

BACKGROUND

One commonly reported approach to measure listening effort is a **dual-task paradigm**, in which an individual's ability to understand speech (primary task) is evaluated while concurrently performing another task (secondary task). Both tasks are performed separately (baseline) and concurrently (dual-task condition) (Gagné et al., 2017).

The **dual-task effect (DTE)** of the secondary task (i.e. change in secondary task performance from the baseline condition to the dual-task condition) is standardly used as a measure of listening effort, under the assumption of stable primary scores in the baseline and dual-task condition. To ensure stable scores on the primary task, prioritization instructions are given (Gagné et al., 2017).

This study aimed to examine the **prioritization strategy** employed by individuals during a dual-task paradigm for listening effort **by assessing patterns of dual-task interference**.

METHODS

DUAL-TASK PARADIGM

The dual-task paradigm consisted of a **primary speech understanding task** in different listening conditions and a **secondary visual memory task**, both performed separately (baseline) and simultaneously (dual-task) (Degeest et al., 2015).

PARTICIPANTS

Twenty-three normal-hearing participants (mean age: 36.8 years; 14 females) were directed to **prioritize the primary speech understanding task** in the dual-task condition, whereas another twenty-three (matched for age, gender, and education) received **no specific instructions regarding task priority**.

DUAL-TASK INTERFERENCE

Each participant's dual-task interference was measured by calculating the DTE for both the primary and secondary task separately (DTE = $100 \times [\text{score in dual-task condition} - \text{score in baseline condition}] / \text{score in baseline condition}$) (Gagné et al., 2017; Plummer & Eskes, 2015). Patterns of dual-task interference were assessed by **plotting the DTE of the primary and secondary task against each other** (Plummer & Eskes, 2015). As illustrated in Figure 1, nine distinct patterns can be identified.

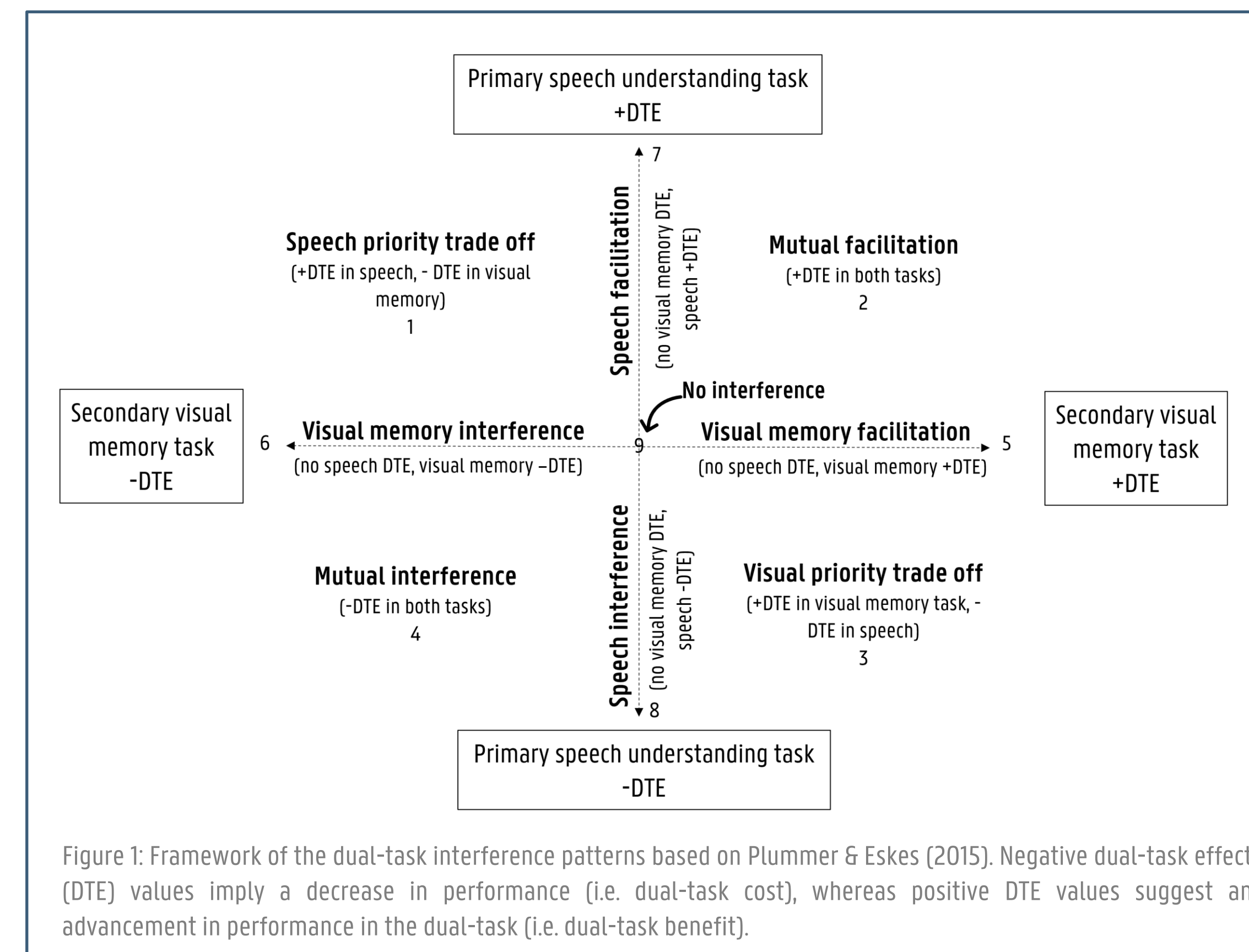


Figure 1: Framework of the dual-task interference patterns based on Plummer & Eskes (2015). Negative dual-task effect (DTE) values imply a decrease in performance (i.e. dual-task cost), whereas positive DTE values suggest an advancement in performance in the dual-task (i.e. dual-task benefit).

RESULTS & DISCUSSION

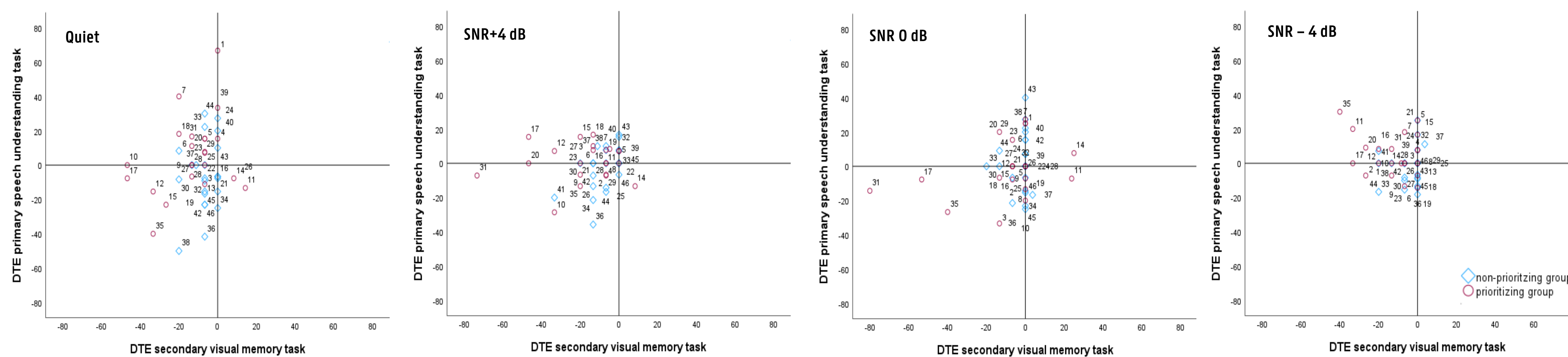


Figure 2: Framework of the dual-task interference patterns for the non-prioritizing (blue diamond) and prioritizing (purple circle) group at each listening conditions.

GROUP LEVEL

The **prioritizing group** had more participants who achieved stable or better scores on the primary task in the dual-task condition compared to baseline.

This observation might indicate an influence of instruction that does cause attentional and cognitive abilities to be more allocated to the primary task in the prioritizing group.

INDIVIDUAL LEVEL

There was considerable variability in the strategy employed at the individual level across listening conditions, regardless the given prioritization instructions.

This finding has important implications for the commonly used formula as stable primary scores can not be guaranteed through instructions.



Providing prioritization instructions when performing a dual-task paradigm for listening effort was insufficient to ensure that an individual will mainly focus on the primary task and will stick to this strategy across listening conditions. These results raised certain reservations about the current usage of dual-task paradigms for listening effort.