

**The Effect of Metacognitive Guidance and
Media Literacy Guidance on the Development
of Drinking Oriented Nutritional Literacy**

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Abstract

The main purpose of the research is to evaluate the effect of Metacognitive guidance by itself, and together with media literacy guidance on drink related nutritional literacy (DNL).

In western countries and specifically in Israel, Sugar-Sweetened Beverage (SSB) consumption is above the recommended value (Malik, Schulze & Hu, 2006). A connection was found between SSB consumption and a variety of health problems like Obesity, Diabetes, Cardio Vascular diseases, and more (Zoellner et al., 2014). Exposure to advertisement leads to excessive SSB consumption and health problems (Harris, Brownell, & Bargh, 2009). **Media literacy** education, defined as "The ability to evaluate and create media in a variety of forms", may improve critical thinking about commercials. Studies show that Metacognitive awareness promotes **meaningful learning**. In addition, active involvement of pupils in Metacognitive activities develops **deep conceptual understanding** (Nielsen, Nashon & Anderson, 2009). Such understanding is especially important when pupils have to deal with multi variable complex nutritional conflicts, critically thinking of the information presented to them, and offer viable solutions. In addition developed Metacognitive awareness (in the context of regulation of cognition) improves the pupils ability in skills like: planning, monitoring and evaluation and may improve their ability to make wise decisions regarding the type and amount of drinks they consume (Chang, 2010; Lakin & Littledyke, 2008) . In order to change the type and amount of pupil's drinks, it's important to increase their nutritional literacy. **Nutritional literacy** is defined as "The ability to achieve, understand and process nutritional information" (Silk et al., 2008).

Studies testing the effect of reducing SSB consumption or the increase of water drinking on Obesity were conducted, but in most of them there was no characterization of the behaviour change process (Zoellner et al., 2009). The few studies that attempted to generate behavioural change related to SSB consumption or water drinking increase where done among adults (Hu, 2013; Malik, Pan, Willett, & Hu, 2013). There is great importance in a study that can identify SSB consumption related behavioural changes in children. As far as we know, there is a **lack of studies linking behavioural change with Metacognitive guidance**, and specifically in the

area of nutritional literacy. There are also no studies that check the effect of combined media literacy guidance with Metacognitive guidance on nutritional literacy. This study reduces this gap, by testing the effect of Metacognitive guidance with or without media literacy guidance on nutritional literacy, and characterized the behavioural change process.

During the study two guidance's were developed, whose purpose is to increase nutritional literacy:

- * The purpose of Metacognitive guidance is that pupils can plan what to do to succeed in drinking more water and less SSBs, check themselves whether they are acting correctly and examine the difficulties and how to overcome them.
- * The purpose of media literacy guidance is that pupils will know how to analyze the messages from commercials and critically think about them.

Following are the study questions:

Quantitative Questions:

1. What is the effect of Metacognitive guidance on DNL?
2. What is the effect of Metacognitive guidance on the development of drink related metacognitive awareness?
3. What is the effect of media literacy guidance on DNL and on drink related media literacy?
4. What is the combined effect of both guidance's on DNL?

Qualitative Questions:

1. What characterizes the process of acquiring DNL: knowledge, attitude and behavior?
2. What characterizes the process of acquiring drink related metacognitive awareness?
3. What characterizes the process of acquiring drink related media literacy?

It was found that:

1. **Metacognitive guidance** contributed to a higher increase in attitudes and specifically in self efficacy, in the context of nutritional literacy. An improvement was found in day to day drink quality and in special occasions, also pupils examined more their urine color after the intervention.
2. **Metacognitive guidance** increased the Metacognitive awareness.

3. **Media literacy guidance** caused a higher increase in information sources about nutritional literacy (the pupils are less susceptible to the messages in commercials); there was also a significant decrease in the level of agreement with the messages in commercials and an increase in critical attitudes towards the commercials.

4. **No combined effect** of both guidance's was found.

5. **Characterization of the acquirement of nutritional literacy -knowledge and Attitudes:** A knowledge increase was found in all pupils, because all of them taught and were taught why it is important to drink more water and what the damages of SSB consumption are. Following the acquirement and processing of knowledge we see a change in their attitudes. After the intervention it is important to all pupils to reduce their SSB consumption and to drink enough water. **Behavioral:** all the pupils report decrease in SSB consumption, an increase in water drinking, examining urine color and reading nutritional information and ingredients. Some of the pupils report behavioral change in their families too. The behavioral change follows the understanding of the damages caused by SSB consumption and the lack of water drinking and understanding the expected gains from the change. **Pupils that received metacognitive guidance use their metacognitive awareness as a tool for behavioural change.**

6. **Characterization of the acquirement of metacognitive awareness:** The pupils that received metacognitive guidance plan monitor and evaluate when they prepare the activities for the younger pupils following the guidance they received. A transfer was found in the usage of Metacognitive awareness to other areas like: an increase in media literacy, preparing of activities in different areas and more.

7. **Characterization of the acquirement of media literacy** - the pupils developed critical thinking towards commercials, they learned to object to the influence of the commercials, probably because they learned to compare between the promises and the messages conveyed in the commercials and the damage caused by SSB consumption. That probably caused attitudes change in the pupils that claim that it is important to teach the purpose of the commercials so that the children will decrease their SSB consumption and wouldn't get caries.

The study is quasi experimental field research in 2*2 outlines; the sample included 419 pupils of the 5th and 6th grade from public schools of high socioeconomic background. The pupils were taught in science class one study unit

about DNL. They prepared and conducted a class for the 1st-4th grade students whose purpose was to reduce SSB consumption and increase water drinking. The classes were allocated randomly to 4 experiment conditions: **Meta and Media** - Metacognitive guidance and media literacy guidance, **Meta** - Metacognitive guidance, **Media** – media literacy guidance, **Control** - no guidance. The intervention plan lasted five months.

Qualitative and quantitative methods were used to examine the effect of the intervention on nutritional literacy and the characterization of the change. Unique questionnaires were developed to examine nutritional literacy, Metacognitive awareness and media literacy, all drink related. The pupils answered online questionnaires before and after the intervention. After the intervention some of the pupils were interviewed. The interviews, the responses for the Metacognitive guidance and the texts the pupils wrote were all analyzed.

The study has a contribution in the theoretical, methodological and applicative areas.

Theoretical area - a connection was found between Metacognitive awareness and DNL, as far as we know it is the first study where a Metacognitive awareness was used as a behavioral change tool - drinking more water. It was found that Metacognitive guidance increased the levels of attitudes and criticism about commercials.

Methodological area - during the study guidance's were developed for Metacognitive awareness and media literacy, questionnaires were developed to examine nutritional literacy, media literacy and Metacognitive awareness, all drink related. The study emphasizes the importance of combining the qualitative and quantitative tools, which help explain the processes that lead to the change found using the qualitative tools.

Applicative area - a behavioral change tool was developed using Metacognitive guidance that can contribute to the reduction of SSB consumption and drinking enough water. The importance of developing such a tool is to reduce the chances of Obesity and various illnesses related to SSB consumption. This program can lead to adopting a healthier life style and improve the quality of life for the participating pupils. It is recommended to integrate the work unit that was developed as part of the science studies syllabus in science studies.