

# Characteristics of indoor rough-and-tumble play (R&T) with physical contact between players in preschool

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*Abstract:* The purpose of this paper was to qualitatively identify and categorize the diverse characteristics of rough-and tumble play (R&T) with physical contact between players among 3- to 5-year-old children in preschool. Previous categorization of R&T has been, to a large extent, based on observations of school-age children. Thus, it is interesting to examine how younger children engage in R&T in preschool in order to obtain more descriptive data regarding the forms of physical activity play and the age-related trends through childhood. Analyses show that previous categories of R&T are applicable for indoor R&T in preschool. However, tumbling has emerged as a distinct category. This new insight contributes to the more accurate categorization of younger children's R&T with physical contact between players, which can support the practitioner's ability to make informed observations of individuals' participation in R&T.

*Keywords:* Rough-and-tumble play, preschool children, social affordances, tumbling

## Introduction

Play is often defined as activity performed for its own sake. Although playful behaviours resemble serious behaviours, participants are usually more concerned with the behaviours themselves rather than the function of the behaviour (Smith & Pellegrini, 2008). Forms of play are typically parsed along the locomotor, social, and object dimensions (Pellegrini, Dupuis, & Smith, 2007). Playful behaviours are normally more exaggerated than their functional counterparts, and children often smile, laugh, and say that they are enjoying play.

Rough-and-tumble play (R&T) refers to vigorous behaviours, such as wrestling, grappling, kicking, and tumbling, that appear to be aggressive except for the playful context (Humphreys & Smith, 1984; Pellegrini & Smith, 2005), and it is commonly observed in children's free-play time from preschool to adolescence (Humphreys & Smith, 1984). R&T has obvious locomotor dimensions but can also have dimensions of social and object play. Sutton-Smith (1997) considered this type of play

to be the most basic of all play and the beginning of the evolution of play. While there is perceived value in R&T related to the development of young children, educators are uncertain of how to manage this form of play (Tannock, 2008). Despite the fact that fighting acts are simulated, exaggerated and normally executed between friends, R&T is often inhibited or prohibited in preschool practice (Logue & Shelton-Harvey, 2010). Reliable categories are needed to recognize and differentiate R&T from other types of play in preschool settings. Tannock (2011) has grouped R&T behaviours in early childhood settings into three categories based on common actions: (1) physical contact between players, (2) play behaviours in which an object is instrumental, and (3) independent physical play behaviours. In this study, R&T with physical contact between players (Tannock's category number 1) is the focus.

In the following section, the published knowledge of R&T and the proposed functions of such play will be reviewed. Then, the characteristics and categories of R&T with physical contact between players will be discussed based on empirical studies of R&T in children between the ages of 3 and 5 years who were enrolled in a Norwegian preschool.

### **Knowledge of R&T**

Fagan (1981) suggests that diverse play behaviours can fit into different categories in order of complexity. One of these categories is called "*social play, some with no contact, like chasing, and some with contact, like sparring and wrestling*". Sutton-Smith (1997) claims that this category, also called play fighting or "rough-and-tumble", may be a display of fighting, but it is also the opposite of fighting because it is performed between those who are not enemies and do not intend to harm each other.

To capture and interpret play signals in R&T, one must distinguish between text and context in play. While text is the play and its concrete expressions, context is the message that is given by the specific situation (Lillemyr, 2009; Sutton-Smith, 1997). To the observer, the context can often be veiled in R&T and, therefore, not always what one thinks it is (Tannock, 2008). Hitting, kicking, wrestling and showing aggression can be observed, while hugging, caring, feeling concerned and embracing is actually occurring (Donaldson, 1976). "It is more about meaning than about mauling", as Sutton-Smith (1997) explains. The most prominent bodily signals (context) that emphasize that an occurrence is play and not real fighting are facial expressions (smiles, laughing, play faces), variable behavioural content during an encounter, role reversals, self-handicapping (by the larger/stronger partner), restraint (self-control), chase-flee, receiving little attention from outsiders and participants remaining together after the encounter (Fry, 2009). In addition to these bodily signals, children can also verbally communicate their playful intentions: "we are just play fighting" is a common phrase used by children to explain what they are doing (Jarvis, 2009).

### ***Children's play experiences - extrinsic and intrinsic functions of R&T***

R&T, likely the most thoroughly studied aspect of play by scientists who approach the subject from an evolutionary perspective, is commonly observed in most mammals, and play signals have similarities between both humans and animals (Aldis, 1975; Bjorklund & Pellegrini, 2002). Because R&T occurs among many mammals and children and adolescents in many human cultures, it is argued that R&T has an underlying function (Blurton Jones, 1978; Fry, 2009). Although play is characterized as being "purposeless", both animal and human theorists conclude that it does have a function. Correspondingly, in R&T, children who are involved in such play are expected to have experiences that favourably affect their development, and these experiences yield both immediate and long-term benefits.

The intrinsic value of R&T, that children are tumbling and play fighting because it is fun or because it provides a positive physical or emotional experience, has received little attention in the literature (Sutton-Smith, 1997). While the extrinsic functions of R&T are the adults' or scientists' perspective on such play, the children's perspective on R&T, such as having fun and experiencing enjoyment, excitement and bodily well being, has intrinsic value (Sandseter, 2009b, 2010b). According to Sutton-Smith (1997), the subordination of intrinsic play functions to extrinsic developmental functions apparently occurs because theorists are primarily concerned with socialization, maturity and children's civilized progress in general.

### ***Characteristics of R&T***

Power (2000) summarizes the various characteristics of R&T. A feature that is often considered is *role reversals* in which children alternate being dominant. In other contexts, this is referred to as the 50:50 rule (Pellegrini, 2009), or the fairness solution (Pellis, Pellis, & Reinhart, 2010), and concerns the outcome of R&T not being predetermined. For R&T to be playful, Pellis et al. (2010) maintained that it must have a minimum level of both competition and cooperation. Without competition, play-fighting becomes excessively predictable and loses its pleasurable quality, and without cooperation, play-fighting escalates into serious aggression.

Aldis (1975) studied play fighting among 6- to 12-year-old children at playgrounds, parks, swimming pools and beaches, and on the basis of those observations, he established two categories for wrestling (Fry, 2009).

<b>Categories and descriptions of play wrestling</b>	<b>Sub-categories</b>	<b>Physical characteristics (text of play)</b>
<b>Wrestling for superior position</b> <i>"very vigorous play wrestling, one boy will make strenuous efforts to throw another to the ground, get on top of him, to hold him down, to flatten him and sometimes to pin him to the ground"</i> (Aldis, 1975, p.p. 178)	<b>Standing position</b>	Throwing, pushing, pulling, tripping the opponent to the ground
	<b>Prone position</b>	Get on top, pinning the opponent to the ground
<b>Fragmentary wrestling</b> <i>"less vigorous play wrestling, neither child will attempt to achieve a clear-cut superiority but will merely grapple or push and pull in various directions"</i> (Aldis, 1975, p.p. 178).	<b>Standing position</b>	Hitting, kicking, pushing, pulling grappling
	<b>Prone position</b>	Piling on, rolling, pushing, butting

Table 1. Categories, sub-categories and physical characteristics of play wrestling

R&T is necessarily social play in which two or more children play together and the physical appearance of play is evident. The characteristics of R&T extend over a wide range of social interactions between the players from purely physical intimate contact (Brown, 2000) to goal-directed play-fighting in which the purpose is clearly to win. With social play in which children are not in

physical contact but are very close together, it can be difficult to differentiate social play from independent physical play behaviours. Pellegrini (2009) claims that, in research, the most common danger associated with conflating non-play and social play is that the incidence of play will usually be overestimated, and thus, the supposed benefits of social play will be exaggerated. Conversely, by operating within a too narrow definition of social play, it is possible to ignore aspects of a given type of play that can be important for understanding the entire play behaviour.

Tannock (2011) observed young children's R&T in two early childhood settings and recorded 27 different R&T behaviours that were later grouped into three categories based on common actions. All of the behaviours within the category "Physical contact between players" involved direct physical contact.

Category	Physical characteristics (text of play)
R&T behaviours that involve physical contact between players	Grabbing body of other player Chasing Grabbing and moving body of other player Banging body into body of other player Rolling around on the ground with other player Pushing other player Open-hand slaps Pulling other player Fleeing Wrestling (e.g., lifting other's body on ground, etc.)

Table 2. Tannock's (2011) recorded R&T behaviours that describe physical contact between players

In investigating the expression of caring in boys through R&T, Brown (2000) described some play situations in R&T as "lulls in the action" during which the participants "linger on the ground, laughing, with their bodies remaining in physical contact". The participants were first videotaped and then later asked to view the tapes and give their personal interpretations of the R&T experience. The conclusions were that the children knew what was considered appropriate touching during R&T, those who were physically touching were friends, and they considered intimate physical contact such as that described above to be a natural part of R&T. This suggests that not all behaviours in R&T have to be competitive, goal-directed and vigorous. Bodily intimate play with a low degree of competition and a high degree of cooperation is also considered to be a natural part of R&T. Konner (1972) described similar common social play in Kalahari-San children between 1 and 5 years old called "gentle and tumble" play. This type of play involves clinging and rolling on the ground while laughing and hugging and is characterized as a "mild form" of R&T.

Descriptions of themes in R&T that differ from previous categorizing of R&T according to repeatable regularities	Physical characteristics (text of play)
Konner (1972): clinging and rolling on the ground while laughing and hugging and is characterized as a "mild form" of R&T	Clinging, rolling, hugging, embracing, gentle tumbling, piling, exploration
Brown (2000): "lulls in the action" during which the participants" linger on the ground, laughing, with their bodies remaining in physical contact"	

Table 3. Example descriptions of "gentle and tumble" that differ from previous categorizations of children's R&T with physical contact

### ***How to understand children's environmental perception during R&T – Gibson's theory of affordances***

Ecological psychology focuses on understanding the relationship between humans and the environment as a complex interaction between psychological factors and the specific environment of a human. The theory of affordances (Gibson, 1979) concerns an individual's perception of the environment surrounding him. The affordances of an environment are its functionally significant properties in relation to the individual. This person-environment relationship is immediate and based on practical activity rather than on analysis (Kytä, 2004; Sandseter, 2009a). Affordances are defined in relation to the features of the environment and to the attributes of the individual, such as his needs and intentions, as well as to the physical characteristics of the individual. Perception is understood as perceiving the sensory action potential in the environment and then acting on it. Clark and Uzzell (2006) claim that Gibson appreciated the importance of social and cultural meaning in environmental perception and believed that the richest and most intricate affordances of the environment are those provided by other people. Thus, affordances in R&T can be either physical or social features of the environment. However, they are indivisible on the plane of experience. Children perceive the environment holistically and do not perceive or utilize the social and physical aspects of the environment separately (Clark & Uzzell, 2006).

Clark and Uzzell also maintain that Gibson recognized a role for learning and development in perception and believed that we learn about the social affordances of the environment from other people. Observing the sensory action potential or affordances in the environment (e.g., perceiving play signals) and then acting upon them is, according to the theory of affordances, how children gain practical experience and develop skills through social play such as R&T. Tannock (2011), in discussing R&T in light of Piaget's development stages, stresses the importance of practical experience through play in young children's cognitive development. Gaining a cognitive understanding of social systems through R&T serves to provide many practical experiences that enhance learning, including developing and understanding social rules, social expectations and logical thinking. According to Piaget, children aged 2-7 years would be in the preoperational stage of play where they are practicing skills that will become the elements of the next stage, concrete operational play. Concrete operational play leads to the development of games with rules (Tannock, 2011). This might suggest an ontogenetic development or sophistication of children's R&T behaviour during preschool years.

## Research question

Pellegrini & Smith (1998) challenge that "*there is a need for more descriptive data on forms of physical activity play and their age trends through childhood and adolescence*". Previous categorizations of R&T (Aldis, 1975; Tannock, 2011) include a wide range of identifying characteristics in which vigorous and competitive behaviours are often emphasized. In addition, Brown (2000) and Konner (1972) describe a mild and gentle form of R&T that has not been given much emphasis in the literature on R&T.

*How are the diverse forms of physical contact between players in R&T during preschool identified and categorized?*

## Methods

### *Participants and data collection.*

The study was carried out in a Norwegian preschool. A total of 32 children (11 girls and 21 boys) between the ages of 3 and 5 years were observed and videotaped during free indoor play for 4 weeks. Four observation sessions were performed, each lasting 3 hours from 8:30 a.m. to 11:30 a.m. The first observation session was used to allow the children to adapt to being videotaped and is not included in the analysis. Video materials of the remaining 9 hours of observations constitute the empirical foundation for the analysis.

The preschool that participated in this study was selected by purposive sampling. The preschool manager indicated a special interest in the issue of R&T, and the preschool staff (4 men and 2 women) tolerated and, to some degree, supported indoor R&T in their pedagogical practices. The preschool location consisted of three open rooms connected by a corridor that made it possible for the observer to have an overview from the center of the department. A Go-Pro HD camcorder (42 mm x 60 mm x 30 mm, weight 94 g) was used with a 173° wide-angle lens that made it possible to hide the camera in the hand while recording without holding it to the eye. The videotapes do not provide a complete picture of all potential R&T situations that took place but rather what the researcher chose to focus on. Because the video recording was guided by the situations taking place, the observer's impressions of R&T with physical contact between players, as described by Aldis (1975) and Tannock (2011), determined what should be recorded.

The video recordings were examined to reduce the amount of data. Episodes that were considered to be genuine aggression or independent physical play behaviours were excluded. The video recordings were then transcribed into an electronic word file. Transcriptions of the video material were based on objective descriptions of the physical characteristics (text) and verbal communication among the children participating in the videos. The transcriptions were later divided into sequences (play episodes), where the criterion for a sequence was a break or pause in the social interaction. For example, a break could be a change of partner, change of play venue or a short break in the social interaction with the same partner. In the observation sessions, the children were not segregated by age. In sequences where children of different ages were involved, the age of the child that initiated the social interaction was the basis for registering R&T related to age. In total, 188 play sequences were transcribed and analysed in this study.

### ***Analysis***

The analysis performed on the data was based on abduction, a qualitative research method that uses deductive and inductive analyses as a principal technique (Patton, 2002). The collected data were analysed according to the research question.

Initially, the transcriptions of R&T were analysed to recognize repeatable regularities according to the categories and descriptions of physical characteristics as described in table 1. The analyses were performed based on a deductive method in which the categorization was carried out according to the predetermined categories and characteristics described by Aldis (1975) and Tannock (2011).

Through the deductive analysis process, R&T sequences appeared that did not adhere to Aldis' two categories of wrestling. This type of play appeared to be somewhat less intense, goal-directed and focused. To find repeatable regularities in these sequences, an inductive method based on developing sensitizing concepts was performed. A sensitizing concept is a starting point for thinking about a class of data for which the researcher has no definite ideas and provides an initial guide for the research (Patton, 2002). Sensitizing concepts include loosely operationalized notions that can provide some initial direction to a study because a fieldworker inquires into how the concept is given meaning in a particular place or set of circumstances being studied. In that sense, sensitizing concepts constitute ways of breaking the complexities of children's play into distinguishable, manageable and observable elements. The sensitizing concepts applied in this study are mainly derived from previous R&T research by Brown (2000) and Konner (1972), as shown in table 3, as well as Tannock (2011), as shown in table 2, and descriptions of the connection between competition and cooperation in R&T by Pellis et al. (2010 ).

### ***Ethics***

A detailed description of the research project and its aims and implications for the preschool were sent to the preschool manager, the staff and the parents. The project was approved by and later reported back to the Norwegian Social Science Data Services, and informed consent was obtained from the preschool manager and the parents. The children were informed by the staff prior to observations and video recordings. Confidentiality and anonymity in this study included verifying full anonymity during data collection and publication. In the transcriptions of video recordings, all names were replaced with fictitious names and codes (e.g., Mb (5) = Martin, boy, 5 years old).

### **Results and discussion**

An analysis based on the deductive method demonstrated that Aldis' (1975) two categories of wrestling with subcategories are applicable for children in preschool between 3 and 5 years old. However, through a comprehensive analysis of the data, a third category emerged. The third category, which is labelled tumbling, emerged through analyses based on the inductive methods used in this study.

Categories	Sub-categories	3 years old	4 years old	5 years old	Total
1. Wrestling for superior position	a. Standing position			30	30
	b. Prone position	3		9	12
2. Fragmentary wrestling	a. Standing position		12	17	29
	b. Chasing		4	24	28
	c. Prone position	4		44	48
3. Tumbling	Bodily play characterized by the exploration of social and physical affordances in the environment	22		19	41
Total		29	16	143	188

Table 4. Categories of R&T that emerged from the data analysis. The table shows the frequencies of registered and analysed sequences of R&T according to age.

The purpose of table 4 is to illustrate that children in preschool between 3 and 5 years old demonstrate a great diversity of physical contact between players during R&T, regardless of age. Because the video recordings in this study do not provide a complete picture of all potential R&T situations that took place, quantification of the data only provides an exemplification of the qualitative diversity of R&T in preschool related to age. However, table 3 shows that accurate categorization of R&T in preschool can support quantitative studies of R&T where, for example, the purpose is to explore the ontogeny of preschool children's R&T.

In the following sections, the results and discussion are organized according to the categories described in table 4. The amount of transcribed data in this study is extensive. To demonstrate the different categories, some of the more widely supported observations will be presented.

### ***Wrestling for superior position***

*"Two boys are making an agreement for their next fight. They are starting by facing each other, and their hands are to the side and front. On a start signal, Bb (5) attacks Jb (5) by running forward. Both lock their hands on each other as they tumble around the mat. It is an apparent struggle to get a good grip, which leads Bb (5) to tear Jb's (5) clothes. "Don't tear!" Jb (5) says, clearly irritated. Another boy, Ib (5), interrupts and demonstrates what is not allowed. The struggle continues, and Bb (5) keeps Jb (5) at a distance with his left arm completely straight. The wrestling continues until Jb (5) falls on his bottom. "You lost," Bb (5) says. "You were strong," Jb (5) replies."*

The goal of wrestling in a standing position is to force the opponent to the ground, and the goal of wrestling in a prone position is to keep the opponent down or to pin him to the ground. On one occasion, an adult initiated standing wrestling for superior position with 5-year-old children where the



purpose was to force the opponent to the ground and, in this way, select a winner. The play was clearly organized and goal-oriented with a few clear rules, such as a game. When the adult retreated and let the children play on their own, the children (3 boys and 1 girl) continued playing for a long time and organized who was to fight next and what the rules were. In this goal-directed R&T (5-year-olds wrestling for superiority), verbal communication among the participants was important. Competition-oriented language, in which talk about winning and what was acceptable behaviour according to the "rules", was observed.

In this type of R&T, the selection and development of fighting techniques and tactics became obvious. Because wrestling for the superior position is clearly goal-oriented, effective fighting techniques developed. The degrees of freedom in movement variability (exploration) appeared to decrease when effective fighting techniques were employed. Certain techniques, such as getting a grip on the opponent's arms or torso, combined with pushing and pulling, appeared to be the most effective and popular. For one of the less physically developed children (Bb, 5), it was more important to choose a defensive technique (straight arms) in order to prevent defeat. Although the selection of effective wrestling techniques appears to decrease the movement variability in such play, the children developed a personal style related to their physical characteristics (e.g., size, strength), their partner's characteristics (e.g., size, strength) and the environment (e.g., rules). This may support the fighting skills hypothesis, which maintains that R&T allows the practice of long-term fighting skills under safe conditions (Fry, 2009). Success in wrestling for superior position requires the use of different fighting techniques related to different tactics, which is also related to environmental factors. The dynamics of wrestling for superior position may develop and support long-term fighting skills for those who continue practicing R&T throughout childhood.

### ***Fragmentary wrestling***

*"A new sequence of boxing begins in which Jb (4), with hands held like a boxer, is twisting the upper part of his body from side to side so that the other two boys do not get a hold on him. Ab (4) is hiding away in the corner. Jb (4) gets a hold on him and drags him back to the open space as he says, "Now we're gonna play fight". They then begin a long sequence of chasing and capturing. Jb (4) is chasing and catching Ab (4). The boys end by wrestling and boxing near the entrance door with no intention of getting a superior position."*

In fragmentary wrestling, the effort is considered less vigorous and goal-directed than in wrestling for superior position, and the play fighting often consists of short assaults of boxing, kicking, pushing, grabbing, pulling, and chasing. In the example above, the players' exaggerated body language signals very clearly that they are playing. The laughter is loud, but beyond that, there is no verbal communication between the three boys other than single words. The effort is intermediate, and the fragmentary wrestling is characterized by large body movements. In this phase of play, there are apparently no rules or mental agreements other than that this is play. R&T characteristics such as role reversals and play faces strongly indicate that this is play.

Although chasing does not always involve physical contact between the players, Fagen (1981) and Aldis (1975) consider this to be both social play and a division of R&T. Subcategory 2b in table 4 (chasing) is considered to be a type of fragmentary R&T that does not necessarily afford much physical contact but in which there is a clear mental commitment or intention to play between the players. In addition to being an independent subcategory of R&T, chasing often functions as a link between other categories of R&T, particularly in fragmentary wrestling. In this way, subcategory 2b relocates the space of play and affords children a short break in their bodily effort.

The above example of fragmentary wrestling indicates that R&T is a type of play in which the text of play is constantly changing (Sutton-Smith, 1997). The children realize potential affordances of the physical and social environment and explore them through intentional actions. Affordances are defined in relation to the features of the physical and social environment and to the attributes of the individual, such as needs and intentions, as well as to the physical characteristics of the individual (Clark & Uzzell, 2006). In the fragmentary wrestling example, the text is as much about the exploration of physical affordances as it is about social play. Initially, the two boys are physically exploring play possibilities with each other, and they are using different techniques to keep the play progressing. They tease each other by tickling the neck region, and they use chasing as a precursor to wrestling. When play is physically spontaneous, less vigorous and characterized by cooperation rather than competition (Pellis, et al., 2010 ); as in this example, R&T appears to be fragmentary.

In this example, it appears that the boys do not have any other ideas regarding their social interactions than to play. To keep this intention alive, they use different characteristics of fragmentary wrestling without any specific direction. Bekoff (2001) claims that, because there is a chance that various behaviour patterns performed during on going social play can be misinterpreted, individuals need to tell their peers, "I want to play". In this study, teasing and tickling are considered to support cooperation and have often been observed in fragmentary wrestling. Teasing and tickling are also observed in other R&T situations that have similarities to fragmentary wrestling as characterized by a high degree of cooperation and a low degree or near absence of competition.

### ***Tumbling***

"Lb (3) and Mb (3) have just arrived. Lb (3) begins by immediately jumping carefully on his knees and waves his hands. Mb (3) put his head to the mat, and it looks like he is trying to do a somersault. He tilts over and lands on his stomach. Lb (3) sees him and throws himself upon Mb (3) and pushes him down while he laughs loudly. Lb (3) squeezes him rhythmically a few times with his whole weight before he finally also tries to do a somersault. Ab (3), who is playing close by, rolls around and sits up next to Lb (3). He touches Lb's (3) back carefully with both hands without performing any specific physical assault."

In this study, all observations of R&T in 3-year-old children were of bodily social play on gymnastics mats. A large part of this play involved exploring the physical affordances of the mats (friction, softness, response, etc.), realizing the potential affordances of the physical environment and exploring them through intentional movements, such as jumping, running, falling and rolling (Kyttä, 2004).

In this example, both girls and boys were observed physically jumping, rolling and playing together. Occasionally, they came into contact with each other, and sporadic R&T (especially categories 2 and 3 in table 4) occurred. According to the theory of affordances, it is not the persons or objects themselves that the children detected but what possibilities for action they afforded (Kyttä, 2004). If one child lay on the mat, a nearby child could immediately perceive this pose as, e.g., "pileable", "climbable" or "touchable". Perception, in that sense, involves perceiving the sensory action potential in the environment and then acting on it. Because competitiveness and goal directedness were completely or almost completely absent in tumbling, this category provides a basis of confidence in R&T that permits children to exhibit a wide range of social and physical explorative play that was not observed in the other categories of R&T.

As shown in table 4, tumbling is suggested as a third category in R&T with physical contact between players and is characterized as being less vigorous and goal-directed than fragmentary

wrestling. Brown (2000) and Konner (1972) have recognized and described similar play activity in R&T in table 3 but did not consider this type of social play as an independent category of R&T.

Tumbling is bodily social play characterized by the indivisible exploration of social and physical affordances in the environment (Clark & Uzzell, 2006). This person-environment relationship is immediate and based on practical activity rather than on analysis (Kyttä, 2004). Clark and Uzzell (2006) claimed that Gibson recognized a role for learning and development in perception and believed that we learn about the social affordances in the environment by acting with other people.

The bodily tumbling that is observed during indoor R&T among preschool children and analysed in this study is difficult to fit into Aldis' (1975) two categories of wrestling. While wrestling is goal-oriented and competitive in its expression and often involves rules, tumbling is typically less vigorous and much more bodily explorative without the same intention of winning or domination that is normally observed in different types of wrestling. When a child lies on top of another child and balances on his back, it is difficult to assess any other intention than that this is some type of bodily exploration being pursued because it is fun, because it is possible or because it feels good. The purpose is obviously not to win but to explore what one can do with their body in social play with other children. Tumbling is children's playful approach to the environment, not primarily to explore environmental opportunities but as a physical consequence of the interaction between children's perception system and potential affordances in the environment (Clark & Uzzell, 2006). Tumbling is something that simply happens; it is a playful exploration of the social and physical affordances in the environment.

Previous research on R&T has focused on the benefits or the extrinsic functions of R&T (Sutton-Smith, 1997). Pelligrini (2009) warns against not distinguishing between social play and non-play in research and claims that exploration is not play (Bjorklund & Pellegrini, 2002). From an ecological perspective, this paper argues that children's playful approaches to their surroundings, in terms of exploration, can be considered play. Tumbling and exploration are both physical in their expression and do not necessarily have to be epistemological. The theory of affordances (Clark & Uzzell, 2006; Gibson, 1979; Kyttä, 2002) makes it possible to analyse children's explorative and bodily playful approaches to the physical and social environments.

The theory of affordances (Gibson, 1979) concerns humans' functional perception of the environment and how this must be understood as a complex interaction system between psychological and environmental factors. In this study, when the environment afforded soft gymnastics mats on the floor, locomotor play appeared instantly. The youngest children were obviously exploring the potential affordances of the environment by jumping, rolling and running on the mats. Sometimes, when the children accidentally came in contact with each other, spontaneous tumbling occurred. In this study, rudimentary tumbling, especially in younger children, is interpreted as an exploration of the environment in which the players intuitively perceived physical and social affordances that initiated locomotor play with social dimensions. Children's spontaneous, interactive locomotor play conducted the exploration of both physical and social affordances in the environment. This interpretation of preschool children's tumbling is in accordance with Clark and Uzzell (2006), who claim that children perceive the environment holistically and do not perceive or utilize social and physical aspects of the environment separately. According to the functions of R&T and the issue of learning and development in perception, this may suggest that there is an ontogenetic development of preschool children's physical contact between players in R&T from tumbling and fragmentary wrestling to wrestling for superior position.

Tannock (2011) questions whether R&T is an evolving form of play through which children move into more or less complex R&T behaviours as they mature. In this study, the 5-year-old children were observed playing adult-initiated and children-initiated standing wrestling for superior position in

several occasions. This category of R&T was organized more as a game with rules in which there is some goal, typically winning, other than play (Smith & Pellegrini, 2008). According to Tannock (2011), this category of R&T is considered to represent Piaget's concrete operational developmental stage. This observation is a contribution to the critique that Piaget's stages have been subjected to, given that it lacks clearly defined borders for when children move from one stage to the next and that the age segments purported by Piaget provide a chronology with a gross underestimation of children's actual developmental abilities (Hendry & Kloep, 2002). Educators are uncertain how to manage R&T (Tannock, 2008), and environmental inhibition or prohibition of R&T in preschool practice (Logue & Shelton-Harvey, 2010) may constrain children's developmental abilities in understanding social rules, social expectations and logical thinking.

## Conclusions and implications

This study of preschool children's indoor R&T has revealed that, in a supportive environment, children between the ages of 3 and 5 years perform a wide range of different R&T characteristics where there is physical contact between the players. Through analyses based on abduction (Bowen, 2006), tumbling emerged as a distinct category of preschool children's R&T with physical contact between players. This new knowledge contributes to the more accurate categorization of R&T. Precise categories with detailed descriptions of characteristics are important and necessary tools for practitioners in recognizing R&T and can also support the practitioner's ability to make informed observations of individuals' participation in R&T. Even when physical interactions among children are playful and not aggressive, educators are often uncertain of what to do. This is not unexpected, as very little research has been conducted on R&T to assist preschool educators in making informed choices about managing R&T (Tannock, 2008).

In this study, the identified and categorized diverse types of physical contact between preschool children between 3 and 5 years old during R&T may suggest that this is an evolving form of play, from tumbling and fragmentary wrestling to wrestling for superior position. This evolving form of R&T is discussed within different theoretical frameworks. R&T with physical contact between players may evolve from categories characterized by a high degree of coordination to categories characterized by a high degree of competition, as described by Pellis et al. (2010). This evolving form of play may also be explained as a consequence of Piaget's description of children's development from preoperational to concrete operational stages of play, as described by Tannock (2011). The theory of affordances as described by Gibson (1979) and Clark and Uzzell (2006) contributes to the knowledge of understanding children's environmental perceptions in R&T and may explain how the increased variability and sophistication of such play can be a consequence of children's perceptions of affordances in the physical and social environment. A common factor between Piaget's and Gibson's theories is the notion that children's perceptions of the environment are based on practical activity rather than on analysis.

This study has revealed that the preschool physical and social environment is important for supporting R&T. R&T holds a social dynamic that aids in the development of social competency as children learn about themselves and others. By exploring the physical and social affordances in the environment through R&T with physical contact, children learn and develop perception skills that are crucial for developing social competency and yield immediate and long-term benefits. As the preschool in this study demonstrates, allowing indoor R&T and providing physical environmental supports for such play afford children opportunities to harvest important bodily, social and perceptual experiences in the initiating phases of social play.

### **Limitations of the study and future research**

The preschool that participated in this study was selected by purposive sampling. The preschool staff policy allowed and supported indoor R&T in their pedagogical practices. For the purpose of the study, this selection criterion was important for experiencing a wide range of children's initiated R&T, without too much environmental (physical and social) constraints on affordances in R&T.

As Pellegrini et al. (Pellegrini, Symons, & Hoch, 2004) emphasized, utilizing sensitizing concepts can only give the user a general point of reference and guidance in the empirical approach and can only suggest a direction of study. Extended testing of the suggested categories of R&T with physical contact between players in preschool (e.g., toddlers) should be performed.

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