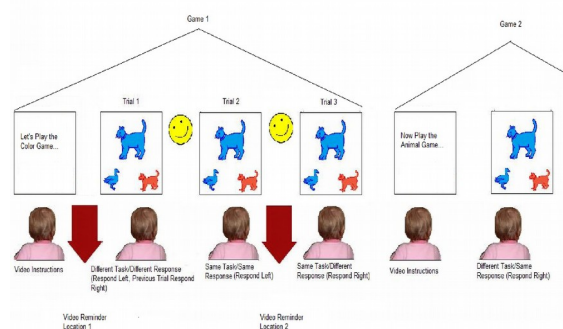


1. Switch

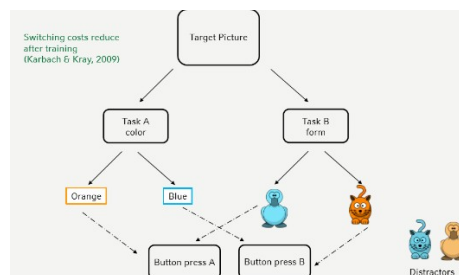
App name: Switch – it should be written in German “Wechseln” ?

Die Logik des Spiels (background)

- “Switch” is a task-switching game. It is inspired by the classical task switching paradigm by Holt, A. E., & Deák, G. (2015). Its simply, shifting attention from one task to another. This is a difficult task for preschooler, so in this app we should try to make it as simple as possible but also make it to improve children’s cognitive skills.
- In a typical Task-switching task, there are congruent and incongruent trials. That means, participants are asked to switch tasks in a random or predictable order.
- For example, in one game, participants are asked to play the
 - o “color game”. If you see a blue animal on the top (below picture, a blue cat), then tap on the given blue animal below (regardless of which animal it is, because here the color is important).
 - o “animal game”. If you see a cat on the top, then tap on the cat picture below (regardless of its color, because here the shape of the animal is important)



Classical task



The logic of task-switching:

- Four images: an orange cat, a blue duck, an orange duck, and a blue cat.
- Shapes and colors should be prototypical and easy to identify for children.
- Two target pictures, a blue cat and orange duck, are constantly present, one near each of the bottom corners of the screen.
- The location of the bottom target pictures (left or right) should be counterbalanced (50%-50%).
- During each trial, one of four test stimuli will be displayed in the center of the monitor.
- Two of the four test stimuli match the two target pictures (i.e., orange cat and blue duck). These congruent, or “no-conflict,” stimuli appears in 33% of all trials. They required the same response in either game (i.e., rule).
- The other two test images (67% of trials) will be incongruent or conflict stimuli; that is, they matched each target, but on different dimensions (color or animal shape). Thus, children have to select one of two conflicting matches, ideally depending upon which game was being played (e.g., the blue cat could be matched with either the blue duck or the orange cat).

Kurzbeschreibung des Spiels

Cover story: There are two animals with different names, e.g. Emma the cat, Luna the dog (the names can be changed).

There are 2 parts in the game:

Part 1 (color game)

- 1) Blue cat Emma likes to play with the blue toys
- 2) Orange dog Luna likes to play with orange toys

Congruent Displays:

Blue Emma – blue ball (congruent)
 Orange Luna – orange branch (congruent)
 Blue Emma – blue branch (congruent)
 Orange Luna – orange ball (congruent)

Incongruent Displays:

Blue Emma – orange ball (incongruent)
 Orange Luna – blue branch (incongruent)
 Orange Emma – blue ball (incongruent)
 Blue Luna – orange branch (incongruent)

Part 2 (shape game)

- 1) Emma likes to play with ball
- 2) Luna likes to play with branch

Congruent Displays:

Blue Emma – blue ball (congruent)
 Orange Luna – orange branch (congruent)
 Blue Emma – orange ball (congruent)
 Orange Luna – blue branch (congruent)

Incongruent Displays:

Blue Emma – orange branch (incongruent)
 Orange Luna – blue ball (incongruent)
 Orange Emma – blue branch (incongruent)
 Blue Luna – orange ball (incongruent)

- The level of difficulty increases with more displays
- The children are instructed to “now play the color game” or “now play the shape game”
- The children are rewarded when they tap the correct display (e.g. by getting a star).
- If they tap the wrong sequence, they will get audio/encouraging feedback

Background

- This app aims to improve children’s task switching skills. In this game children will be asked to play the color game and then switch to the shape game, or vice versa.
- The app starts with a tutorial informing and guiding the children about the goal of the app (e.g. an audio tutorial with arrows). The animal characters will be

introduced first. This is Emma, emma likes to play with blue toys. This is Luna, Luna likes to play with orange toys. “e.g., now we will play a color game, if emma is in blue color, chose her favorite blue toy”

- In the tutorial, children follow the arrows, listen to the instructions and learn the game. If possible, one or two trial runs could be given to children
- After the tutorial, children will carry on with level 1 (see difficulty below)

The difficulty:

This game is already difficult for preschoolers. To make it easier, we will go gradually.

- Level 1 (warm-up color game & shape game): In level 1, there will be 2 trials of the color game. Children will only match the colors for five trials. Then there will be 2 trials of the shape game. Children will only match the shapes (4 trials in total). After finishing 4 trials, they will get stars equal to their correct answers.
- Level 2 (color game & shape game): There will be 4 trials of the color game. Children will only match the colors for four trials. Then there will be 4 trials of the shape game. Children will only match the shapes (8 trials in total). After finishing 8 trials, they will get stars equal to their correct answers.
- Level 3 (shape game & color game): There will be 4 trials of the shape game. Children will only match the shapes for four trials. Then there will be 4 trials of the color game. Children will only match the color (8 trials in total). After finishing 8 trials, they will get stars equal to their correct answers.
- Level 4 (start with shape game): There will be 2 times (4 x 2) - 4 trials of the color game and 4 trials of the shape game (16 trials in total). After every 4 trials, the game will switch. For example,
 - o 1) 4 trials: shape game
 - o 2) 4 trials: color game
 - o 3) 4 trials: shape game
 - o 4) 4 trials: color game
- Level 5 (start with color game): There will be 2 times (4 x 2) - 4 trials of the color game and 4 trials of the shape game (16 trials in total). After every 4 trials, the game will switch. For example,
 - o 1) 4 trials: color game
 - o 2) 4 trials: shape game
 - o 3) 4 trials: color game
 - o 4) 4 trials: shape game

2. Inhalt:

- Objects: Any objects can be used for this game but it is important to use objects that are child friendly.
- Background: It would be good to give a certain “context” for this game. However, the background should definitely not distracting. The background can also be monochrome.

3. Gesprochener Text:

(Tutorial) Einführung in das Spiel.

You can change the instructions below.

Farbenspiel:

"Lass uns gemeinsam etwas spielen. Wir werden ein **Farbenspiel spielen**, lass uns das Farbenspiel spielen.

Auf dem Bildschirm findest Du zwei Tiere:

Das ist Emma, Emma ist blau, und er/sie spielt gerne mit blauen Spielsachen. Hilfst Du ihr/ihm, blaue Spielsachen zu finden. Deine Aufgabe ist es, auf die blauen Spielsachen zu tippen, wenn Du Emma siehst.

Das ist Luna, Luna ist orange, und er/sie spielt gerne mit orangefarbenen Spielsachen. Hilfst Du ihr/ihm, orangefarbene Spielsachen zu finden. Deine Aufgabe ist es, auf die orangefarbenen Spielsachen zu tippen, wenn Du Luna siehst.

Los geht's!"

Formenspiel:

"Lass uns gemeinsam etwas spielen. Wir werden ein Formenspiel spielen, lass uns das Formenspiel spielen.

Auf dem Bildschirm findest Du zwei Tiere:

Das ist Emma, Emma spielt gerne mit Bällen. Hilfst Du ihr/ihm, den Ball zu finden. Deine Aufgabe ist es, auf den Ball zu tippen, wenn Du Emma siehst.

Das ist Luna, Luna spielt gerne mit Zweigen. Hilfst Du ihr/ihm, den Zweig zu finden. Deine Aufgabe ist es, auf den Zweig zu tippen, wenn Du Luna siehst.

Los geht's!"

„Folge zuerst den Pfeilen und probiere es selbst aus!“

Im Spiel:

The individual animal sounds can be heard before each hae (cow, cat, frog, fish).

Audio-Feedback:

- > Nach dreimaligem falschen Tippen, hört der Spieler positives, ermunterndes Feedback:

„Das war leider nicht die richtig. Versuche es weiter!“

„Versuche es noch einmal!“

- > Nach 30 Sekunden ohne Berührung des Bildschirms ertönt ebenfalls Feedback:

„Möchtest du noch weiterspielen? Klicke auf den Bildschirm“

4. Sounds:

- No background music

- When all trials are finished in one level, there will be positive audio feedback
- No other sound should be included during the game, except a cat could miaow, or the dog can woof at the beginning of every task-switch.
- Tapping sound can be added

5. Programmierung

- Only single-touch tap functions are required in this app.
- A multi-player mode can be added in consultation and depending on the effort involved.
- For example, parents mode can be added, shared playing with the child.

6. Belohnung

- Apart from the above-mentioned reinforcements through sounds and audio, a reward system with stars will be added after every level is finished and a new level is unlocked. Here, children should receive stars according to their performance.

7. Auswertung

- The duration of use of the game should be recorded for each player via the log files.
- Data collections like the number of completed levels, the error/success rate/reaction times of a player across all levels, can be added.
- Access to this data will be given to the research team in order to create feedback for the parents based on this data.

8. Navigation

Start page:

- Learning4Kids Logo will be added
- Learning4Kids impressum will be added
- A start button will be added: Here the children see the title of the game attractively designed with pictures. In the middle is a big "Start" icon (maybe multiplayer mode), which flashes and can be clicked to start the game.
- An exit button will be added (do you want to exit the game, yes/no)
- A child-friendly welcoming background is preferable

Levels page:

- In total, five levels will be implemented
- For this, there will be buttons to be tapped representing five levels
- Each level will be unlocked after finishing the previous one
- The game will start at the state of the last game when reopened
- There should also be an option to restart the app from the beginning (e.g., restart icon "zurücksetzen")
- A progress bar should be added
-