Exploring the Relationships Among Executive Functioning, Behaviour, and Adaptive Skills in Young Children

Melissa Read 1, 2, MA Candidate, Karen A. Bax 1, Ph.D., C.Psych., and Claire V. Crooks 2, Ph.D., C.Psych.
1Mary J. Wright Research and Education Centre, 2Centre for School Mental Health, Faculty of Education, Western University

ABSTRACT

Objectives: This study aimed to investigate the relationships between executive functioning, adaptive skills, and behaviour problems in young children using latent class analysis. Participants were divided into four behaviour groups (high internalizing, high externalizing, combined high internalizing and externalizing, and within the normal range) based on their behaviour ratings and executive functioning (EF) scores. The primary aim was to explore how EF and adaptive skills influence group membership and the strength of these relationships across different groups.

Methods: A total of 712 children (ages 3-7 years) participated in the study. Executive functioning was assessed using the Behaviour Rating Inventory for Executive Functioning, and adaptive skills were measured using a standardized tool. Two-way ANOVA was used to examine the main effects of age and gender on group membership, while multivariate logistic regression was applied to test the predictors of group membership. Cluster analysis was used to explore subgroups within each behaviour group.

Results: The study found that EF and adaptive skills were significant predictors of group membership. The strongest predictors were inhibition and working memory, with age and gender also playing a role. The results indicated that inhibitory control and working memory were the most powerful predictors of externalizing and combined behaviour problems, respectively.

Implications: The findings suggest that interventions focused on improving EF and adaptive skills could be effective in reducing behaviour problems. The study provides insights into how these skills interact with age and gender to influence group membership.

INTRODUCTION

Executive functions (EF) are essential for goal-directed behavior and self-regulation. They are typically divided into four main categories: inhibition, shift, working memory, and global executive composite (GEC). The relationship between EF and adaptive skills has been a topic of interest in developmental psychology.

This study aimed to investigate how these factors influence group membership among young children. The primary objective was to explore how EF and adaptive skills predict group membership and the strength of these relationships across different groups.

RESULTS

Participants

(N = 790)

- Age: 3-7 years
- Gender: Male = 380, Female = 410

Measures

- Behaviour Assessment System for Children, 3rd Edition (BASC-3-TRS-P, BASC-3-TRS-C; Reynolds & Kamphaus, 2015)
- Teacher-rating scales
- Inhibitory Control
- Psychological Flexibility
- Working memory
- Global Executive Composite (GEC)

Analysis

- Two-way ANOVA
- Multivariate Logistic Regression
- Clustering

One-Way ANOVA

Significant differences were found between the four behaviour groups in relation to their adaptive skills, inhibition, shift, working memory, and GEC (Table 1).

Multinomial Logistic Regression

Univariate analyses indicated that inhibition, shift, working memory, GEC, age, and gender were all significantly predictive (p < 0.001) of group membership.

Cluster Analysis

The two-step cluster analysis divided participants into two groups: 1) A group within the normal range for inhibition (M = 47.4), working memory (M = 48.7), and shift (M = 45.7), and 2) A group with elevated levels of inhibition (M = 67.7) and working memory (M = 71.7), and shifting (M = 61.9) deficits.

DATA ANALYSIS

Several differences were found between the four behaviour groups in terms of adaptive skills, inhibition, shift, working memory, and GEC.

1. **Inhibition**
   - The EXT group had higher levels of inhibition and working memory.
   - The COMB group had higher levels of inhibition, shift, and working memory.
2. **Shift**
   - Age was no longer predictive of group membership for any behavioural group.
3. **Working Memory**
   - The EXT group had higher levels of inhibition and working memory deficits compared to the INT group.
   - The INT group had a higher level of shifting deficit compared to the EXT group.

**ADAPTIVE SKILLS**

- 40% of those who have elevated levels of EF are not exhibiting high levels of behaviour problems.
- Most children (90%) who do not have EF deficits are also not displaying high levels of behaviour problems.

**IMPLICATIONS**

- Different strategies are needed for children with high levels of EF compared to those with low levels.
- For young children with internalizing behaviour problems, interventions targeting executive functioning will be most appropriate.
- For young children with externalizing behaviour problems, interventions targeting shifting ability may be most appropriate.
- For young children with combined internalizing and externalizing behaviour problems, interventions targeting both inhibition and shifting will be most appropriate.

**SUMMARY AND CONCLUSIONS**

1. Are there differences in the executive functioning and adaptive skills profiles across the four behaviour groups?
   - There were significant differences between the four behaviour groups based on their executive functioning and adaptive skills.

2. To what extent are executive functions predictive of behaviour group membership in children?
   - Additional variables such as adaptive skills, gender, or age add to the prediction of group membership.

3. When taking a person-oriented view, do we see a similar pattern when looking at executive functioning and behaviour?
   - When taking a person-oriented view, similar results were found, wherein:
     - Most children (90%) do not have EF deficits but are also not displaying high levels of behaviour problems.

**REFERENCES**


**Figure 1.** Predictor Strength of Executive Functions based on Multinomial Logistic Regression using Standardized Residual Scores

**Table 1.** One-Way ANOVA Comparing Independent Variables Across Behaviour Groups

**Table 2.** Chi Squared Goodness-of-Fit Statistics across Multivariate Multinomial Logistic Regressions (N = 790)

**Table 3.** Predictive Contributions in the Multivariate Multinomial Logistic Regressions (N = 790)

**Figure 2.** Mechanical Logistic Regression Model Fitting Information - Behaviour Group by Behaviour Group