

# SUMMARY

In this thesis, the development, effectiveness, evaluation, and implementation of the PLAYgrounds programme is described. This programme targets the school's playground with the aim to encourage children to be physically active during recess. In addition, a review on the acute effects of bouts of physical activity on the attention in the classroom in children has been carried out. Subsequently, an experiment was carried out, wherein the effect of various short-term breaks on selective attention was measured. In this summary, the main results of the thesis are described.

In the Netherlands, the number of overweight children has increased in recent years. Inactivity is one of the main causes, and different studies have shown that only a small proportion of children meet the physical activity guidelines. Therefore it is necessary to encourage children to be physically active. Since all children go to school five days a week, schools offers the opportunity to reach all children for the promotion of regular daily physical activity. The playground can be a motivating environment to be physically active, but due to a hierarchy based on age and gender, the intensity level of physical activity at the playground has shown to be low.

A different organization of the playground can ensure that all children are physically active. Therefore, the PLAYgrounds programme was developed. The development is described in chapter two. In this playground programme, intervention strategies have been included, which have been found to be effective in several studies. The effectuation of these strategies is based on practical experience. The programme also had to be structurally embedded in the school structure and had to be financially feasible. In short, PLAYgrounds consists of a framework of five components: 1) an alteration of the playground by coloured markings, by which specific areas for different activities are

created; 2) a recess schedule, by which the number of children on the playground at the same time is reduced; 3) the provision of play equipment, by which active usage of the playground is encouraged; 4) teachers who encourage children at the playground; 5) supportive physical education classes, in which ideas for games which can be played in the playground are presented, the skills of children are practiced and from where a monthly theme is initiated. The combination of these measures is aimed at creating more play space per child, and to encourage active usage of the playground.

In chapter three and four the effectiveness of PLAYgrounds is described. Four intervention/schools and four control schools were measured during a full school year. The intensity of physical activity was measured every two weeks with accelerometers, and every month through the SOPLAY observation protocol. In addition, the physical fitness of the children was measured at the beginning and at the end of the school year. To evaluate implementation and maintenance of the programme the RE-AIM model for process evaluations was used, which is described in chapter five.

The results, described in chapter three, showed a significant difference in intensity of physical activity between the intervention/schools and the control schools. In control schools, the percentage of children being moderate to vigorous physically active remained around 40%. In the intervention schools the percentage of active children increased from 39.6 % to 77.3%. This difference was consistent throughout the school year (regardless of season or novelty effect). Also, the results showed that the effect for girls was 1.4 times stronger than for boys, and the effect for children of 10-12 years was 1.3 times larger than for children 6-9 years old.

The measurements for physical fitness (chapter four) showed that the children in the intervention schools had a significantly better score on the eye-hand coordination test, the 10x5 m sprint and 20m shuttle-run, whereby the effect of the intervention on the 20m shuttle-run test was stronger for girls than for boys.

The process evaluation, described in chapter five, shows that schools could implement and maintain the PLAYgrounds programme at a reasonable level. This was likely due to the programme consisting of a total intervention package, including financial and material support and a supportive coordinator. The PLAYgrounds programme now also has been included in the Jump-in programme of the “Amsterdamse Aanpak Gezond Gewicht”, in which being physically active at the playground is a priority. Coordinators of Jump-in support the schools in implementing PLAYgrounds. From January 2015 PLAYgrounds will also be introduced within the “Lekker Fit!” programme of the municipality of Rotterdam.

In chapter five is furthermore described that the group of teachers play an important role in implementing and maintaining the programme. Yet an active role for the class teacher is challenging to maintain and teachers’ participation was an element that was not implemented or maintained in all schools. Even if teachers understood the importance of physical activity during recess, they often could not fulfil an active role in the playground. Schools are – in their own words – primarily responsible for the cognitive development of the children, and therefore, in the second part of this thesis an attempt was made to gather information about the relationship between physical activity and cognition.

The literature shows a positive correlation between physical activity and cognition, but knowledge

about the possible effect of a short-term physical activity bout on concentration in the classroom is still very thin, as described in chapter six. This conclusion had to be drawn primarily due to differences in study design, population, the physical activity bout and the measurement method of attention across the various studies.

The follow-up experiment described in chapter seven – in which the effect of different short physical activity bouts (as possible in a regular school break) – showed a positive effect from physical activity on selective attention. The largest effect was found after a moderate-intensity physical activity bout, which was similar to the level of physical activity in the PLAYgrounds programme. The results of this experiment can help teachers to underpin the importance of promoting physical activity at school. A suggestion would be to include multiple active breaks per day. A good playground programme, such as PLAYgrounds, can provide the necessary structure to implement this.

In conclusion, PLAYgrounds has been shown to be an effective, simple and inexpensive intervention, encouraging children to be physically active during recess. In the programme physical activity on the playground and physical education are combined, which may also have a positive effect on the attention in the classroom. It is quite possible that PLAYgrounds also provides a solid basis for other interventions, while children are encouraged daily to be physically active during recess. This is especially important for children who are less active during recess and for those with less motor skills, since improvement of motor skills and joy for physical activity may further facilitate a physically active lifestyle; now and in the future.