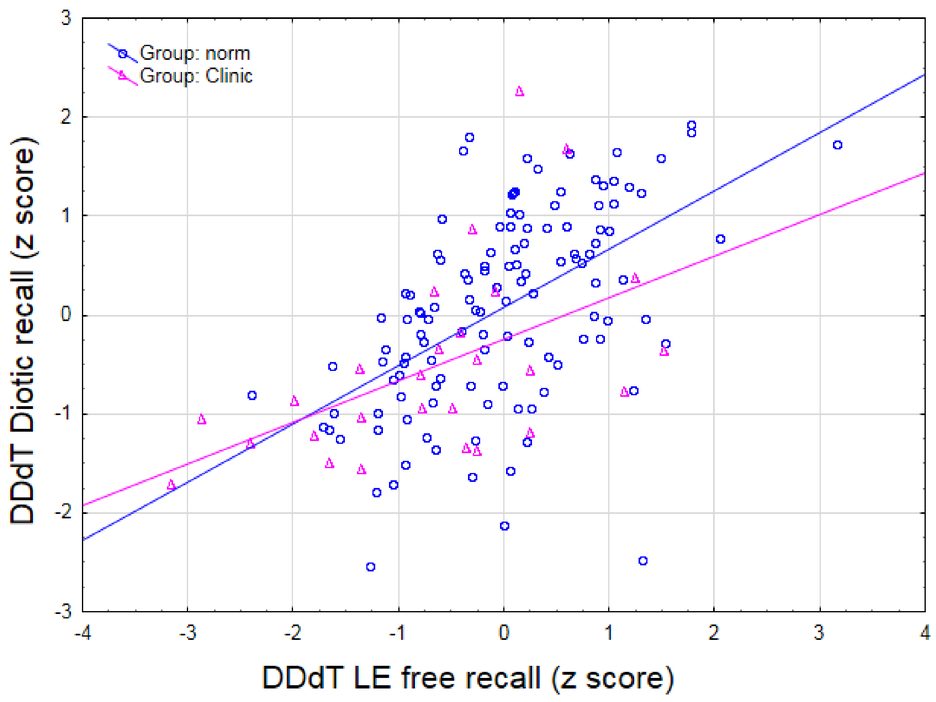

Fig. 2 The correlation between DDdT free recall LE and Diotic recall (n = 120 norms & n = 19 clinical children.

How would the DDdT work in theory?

	DDdT free recall LE OR RE	Diotic recall	Dichotic Advantage
True dichotic deficit	SCORE DEPRESSED	WNL	SCORE DEPRESSED
Spurious fail caused by cognition	SCORE DEPRESSED	SCORE DEPRESSED	WNL

Does the theory translate to practice?

- Case studies of two children who failed Dichotic Digits Test (DDT) clinically and were referred for a research study.
- Assessed on:
  - Fisher's auditory checklist, IVA + test of attention, TAPS-3 number memory forward, number memory reversed
  - Test Of Non-Verbal Intelligence – 4, & DDdT

Case Study 1

• Female, 7 yrs old

Fisher's	IVA+ vigilance quotient	IVA+ prudence quotient	NMF scaled score	NMR scaled score	TONI (age eq.)
60	91	87	8	13	11;6

- All cognitive measures were within normal limits.

	DDdT free recall LE / RE	Diotic recall	Dichotic Advantage
% correct	65 / 60	65	-2.5
Z - score	-0.76 / -2.07	-0.57	-1.55

- DDdT pattern of results consistent with true dichotic deficit.

Case Study 2

• Male, 10 yrs old

Fisher's	IVA+ vigilance quotient	IVA+ prudence quotient	NMF scaled score	NMR scaled score	TONI (age eq.)
76	59	77	9	8	7;6

- Outside normal limits on attention measure of vigilance and low average non-verbal intelligence.

	DDdT free recall LE / RE	Diotic recall	Dichotic Advantage
% correct	65 / 97.5	71.3	10
Z - score	-1.81 / 0.74	-1.21	0.32

- DDdT pattern of results consistent with depressed LE score being related to cognition.

However…

•Both children retested on DDdT approximately 2 weeks later.

	FR LE / RE	Diotic recall	Dichotic Adv.
Case Study 1	60/80	66.25	3.75
Case Study 2	85/82.5	78.75	5

Take home thought

•Although consistency between initial advantage scores & cognitive measures suggests the DDdT may be useful for differentiation, more clinical cases are needed to assess the reliability of the DDdT in a clinical population.

References

Cameron, S., Glyde, H., Dillon, H., & Whitfield, J. (2016). Investigating the interaction between dichotic deficits and cognitive abilities using the Dichotic Digits difference Test (DDdT). *Journal of the American Academy of Audiology*

Tomlin, D., Dillon, H., Sharma, M., & Rance, G. (2015). The impact of auditory processing and cognitive abilities in children. *Ear & Hearing, 36*(5), 527-542.

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