



Measuring preschool children's active play using activity monitors

PARENT INFORMATION SHEET

Why are we conducting this study?

Small wearable motion sensors, called activity monitors, could be useful for understanding how active preschool children are by measuring their physical activity more accurately than other methods like questionnaires. Although new and sophisticated data modelling approaches are now available, there is a lack of information on ways to apply these methods to understand young children's unique patterns of movement and play. This study aims to evaluate new data modelling techniques for measuring active play or physical activity in preschool-aged children. The focus of the study is on evaluating activity monitors rather than measuring children's physical activity, so the study will not be able to provide participating families with information about children's level of physical activity.

Who is conducting the study?

This study is being conducted by a group of researchers from the Schools of Computer Science and Software Engineering and Education at the University of Wollongong (UOW) and Queensland University of Technology (QUT). The researchers will not receive any financial benefits from the manufacturing companies who produce and sell the devices we are testing in this study.

Project team

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What will we ask you and your child to do?

You and your child can attend an information session at the University if you would like further information about the study and its requirements, as well as the opportunity to see the equipment described below, before you decide to participate.

If you choose to allow your child to participate, your child will be asked to **visit the University three times** for approximately **1-1.5 hours each visit** (total time = 4.5 hours). During these visits children will complete **several common activities for preschoolers ranging from low (e.g. drawing) to high effort or intensity (e.g. jogging or active games)**. We have tested the activities and procedures for each visit among more than 100 children in previous studies.

At each of the three visits you and your child will be introduced to the study staff (Melinda Smith will fit children with activity monitors and equipment described below), shown the equipment, and be familiarised with the activities. At the first two visits your child will complete the activities with a research assistant but no other children. At the third visit your child will complete the activities


with a research assistant as part of a small group of children (4-6 children in total). At each visit, children will also be asked to:

- **wear a heart-rate monitor** under their clothing on a belt around their chest (to understand how hard their body is working during the activities),
- **wear eight small activity monitors** (4.6 x 3.3 x 1.5 cm; 19g), which will be attached to their wrists, thigh, and waist (see Table 1),
- **be filmed completing the activities** (to classify children's movement – e.g., lying down, sitting, standing, walking, or running), and
- **refrain from eating for 2 hours before visits 1 and 2** (i.e., they will start the activities 2 hours after breakfast or lunch). Your child can drink water during this period. We will provide a healthy snack for your child to eat after they finish the visits.

Visit 1 – Individual activities

At the first visit we will:

- Measure your child's height, weight and body composition (using equipment similar to household scales),
- Fit their heart rate monitor and activity monitors,
- Fit your child with a lightweight (950g), **portable breath analysis system (Table 1)**, which collects information about your child's breathing. This system includes a flexible facemask that covers the child's nose and mouth, which is held in place by a head harness (see Figure 1). From these measurements we are able to calculate energy expenditure, which is important in understanding how accurate instruments like activity monitors are in measuring the energy expenditure that results from movement and active play. Children will be shown how to remove the facemask, which can be done between activities. They will be trained to make hand signals to show the researcher how they are feeling during the activities. "Thumbs up" will be used to indicate that they are feeling okay and can proceed with the activities, whereas "thumbs down" will be used to indicate that they need to stop and the researcher will assist them in removing the mask.
- Ask your child to complete **seven 5-minute activities** with a member of the project team. These will include **lying down and six randomly selected activities from Table 1** – two each from low, medium, and high intensity categories. If needed, children will have rest breaks during high intensity activities.
- Familiarise you and your child with the equipment and procedures for visit 2, which includes the University's room calorimeter.

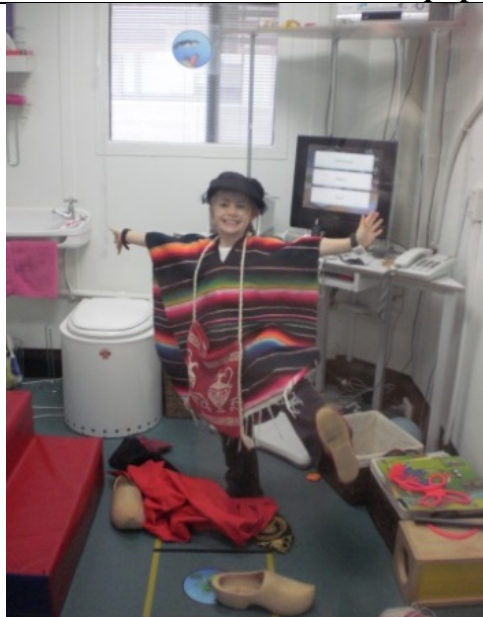
Table 1 – Visit 1 activities & equipment		Low intensity	Medium intensity	High intensity
		Reading/story time	Dancing	Obstacle course
		Watching DVD	Cleaning-up	Active game
		Handheld computer activity (iPad)	Walking (self-selected pace & accompanied)	Bicycle/tricycle riding (Parent choice of with or without training wheels)

			depending on child's ability)
	Playing with toys	Arts and craft	Jogging (self-selected pace & accompanied)

Visit 2 – Room calorimeter activities

At the second visit we will:

- Fit your child's heart rate and activity monitors,
- Explain the room calorimeter procedures to you and your child. The facility is a room around the size of a child's bedroom (3.0 x 2.1 x 2.4m), which measures the oxygen consumption and carbon dioxide production of the person inside. From these measurements we are able to calculate children's energy expenditure. Your child will be supervised through a window by you and the researchers at all times. The intercom will be left on so that your child can be heard outside the calorimeter. Your child will be able to exit the calorimeter if they wish (they will be shown how to do this beforehand). If your child becomes distressed inside the calorimeter, the measurements will be discontinued.
- Ask children to spend approximately 1 hour in the room calorimeter completing similar activities to those completed in Visit 1 (see Table 2).

Table 2 – Visit 2 activities & equipment		Low intensity	Medium intensity	High intensity
		Lying down	Dancing	Obstacle course
		Watching DVD	Cleaning-up	Active game – musical stations
		Handheld computer activity (iPad)	Stretching/Yoga	Fitness activities
		Playing with toys	Arts and craft	Active game – throwing challenge/ basketball

Visit 3 – Group session

At this visit your child will attend with a small group of other children (approximately 4-6) and will be involved in a variety of activities that young children might complete at home, preschool or a play-group. At this visit we will:

- Fit your child's heart rate and activity monitors, and
- Lead them through a range of activities from Table 3, including free-play time, for approximately 45 minutes.

Table 3 - Visit 3 activities		
Story time	Dancing	Playing with toys

Arts and craft	Imaginary play	Active play
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Who can participate in the study?

Children aged 3, 4, and 5 years who are generally healthy and do not have a disability or health condition that would prevent them from participating in physical activities.

Your child should not participate in this study if he/she:

- Is claustrophobic
- Has a skin reaction to rubber-based products
- Has a disability or health condition. This might include a physical or developmental disability, asthma, a current illness or infection, or a congenital condition.

What are the potential benefits of the study?

This project will contribute to improving the measurement of physical activity among preschool-aged children. Because sophisticated new data modeling procedures for activity monitors offer the potential to substantially improve the measurement of physical activity, the developed methodologies could be used extensively by researchers both nationally and internationally. Being able to accurately measure young children's physical activity behaviour will allow many important unanswered questions related to the development and health of young children to be investigated in the future more accurately.

Although there are no direct benefits for you and your child from participating in the study, to compensate you and your child for your time and effort we will be happy to provide you with a \$15 Coles/Myer gift voucher for each visit that your child completes. If children withdraw from the study during a visit, you will receive the gift voucher for that visit but not for subsequent visits.

What are the potential risks of taking part?

It is important to remember that your and your child's participation in this research is voluntary. You are free to refuse to allow your child to participate, and you are both free to withdraw from the research at any time – this includes your child's choice to withdraw or not participate in any of the activities involved in the study, even if you provide consent for them to participate. Any or all of your child's data can be withdrawn if they are withdrawn from the study if you notify the research team within 3-months of the data being collected. This includes data from coding of videos and videos from visits 1 and 2, however videos from visit 3 (group visit) cannot be withdrawn. Withdrawing from the study or choosing not to participate will not influence your relationship with the University of Wollongong.

Although breath analysis devices and room calorimeters have been used in many studies with school-aged and preschool children, there are some aspects that children may potentially find uncomfortable. It is possible that a child may have an adverse reaction to wearing the face-mask or to being in the calorimeter, including possible claustrophobia or an allergic skin reaction. If your child becomes distressed they may stop the study at any time and remove the face-mask or leave the room calorimeter. At this time the protocol will be discontinued and they will be allowed to: i) take a break and then return to the activities, or ii) withdraw from the study. You may, if you wish, also withdraw your consent for the use of your child's data in the study. A research staff member with First Aid Accreditation will be present during the assessments.

Other than the time commitment required by you, we do not foresee any other risks or any disadvantages of taking part in this study.

What will we do with the information we obtain?

All information collected during this study will be kept strictly confidential and be stored in a locked office for a period of 5 years, after which it will be deleted. Video footage will be securely stored on a password-protected computer until the completion of the study when it will be deleted. The name of your child will not be revealed or used in the study and will only be seen by the researchers involved in the study. The data collected will be reported in research theses and peer-reviewed research journals. In addition, the research will be presented at national/international conferences. The identity of participants will not be revealed in any publications or presentations.

This study is funded by an Australian Research Council Discovery Project grant (DP150100116). Data collected for the study will be the property of the University of Wollongong and Queensland University of Technology.

If you have any questions regarding the study, please contact Melinda Smith on (02) 4239 2274 or Dylan Cliff on (02) 4221 5929. If you have any concerns or questions regarding the way the research is or has been conducted, you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 4221 4457 or via email on rso-ethics@uow.edu.au.