

Booklet for Partners and Community Organizations

Building Brains and Futures

Acknowledgements

Partner sites: Holy Spirit School Division, Lethbridge School District 51, Opokaa'sin Early Intervention Society, Sunny South Childcare

Funders: Alberta Government, Palix Foundation, Anonymous Donor, University of Lethbridge, City of Lethbridge.

Introduction

Historical overview: In 2012 the Harvard Center for the Developing Child in conjunction with the Alberta government and the Norlein Foundation (now Palix) identified four communities in Alberta to try programs to enhance child development. Lethbridge was one of these sites. The Alberta government through the Department of Education provided a small start-up fund to launch a program for pre-schoolers.

What is BBF: The Building Brains and Futures program was founded after the Alberta government collected early developmental data on the kindergarten children and identified children in Lethbridge as scoring below Alberta norms and Alberta's children as scoring below Canadian norms. A committee with representatives from two school divisions, the University of Lethbridge, and other early-learning groups was established in order to inform families about child development and to improve kindergarten readiness for children. Two sites (one classroom from the Holy Spirit School Division and one site from the Lethbridge School District 51) from the most disadvantaged areas in Lethbridge were chosen for the delivery of a play-based curriculum that aimed to improve children's executive function skills. This curriculum was adapted from previous work (done with Barons Eureka Warner Family and Community Social Supports). Children at each site were tested before and after the administration of the curriculum and educators were asked report on adherence to the program. The results showed that the children from the school that adhered to the program had better outcomes in cognitive and motor domains, whereas the school that seldom used the program showed improvement only in the motor domain (see figure 1). Based on these findings both pre-school sites recognized the importance of implementing the program and using it routinely. We were encouraged by the positive outcomes of the school that implemented the program so we expanded to include childcare facilities (Opokaa'sin Early Intervention Society, Sunny South Childcare).

CHILD OUTCOMES from BBF 2015-2016

	Motor (time)	Language (PPVT)	EF (Stroop)	EF (Snap)	EF (BRIEF)
High Dose	↑	↑	↑	↑	↑
Low Dose	↑	-	-	-	-

Figure 1. Results from the first year of the BBF program. The three domains tested were motor, language and executive function (EF). Arrows indicate statistically significant improvements. Note: One classroom used the program daily (High Dose), whereas the other classroom used it sparingly (Low Dose).

The Program

What is Executive Function (EF)? EF is a set of cognitive processes that help and individual regulate and adapt their behaviour. EF has been identified as key component of academic and life success. The three main areas of EF include: behavioural inhibition, working memory, and self-regulation.

The Program: The goal of our BBF learning curriculum was to increase EF ability in children. In order to achieve this goal, our main focus was to improve teacher/caregiver knowledge of these skills. They were trained in the curriculum before implementing it in their classroom. The curriculum includes 10 different five-minute skill-building games (see Table 1). Each of these activities focuses on strengthening EF. The ten games include: red light green light, Simon says, Stroop (opposites), musical freeze, pretend play, circle time with lips and ears, shared project, wait for it, dimensional change card sort, and right is right. A brief description of each activity follows this, but more information on each of the games can be found elsewhere (Gibb et al., 2015). The EF's that we focus on include: Inhibition, shifting, working memory, planning, and emotional control. Inhibition refers to the child's ability to refrain from responding, while shifting refers to their ability to shift between tasks/rules. Working memory has been defined as the process by which information is stored and can be manipulated for complex cognitive tasks (for example: language comprehension; (Baddeley, 1992)).

Why play: Play is known to develop and enhance:

- Physical fitness
- Independence
- Group interactions
- Team work and cooperation
- Imagination and Creativity
- Language skills
- Working memory
- Ability to follow instructions
- Problem solving skills
- Emotional control

Nearly all of these skills are components of EF, thus the BBF curriculum and its play-based delivery is both directly and indirectly fostering EF.

How have we measured success?

In an effort to be thorough three major aspect of development were evaluated: motor, language, and EF. *Motor function* was measured through: Playing with LEGO (brick-building task), picking up Froot Loops, pointing at pictures (Peabody Picture Vocabulary Task; PPVT), and with the Ages and Stages Questionnaire (ASQ). *Language* skill was measured using the PPVT, and the ASQ. *EF* was assessed using the brick-building task, the Stroop (silly animal and grass/snow), snap (a modified version of the Wisconsin card sorting test), the Behavioral Rating Inventory of EF pre-school version (BRIEF-P), and the ASQ-SE (Social Emotional).

Children were assessed using these tests *before and after* the administration of the program.

EF	Games	Example
Inhibition	Red light, green light; Simon says; Opposites; Musical freeze; Pretend play; Circle time with lips and ears; Shared project; Wait for it....; Dimensional card sort; Model building	Simon says develops inhibition skills by challenging children to only move when the correct verbal instruction is given, and thus inhibit their response if “Simon says” is not included in the instruction.
Shifting	Red light, green light; Simon says; Opposites; Pretend play; Shared project; Dimensional card sort	For the dimensional card sort, the children must shift between changing rules during the game in order to have success.
Working memory	Red light, green light; Simon says; Opposites; Musical freeze; Pretend play; Circle time with lips and ears; Shared project; Wait for it....; Dimensional card sort; Model building	Working memory is developed in red light, green light by having the children be aware of how to execute the rules (move only on green light, stop on red light).
Planning	Pretend play; Shared project; Dimensional card sort; Model building	Model building helps to build planning skills as the children must plan what they are building before (or during) the completion of the model.
Emotional control	Red light, green light; Simon says; Opposites; Musical freeze; Pretend play; Circle time with lips and ears; Shared project; Wait for it....; Dimensional card sort	Emotional control skills are built in the opposites task after the child makes a mistake. Specifically, having them understand how to react after making an error.
Monitoring	Red light, green light; Simon says; Opposites; Musical freeze; Pretend play; Circle time with lips and ears; Shared project; Wait for it....; Dimensional card sort; Model building	Musical freeze requires monitoring as the children must watch what pose the instructor makes in order to correctly match it.
Organizing of materials	Shared project; Model building	Shared project requires the children to organize the materials that they need to accomplish their goal.
Initiation	Musical Freeze; Pretend play; Shared project	Initiation is developed in pretend play because the children must decide who is taking what role, and what they are accomplishing.

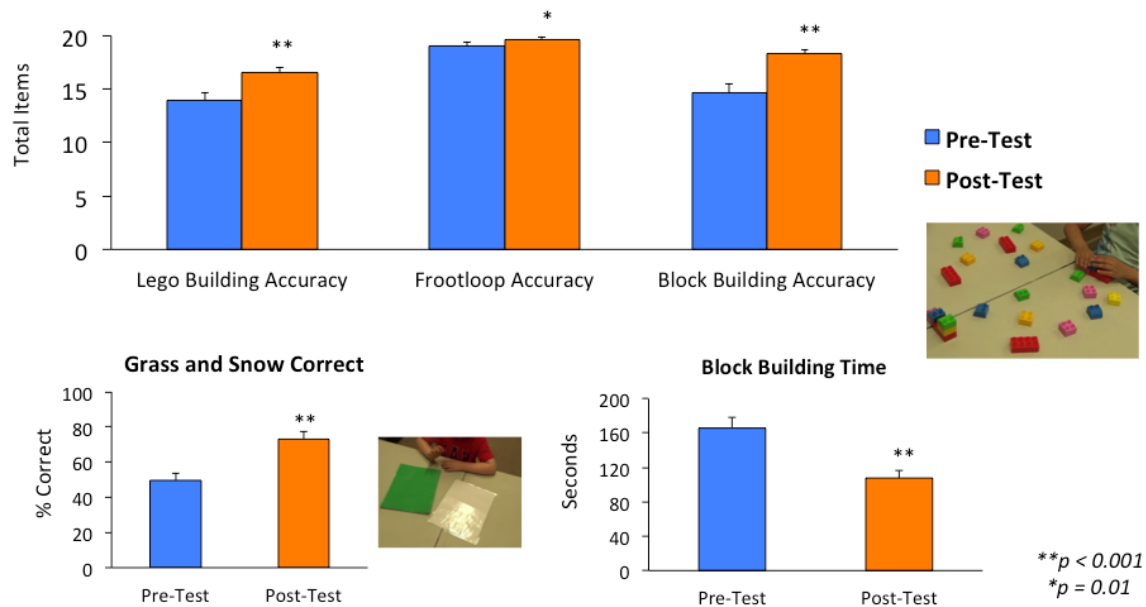
Table 1: Each of the EFs developed in the BBF program. We provide the games that build each of these EFs and an example of how the EFs are built.

Current work

The program complete with evaluation and testing in the four sites spanned through September 2017-June 2019. Analyses of data are now complete. This work resulted in two peer-reviewed journal manuscripts; one is accepted for publication in the International Journal of Play (Coelho et al., 2020) and the second one is nearly ready to submit to Developmental Science.

Briefly, the results show

Motor & Cognitive Tests



Ages & Stages Questionnaire

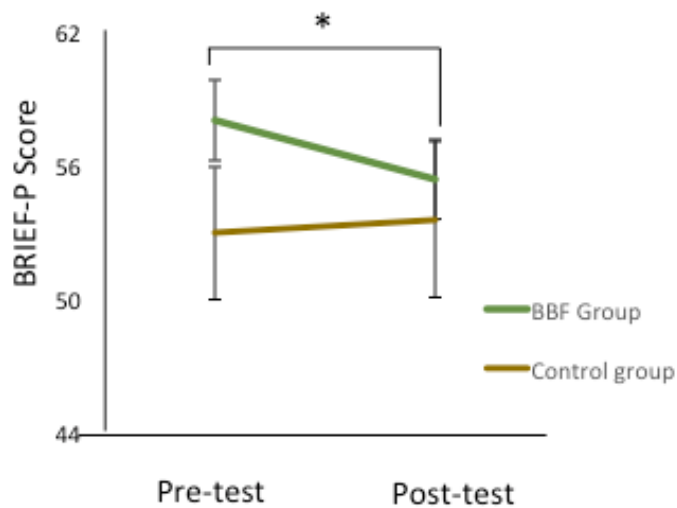
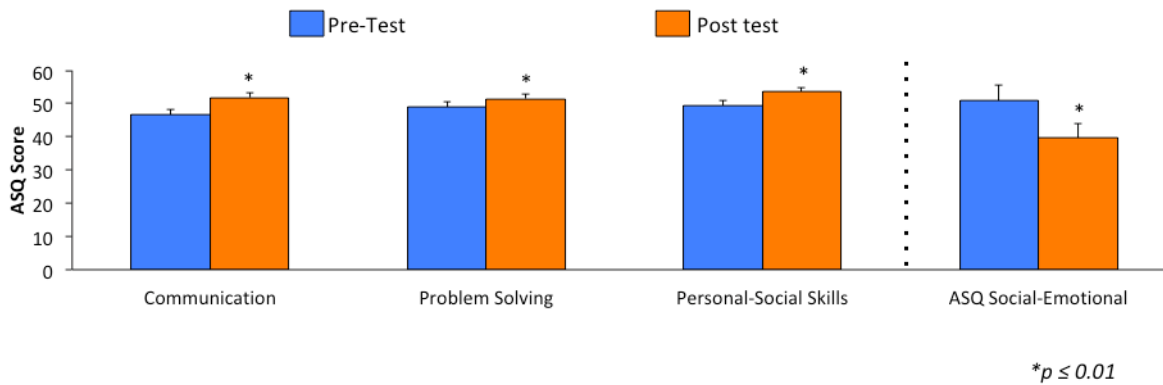


Figure 2. Pre- and post-test scores for the test where significant differences were found. Note that in the ASQ-SE and in the BRIEF-P a lower score denotes better performance.

The Future

We have now moved into Phase 2 of the program: Building Brains Together. This phase is focused on building adult capability and objectively measuring it. A second goal is to share information regarding brain development, EF, and the importance of play with adults (parents, caregivers, educators, etc.).

Funding for Phase 2 has come from the City of Lethbridge (year 1) and from an anonymous donor (year 2).

We are looking forward to growing our engagement with underserved populations, childcare staff, and day-home providers.

Link

Website: Buildingbrains.ca

Video testimonials: <https://videos.files.wordpress.com/0qqHAoUr/bbf-movie-take-2-1.mp4>