2011

Moving like a kid again : an analysis of Parkour as free-form adult play

Margaret E. Kelley
Western Washington University

Moving Like a Kid Again: An Analysis of Parkour as Free-Form Adult Play

By
Margaret E. “Beth” Kelley

Accepted in Partial Completion
of the Requirements for the Degree
Master of Arts

Moheb A. Ghali, Dean of the Graduate School

ADVISORY COMMITTEE

Dr. Joan Stevenson
Dr. Charles Sylvester
Dr. James Loucky

MASTER'S THESIS

In presenting this thesis in partial fulfillment of the requirements for a master's degree at Western Washington University, I agree the library may make copies freely available for inspection. Library users are granted permission for individual, non-commercial reproduction of this work for education research purposes only.

I represent and warrant this is my original work, and does not infringe or violate any rights of others. I warrant that I have obtained written permissions from the owner of any third party copyrighted material included in these files.

I acknowledge that I retain ownership rights to the copyright of this work, including but not limited to the right to use all or part of this work in future works, such as articles or books.

Any copying or publication of this thesis for commercial purposes, or for financial gain, is not allowed without my written permission.

Margaret "Beth" Kelley
November 1, 2011

“Moving Like a Kid Again”:
An Analysis of Parkour as Free-Form Adult Play

A Thesis
Presented to
The Faculty of
Western Washington University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

By
Margaret E. “Beth” Kelley
November 2011

ABSTRACT

Parkour is a sport that developed in France in the late 1980s that is described as "the art of movement." The objective of the participant is to choose a route of their own making, from an arbitrary Point A to Point B, and move through that route as efficiently as possible, overcoming any obstacles that are along the way. As of 2011, Parkour has become an international pastime, with practitioners, called "traceurs," participating all over the world.

This thesis proposes that Parkour is a form of play, specifically locomotor play. The movements that make up this type of play are universal as to be identifiable cross-species in all primates. Several researchers are beginning to discuss an "evolutionary" or innate set of play behaviors, particularly movements seen in locomotor play.

Qualitative ethnographic data was collected on traceurs and compared with previous studies of play performed on children and primates. The qualitative data indicates that Parkour fits well into the descriptions and definitions of play as discussed in previous studies.

No quantitative analysis or analysis of movement has previously been performed on Parkour to analyze the behavior of traceurs and to see if it fits in with play research. Using publicly available videos, new quantitative data is introduced that demonstrates that traceurs are using the same locomotor movements seen in all other primates, and it is proposed that Parkour is a good fit with innate free-form locomotor play. Findings are discussed, as well as what other applications this research may have.

ACKNOWLEDGMENTS

Thank you to the members of my committee, Dr. Joan Stevenson, Dr. Charles Sylvester, and Dr. James Loucky, for their advice, guidance and invaluable feedback. Thank you also to Dr. Peggy Wagner, Dr. Anthony Pellegrini, Dr. Marc Bekoff, and Dr. Garry Chick for their insights, feedback and encouragement throughout this process. I would also like to thank Parkour Visions in Seattle, WA, and the traceurs throughout the Pacific Northwest who contributed their time and insight into this project. Finally, I dedicate this work in memory of Dr. Michael Grimes and Caroline V.C. Huetter, two of the most playful people I have ever met.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

All figures and tables were created by the author unless otherwise credited.

INTRODUCTION

You have already observed behaviors typically used in the practice of Parkour if you have ever seen somebody jump from rock to rock over a creek, hop over a railing, or take the stairs two by two. **Parkour** is a physical discipline created by a group of teenagers in Lisses, France in the late 1980s (Stapleton & Terrio 2010). The goal of Parkour is to get from one location to another and overcome any obstacles that get in the way (Parkour Visions 2011). Overcoming obstacles can involve running, jumping, climbing, vaulting, and hurdling over objects. Parkour is often described as an urban sport, but can be practiced in any setting and is indeed practiced on every continent, including Antarctica (American Parkour 2009). Practitioners are called **traceurs**, and many of them view Parkour as a way of life.

Parkour's reception by the world at large is mixed. It has been compared to gymnastics, rock climbing, and skateboarding, and its practitioners to comic book superheroes like Spiderman (Geyh 2006; Kornblum 2007; Sieh 2007). It has been used to promote shoes, movies, law firms, and cars, has been sensationalized by film and media, and has been banned in some parks and universities. Some claim that Parkour is too dangerous for young, growing bodies (Krikler 2007; McClean et al. 2005; Miller & Demoiny 2008; Rawe 2007). Others have classified Parkour as an expression of teen rebellion (Atkinson 2009; Cazenave 2008; Fuggle 2008; Kural 2010). Still others have labeled it an entirely original and unique way of exploring one's environment (Daskalaki et al. 2008; Mörtenböck 2007; Ryan 2006).

I argue that these above descriptions are wrong. Parkour is not a form of mass youth rebellion or a new method for exploring urban settings. Parkour is instead a form of play and the practice of Parkour involves the use of innate locomotor patterns shared in all forms of

mammalian play. These locomotor movements are not new, unique, or "unnatural" for humans to perform.

Play is any activity that is outside of an animal's typical behavioral patterns and does not serve an immediate need for survival (Bekoff & Byers 1981). The field of play research studies many different facets of play, but the majority of play research is dedicated to studying how play promotes learning and biological processes (Allen & Bekoff 1994; Ansell 2005; Batt 2003; Bjorklund and Brown 1998; Blanchette et al. 2005; Brown S. 2009; Chaker 2006; Creasey et al. 1998; Fouts 2001; Frost & Jacobs 1995). Play behaviors that involve moving the body are categorized as **physical** or **locomotor play** and are present in all types of mammals (Bekoff & Byers 1981; Burghardt 2005; Fagen 1981). Locomotor play is especially common in primates, and particularly humans (Wilson 1975; Sutton-Smith 1997). Play research was often discredited or considered less robust than other behavioral research (Krentz 1998; Burghardt 2001), however play has been determined to be crucial to proper physical and mental development in all animals, including humans (Bjorklund 2006; Bjorklund & Brown 1998; Lewis 2000; Palagi 2007), and arguably increases an individual's lifespan (Allen & Bekoff 1994; Brown, S., 2009; Fagen 1981; Hartle & Johnson 1993; ICM Research 2008; Malone 2007; OECD 2002; Palagi 2008; Singer & Singer 1990; Visalberghi 2009).

Initial qualitative analysis and interviews with traceurs have indicated that their locomotor behaviors and intentions were consistent with the descriptions of nonhuman primate play (Angel 2006, 2008; Kelley 2008a, 2008b). Brown (2007), Forencich (2007), and Saville (2008) have already identified Parkour as a playful form of movement, as do traceurs.

Not all are willing to see the shared and likely adaptive and fitness enhancing aspects of human and nonhuman primate play in Parkour, and instead its reputation as an "extreme sport"

has resulted in negative portrayals of the sport by both journalists (e.g. Bernstein 2011; Kornblum 2007; Oz 2007; Rawe 2007) and academicians (Frumkin 2005; McClean 2005, 2006; Miller & Demoiny 2008; Murphy 2006).

To date, only a couple of academic publications have argued that Parkour is a form of play (Bavinton 2007; Saville 2008), and no one has systematically analyzed the behavior and movements exhibited by traceurs to see if these actions are consistent with adaptive, nonhuman primate play. This study incorporates quantitative and qualitative methods to demonstrate that Parkour is consistent with typical primate play, involves the practice of adaptive locomotor behaviors natural to humans and nonhuman primates, and that reinforcement of these behaviors is healthy exercise with fitness enhancing benefits.

First is a brief history of Parkour. Second are definitions of play and evidence that demonstrates its universality among all primates which justifies why Parkour needs to be studied as play. Next follows a description of ethnographic research supporting the hypothesis that Parkour can be classified as play. Videos of Parkour provide data for identifying typical actions and movements that have been identified in other nonhuman primates during unstructured "free-form" play. Methods, Results, Discussion, and Conclusions follow.

TRAIN TO BE USEFUL – The History and Practice of Parkour

"Etre fort pour être utile."(Be strong to be useful) -Méthode Naturelle

Parkour has been called the art of overcoming obstacles (Parkour Visions 2011), and involves running, jumping, climbing, vaulting, rolling, and quadrupedal movements. The origins of Parkour are rooted in a physical education system called *Le Méthode Naturelle,* created by physical trainer Georges Hébert shortly before World War I (Foucan 2008b). Hébert was stationed in Africa and inspired by the movements and behaviors of indigenous groups. He developed a system based on their training methods, and introduced it to French soldiers. Hébert described the purpose of training the Méthode Naturelle as *"Etre fort pour être utile";* be strong in order to be useful (Le Corre 2008). Figure 1 portrays how students of the Méthode Naturelle practiced quadrupedal movements as part of their training regimen.

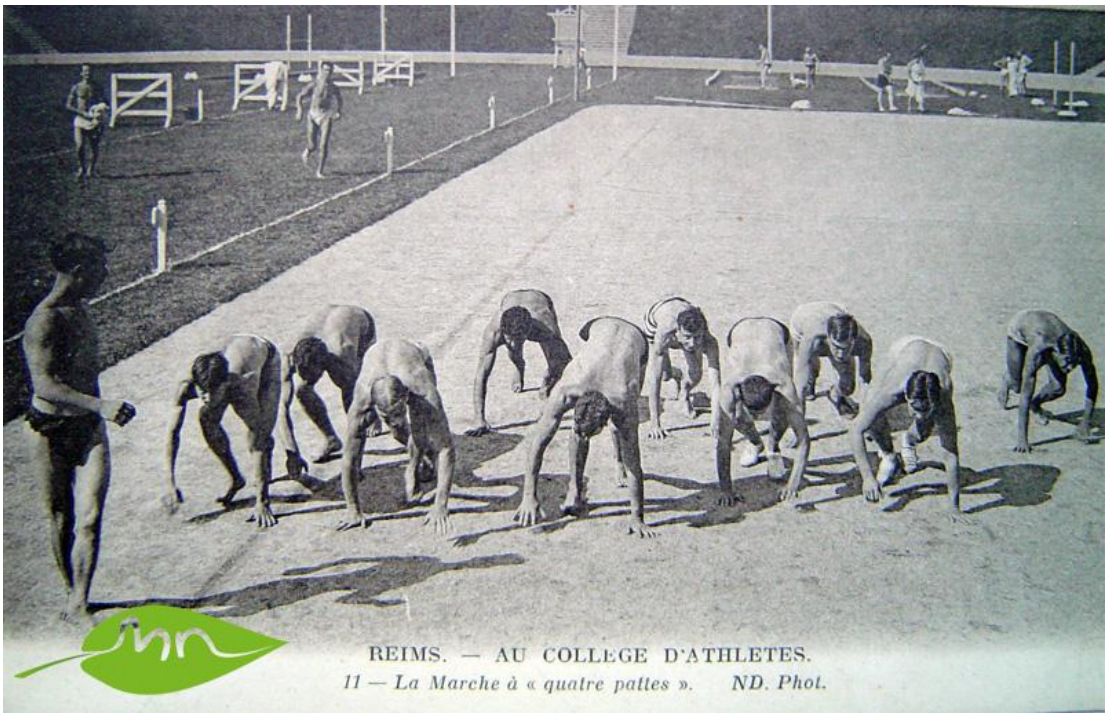

Figure 1. *Original Méthode Naturelle students practice quadrupedal movement. (Photo courtesy of MovNat, Erwan Le Corre).*

The Méthode Naturelle style of physical training was quickly adopted by military training systems the world over, including U.S. military obstacle courses, where it is still in use (Dumas 2005; Zimmerman 2007). The Méthode Naturelle was also the inspiration for American *parcourses* popular in the 1970s and 1980s as a form of fitness circuit training (Grudowski 2000). Parcourses consist of a few wood-and-metal exercise stations along a running trail. There were approximately 4500 courses in the 1980s, although only a few are still in use, including Greenlake Park in Seattle, WA and Fort Mason Park in San Francisco, CA. Figure 2 shows photos of parcourse exercise equipment along running trails at Atascadero, CA and San Francisco, CA.

(a) **(b)**

Figure 2. *Parcourse stations in Atascadero Lake Park, Atascadero, CA (a), and at Fort Mason Park, San Francisco, CA (b).*

David Belle, born in 1973 (Belle 2007) is often credited as the founder of Parkour (Cecka 2008; Ramirez 2007; Sieh 2007; Wilkinson 2007). His father, Raymond Belle, was a child soldier during the Franco-Vietnamese War during 1946-1954, and was trained in the Méthode Naturelle. He also trained in fire fighting and gymnastics after returning to France. Belle encouraged his sons to learn the Méthode Naturelle, which David did, as well as briefly joining the French military pompieurs and training as a fire fighter. At 15 years old David, Sebastien Foucan, and a group of their friends who later called themselves the Yamakasi, began to adapt

David's father's knowledge of Méthode Naturelle for his friends in the working-class, migrant suburb of Lisses, France (Stapleton & Terrio 2010) and Parkour was born (Wilkinson 2007). [The term **yamakasi** is borrowed from the Congan term *Ya makási* for "strong body" or "strong spirit" (http://sim.sstwo.net/yamakasi.html 2009)]. David Belle has described Parkour as:

> "Parkour is a means of transportation. It's a technique which consists of going from A to B using the simplest and most efficient means. So, you have to adapt to all the different types of structures you can find in a town, and to the natural surroundings. You have to go on objects that were not originally built for this purpose. It's all about freedom of movement." (*Banlieue 13*; dir: Morel 2004)

David also explains how the Yamakasi and he changed this originally serious, non-playful form of military training into something fun:

> "I transformed it into something playful, like a game. Things they did in the army, but a little more free. When I say playful I mean it's fun to go out and exercise. My friends and I will see walls and passes that tell us 'you should go like this or like that.' But we say 'no, we can go like this just as well.'" (documentary; dir. Biedermann 2006)

Originally called **"L'Art du Déplacement"** or *the art of movement* by David Belle and other original practitioners, the term **Parkour** developed as a version of the French verb *parcourir*, meaning to travel or trace a course (Foucan 2008a; Merriam-Webster 2000:255). The term **traceur** is borrowed from the English "tracer," as in a tracer bullet, and stems from the same idea of overcoming obstacles and navigating through the environment in an efficient way, someone who traces a new path or route. Parkour has also been referred to as **free running** or **pk** (Foucan 2008a).

Parkour is most often practiced by young men, though not exclusively (Cecka 2008; Kelley 2008a, 2008b; Ramirez 2007; Sieh 2007; Wilkinson 2007). Parkour Visions, a Parkour-specific gym in Seattle, WA, has a total membership of over 120 students, ranging in age from 5 to 45 years (Parkour Visions 2011). The mean age of all enrolled students is 21 years. The mean age of children up to 13 is 9.7 years. The adult mean is 24 years of age.

Parkour began to spread internationally when practitioners began to exchange and post videos over the Internet beginning around 2001 (Huetter 2007; Wilkinson 2007). Parkour has spread predominantly through grassroots efforts, social networking, online forums, and the distribution of online videos. Television was also influential in spreading Parkour, first with Nike television commercials in 2002 that featured the Presto shoe as an athlete traversed the terrain using Parkour techniques (Nike 2009), and followed by two TV documentaries: *Jump London* (Christie 2003) and *Jump Britain* (Christie 2005), also distributed via bootleg copies and via the Internet. Adidas, K-Swiss, Toyota, Mervyn's California, and Canon have all used traceurs to promote their products, (e.g. Canon 2005; Ortega 2006). Parkour has also been featured in feature films such as *James Bond: Casino Royale* (2006) and *Prince of Persia: the Sands of Time* (2010). Traceurs have appeared on popular U.S. TV shows such as *Survivor, MTV Ultimate Parkour Challenge*, and *Ninja Warrior*.

Parkour has spread predominantly through the Internet (Huetter 2007), which may partly explain why there has been a lack of academic attention. Some of the most researched and detailed attempts at understanding Parkour are housed in online forums and websites rather than in academic journals and editorials (e.g., Foucan 2008b; Germain 2008).

Much of the research by academics examines the physical impact of Parkour exercise on the human body (Frumkin 2005; Krikler 2007; McClean 2005, 2006; Miller & Demoiny 2008; Murphy 2006), and have argued that Parkour is too dangerous, although there is little evidence to support their suggestions that skeletal loading or high impact is damaging to growing bones (Malina 2006; Sothern et al. 2000; Parkour Visions 2011). Others have attempted to argue the motivations of Parkour practitioners as being primarily for thrill seeking (Bernstein 2011; Cazenave 2008). There is a third group that discusses the anthropological and social studies of

traceurs' interaction with their social and physical environment, often focusing on the traceurs' use of space rather than their motivations for practicing Parkour (Angel 2008; Brown N. 2009; Daskalaki et al. 2008; De Souza & Hjorth 2009; Fu 2004; Mörtenböck 2007; Neill 2009; Pratt 2008; Taylor 2008). Some academics and journalists have described Parkour as an art form or sport (Sieh 2007; Stapleton & Terrios 2010; Weiner 2009; Wilkinson 2007), but have not gone so far as to describe it as play. Only a few analyses have studied Parkour as an act of play or leisure, both in urban settings (Bavinton 2007; De Souza & Hjorth 2009; Saville 2008) and in national parks (Zinn & Graefe 2007).

Summary

Parkour is the art of overcoming obstacles and moving from point A to point B as efficiently as possible. People who practice Parkour call themselves traceurs. Originators of Parkour were influenced by military and emergency training, but founders of Parkour emphasize the fun, playful aspects of its practice. Parkour's enthusiastic supporters are criticized by those who claim it is dangerous and extreme both in its practice and in its philosophy. Some authors have found ethnographic evidence that Parkour is a type of play, but no one has examined Parkour behaviors as typical of the actions found throughout mammals and particularly in nonhuman primates while playing. The next chapter provides a brief review of the theory and research on play behavior.

PLAY – The Short Version of a Long History

"No behavioral concept has proven more ill-defined, elusive, controversial, and even unfashionable."

– E. O. Wilson, (1975:164)

Introduction

The goals of this chapter are to define play and to provide a brief history of research on play in animals and humans. The author will show that locomotor behaviors used in play are evolutionarily conserved and thus most movements are universally shared throughout the primate order. What that means for human play will be discussed.

Play Defined

The term "play" includes many kinds of behaviors in animals (Bekoff & Byers 1998). "Play" can be used to describe the physical play of a child dropping a spoon repeatedly during mealtime or a cat "toying" with a mouse before she eats it (Sutton-Smith 2005), politically repressed tribal groups in Thailand using soccer games to protest against the regional government (Jonsson 2005), or people engaging in make-believe play by dressing up for Mardi Gras. U.S. President Barack Obama plays with a football at breaks during his work day in Figure 3.

Figure 3. *U.S. President Barack Obama often palms a football or basketball while thinking or during breaks. Photo and caption by Callie Shell, TIME Magazine.*

Describing play and differentiating it from other behaviors is contentious because of its diversity and flexibility and the lack of a universally accepted definition (Bekoff 1984; Burghardt 2005; Fagen 1981; Sutton-Smith 1979). Bekoff and Byers (1981:301) have laid out the most commonly accepted definition of play:

> **Play** is all locomotor activity performed postnatally which appears to an observer to have no obvious immediate benefits for the player, in which motor patterns resembling those used in serious functional contexts may be used in modified terms. The motor acts constituting play have some or all of the following structural features: exaggeration of movements, repetition of motor acts, and fragmentation or disordering of sequences of motor acts.

This definition is a comprehensive and yet exclusive definition of play, and has been accepted by most play researchers (e.g., cited by Brown 1998; Burghardt 2005). Martin and Caro (1985) elaborate on Bekoff and Byers' definition, and suggest that an activity needs to have at least one but usually most of the following features in order for it to be identified as play:

1) The action involves exaggeration and repetition of motor acts and the reordering of behavioral sequences.

2) The action is initiated by a "play" signal or a form of "metacommunication." This signal can take the form of a bow, smile, or even a light push or peck.
3) Play occurs when essential needs such as food, water, and immediate safety are met, and when animals are in a relaxed state.
4) The sequences of motor acts are incomplete or fragmented.
5) Role-reversing and/or self-handicapping occurs; for example a larger or stronger individual will lower themselves down or not use full force during the interaction.
6) Play is fun.

Pellegrini adds, "Play enables individuals, after they have sampled their environments, to generate, in a rather low cost manner, a repertoire of innovative behaviors that may be adaptive to their specific niche," (Pellegrini et al. 2007:263).

Other definitions of play have been used in play research, each with its own benefits and negatives. Cherfas (1980) and others (Bateson 2005; Bekoff & Byers 1981) emphasize play's role as any activity that has no immediate goal essential to survival; yet humans and other animals perform many activities that are not essential to survival – singing, exploratory behavior, cultural rituals – so this distinction is too broad for most types of analysis. Another argument against this criterion is that play can have near-immediate benefits for both juveniles and adults such as social bonding, learning to negotiate friendships and group hierarchy (e.g. Burghardt 2005; Millar 1981), and coordinated food procurement followed by sharing (Visalberghi 2009). "Individuals must survive through infancy and childhood before reproducing, and there is every reason to believe that natural selection has acted as much upon the early portions of the lifespan to promote survival as it has upon adulthood," (Pellegrini & Smith 2000:51). Fagen (1981; 1993) has emphasized how play's expression and functions change over an individual's life and its influence on reproductive success, however play may not in all cases directly improve reproductive success (Bekoff & Byers 1998; Burghardt 2005). All of these varying definitions

and caveats demonstrate that play behaviors are diverse and context dependent, whose boundaries overlap with many other spheres of behavior.

Play that helps juveniles learn their place in the social order and also practice skills needed for a reproductively successful adulthood are described as progressive play, or **biological/processual** play (Sutton-Smith 2005). Biological/processual play is typically subdivided into three categories: **locomotor-rotational** play, **object** play, and **social** play. Locomotor play involves any movement of the body that does not require coordinating one's actions with another individual. Multiple individuals can participate in locomotor play at the same time, but the play is not dependent on others' participation. Object play occurs when an individual manipulates tools, food, blankets, snowboards, or any moveable object or set of objects in its environment. Social play and play-fighting are defined as playing in an interactive way with another individual. These categories are not mutually exclusive (Christie 1998; Fagen 1981; McDonnell 2002), yet they are distinct functionally and serve different needs for the individual (Fagen 1981).

This thesis will focus on locomotor play as practiced by traceurs. Locomotor play is very common but has received the least attention by behavioral scientists of the three types of play (Pellegrini & Smith 1998a). Locomotor movement is a key characteristic of all animal play and Fagen notes that "Animals may somersault, roll, flip forward or backward, spin, whirl, pirouette, make handstands, chase their tails, rear, and kick up their heels... Often a vertical leap is decorated with body twists, rear kicks, or head-shakes," (Fagen 1981:291). Figure 4 portrays two examples of locomotor play.

(a) **(b)**

Figure 4*. Examples of physical or locomotor play as expressed in (a) humans [author photo], and (b) canines [credit Flickr (creative commons)].*

Physical play is distinguished from other similar non-play physical behaviors like fighting, exploration, or food procurement partly by apparent function or goal (Hughes 1978). For example, exploratory behavior is sometimes confused with play. However, exploratory behavior provides immediate benefits and is mostly sequential in physical motor patterns (Martin & Caro 1985). Wilson (1975:165) notes that the goals differ: exploratory behavior poses the question "what does this object do?" whereas play asks the question "what can I do with this object?" Another behavior often confused with play is stimulation. Stimulation is an action that is repeated over and over out of context and is typically observed in stressed animals and humans with disorders such as autism (Grandin 2008). The behavior or action may serve to provide immediate relief from stress but it is not usually beneficial to the animal and may cause harm. These repetitive behaviors can indicate a need for more enriching (i.e. playful) environments

(O'Neill-Wagner 1989). This also illustrates how play behaviors are diverse and context dependent, an aspect well understood by all who have studied play.

A Brief History of Play

The value of play was recognized by Plato (Krentz 1998), but Western science was late to consider play research a legitimate area of study. Exercise outside of regular work and fitness through play was not widely considered as a means to be healthy until the late 1800s (Curtis 1917; Hall 1883; Darwin 1871; Patrick 1916). Spencer (1873) argued that juvenile animals burned excess energy during play. Groos (1898; 1901) was the first to propose that play was practice or preparation for adulthood. Hall (1883, 1920) described the different developmental stages that recapitulated phylogenetic changes reconstructed from the fossil record and applied these to child development. Names for children's play equipment like "monkey bars" and "jungle gym" echo that perspective (Hartle & Johnson 1993). Johan Huizinga (1938) was another key investigator who anticipated contemporary attitudes about play, as one of the first to argue play to be important for both juvenile and adult humans from both an individual and social perspective.

Play research emphasized child development, and this perspective dominated research through much of the 20th century (e.g. Bateson 2005; Christie 1998). Developmental psychologist Piaget (1953) proposed stages or schemas of human cognitive development and argued play was instrumental in each stage, with play becoming more complex with each stage. Twenty years prior, Vygotsky (1967) theorized that children had more malleable stages and learned through a "scaffolding" of previous knowledge, new knowledge, and aid from others. Both Piaget and Vygotsky considered play to be an essential part of human learning and

development, although for different reasons, and remain influential in child development and play research.

Play did not gain the attention of biologists and ethologists until the late 1960s at the same time that naturalistic studies of primates in the wild were beginning (Ribnik 1982). Anthropologist Sherwood Washburn believed that human evolution could be reconstructed from studies of nonhuman primates (e.g. 1978). Washburn inspired Jane Goodall and others who observed all kinds of behaviors including play in primates (Goodall 1986; 1995; van Lawick-Goodall 1968), and then in other animals (Burghardt 2005; Brandenburg 1993; Liers 1951; Pellegrini 2005), suggesting that play is not exclusive to humans. Despite this research of play in animals in all stages of maturity, play research is primarily viewed through the child development lens (e.g. Christie 2008; Pellegrini & Smith 1998a), and is only recently expanding to lifetime development, including geriatric research and maintaining healthy and active human cognitive function (Ding 2006; Etnier et al. 1997; Netz 2007; Scott et al. 1998). The individuals who studied play in children did not communicate with the work by biologically trained ethologists studying animals. The resulting literatures were not compared because of the inability of ethologists to determine the "intentions" of animals (discussed in Burghardt 2005). However, by the turn of this century play researchers in both child development and animal research began to communicate and identify the similarities between human and nonhuman mammalian play (Allen & Bekoff 1994; Bekoff 1984; Burghardt 2005; Fagen 1981; Maple & Zucker 1978; Maple 1980; Pellegrini & Smith 1998b, 2005; Sutton-Smith 2005).

The Universality of Play

Research is most extensive on children because of the early interest in healthy child development. Children are often viewed as exhibiting innate, un-encultured behaviors of young

primates (Ansell 2005; Beach 2003; Bronfenbrenner 1979; Fouts et al. 2001; Smith 2004; Turnbull 1972). Juvenile humans are typically observed running, jumping, wrestling, rolling, swinging, and improvising on other movements mimicking the movements of adults (Christie 1983; Panksepp & Scott 2003; Pellegrini & Smith 1998a). However, much of the initial research obscures determination of the natural preferences and inclinations of children. The bulk of research on children has been accomplished in educational settings (e.g. Christie 1983, 2008; Pellegrini 2004, 2007; Singer & Singer 1973, 1990; Singer et al. 2007). Educators since the 1800s and even up to today believe play to be most beneficial to healthy child development only when guided by an adult ideally in a planned setting (Elliot 1978; Hall 1883; "Play with a Purpose" 2009; Spencer 1878) despite evidence indicating the contrary: that unstructured "free-form" play is more beneficial overall to development (Neighmond 2011, Spiegel 2008).

This bias has been countered by anthropologists such as Turnbull (1972) and more recently in the work of Bock and Johnson (2004), Bock (2009), Fouts, Hewlett and Lamb (2001), Gosso et al. (2005), and Malone (2007) among others. Turnbull (1972) studied the Ik peoples and observed children playing games involving balance, throwing, jumping, swimming, climbing, and wrestling. This type of play has also been documented in children living in many different environments (Beach 2003; Bock 2009; Fouts et al. 2001; Humpfreys & Smith 1987; Kamei 2005; Martin & Caro 1985; Pellegrini et al. 2007; Smith 2010) and likely experienced and observed by the reader. These play behaviors are consistent enough across different environments and cultures that they can be considered innate play.

All primates, and in particular the great apes (including humans), have been documented as the most playful of all mammals (Lewis 2000; Pellegrini & Smith 2005; Pellegrini et al. 2007). Nonhuman primates have been documented performing the same general locomotor play

behaviors observed in human juveniles (e.g. Burghardt 2005; Fagen 1993; Goodall 1968, 1995; Maple 1978, 1980; O'Neill-Wagner 2009; Pellegrini & Smith 1998a, 2004; Pika & Zuberbuhler 2008; Schaller 1963; Symons 1978; Visalberghi 2009; Wilson & Kleiman 1974), although there are species-specific aspects of the expression of these behaviors dependent on local ecology. Young rhesus macaques *(macaca mulatta)*, for example, first perform simple motor patterns such as lurches and hops, and then engage in more elaborate motor "projects," such as repeatedly leaping up to a particular branch, and soon these behaviors become more elaborate and also include explorations of their territory (Simpson 1976). This sequence of stages in macaque motor and cognitive development has been observed also by Fagen (1981), and O'Neill-Wagner (O'Neill 1988, 1989, O'Neill-Wagner 2009). Among the apes, Loizos (1976), Barber (1991) and Weisler & McCall (1976) have all described similar behavioral sequences in siamangs (*Symphalangus syndactylus)* and gibbons *(Hylobates lar)*, including somersaulting, running, play fighting and wrestling, as well as chasing games in the canopy. Goodall witnessed juvenile chimpanzees tumble, chase, pull, climb, swing, push, play with water, and perform acrobatics, all for play (Fagen 1981; Goodall 1986, 1995; van Lawick-Goodall 1968). Captive adult chimpanzees have also been documented performing these behaviors (Chimpanzee Sanctuary Northwest 2011). Maple (with Zucker 1978; 1980) has documented pulling, pushing, climbing, jumping, and play fighting in orangutans. Bateson (2005), Lewis (2005) and the author have observed this behavior in gorillas.

Fagen (1981), Pellegrini (1998), and others (e.g., Buttelman 2009; Lewis 2005; Maple & Zucker 1978; Maple 1980; Pereira & Fairbanks 1993; Pika 2008; Power 2000; Smith 1982; Symons 1978; Wilson & Kleiman 1974) note that play behaviors are similar and shared and thus can be coded for cross species comparisons across all primates including humans, and most

mammals. Maple (1980) found that juvenile orangutans, chimpanzees, and gorillas all used running, jumping, climbing, and pushing as signals or metacommunication to play (as defined by Martin and Caro and described earlier in the chapter) during their bouts of interspecies play with one another. These are also the same signals used to communicate playful intent in human play. Beyond primate play, countless researchers from Darwin (1871) to Stuart Brown (2009) to the author have documented humans and canines playing together. Brandenburg (1993) documented ravens (*corvus corax)* teasing and playing with wolves (*canis lupus*) and grizzly bears (*ursus arctos horribilis*). Liers (1951) observed river otters (*lutra Canadensis*) teasing and chasing ravens. Due to these and other studies, it is now widely accepted that interspecies play can take place and is a strong candidate for cross-species comparison (Fagen 1981; Maple 1980; Pellegrini 1998, 2005; Pika & Zuberbuhler 2008). Figure 5 provides two more examples of interspecies play.

After looking at generic play behavior in animals, it is beneficial to dive deeper into specific types of play, specifically locomotor play.

(a) **(b)**

Figure 5*. (a) A man and dog engaged in interspecies locomotor play (Photo courtesy of Al Ragan.) (b) A domestic dog and coyote both perform a play bow to signal their interest before engaging in play (photo courtesy Shreve Stockton 2009).*

Locomotor Play

"Locomotor-rotational play is reported in species after species," (Fagen 1981:88) and not just in mammals; locomotor, object, and social play have also been noted in birds (Brandenburg 1993; Burghardt 2005), some reptile species (Burghardt 2005; Wilson 1975:276), and possibly even in octopuses (Kuba et al. 2006). As defined earlier in this chapter, locomotor play involves any physical movement of the body that does not require coordinating one's actions with another individual. Locomotor play is usually the first type of play to appear in an animal's play life and typically occurs before young animals begin to move at high speed around barriers and obstacles (Stamps 1995). Locomotor play is prominent in species that navigate in complex environments (Burghardt 2005).

Table 1 is a partial list of locomotor play behaviors observed in specific mammal species with citations. The coding of the play behaviors is standard (see Appendix). Notice that juvenile humans are included in almost all of the categories. Table 1 demonstrates that play behavior patterns are readily and easily identified across several different mammal species.

It is also well established that the more flexible a mammal needs to be to adapt to an ever changing setting, the longer that mammal's juvenile period, and the more playful the mammal (e.g. Bjorklund 2006; Burghardt 2005; Fagen 1981; Maple 1980). The frequency and complexity of locomotor play peaks during developmentally sensitive stages of neuro-muscular development (Burghardt 2005; Lewis 2005). This is especially true in great apes and humans. These species also show especially similar frequencies of time spent in play, and locomotor play in particular. Some studies have even documented human children spending almost twice as much time at play as their chimpanzee, orangutan, and gorilla counterparts (Pellegrini & Smith 2005; Pellis 2007). Table 1 documents examples of play in all of these species.

Table 1. *Partial List of the Types of Locomotor Play Observed in Mammals. Expanded from a table created by Burghardt (2005).*

Types of locomotor play	Animals recorded displaying this behavior during play
Quadrupedal walk	Juvenile humans (Scott & Panksepp 2003); orangutans (Lewis 2005; Maple 1980; Povinelli 1995); chimpanzees (Fagen 1981); rhesus macaques (Symons 1978)
Bipedal walk	Orangutans (Maple 1980); rhesus macaques (Symons 1978); horses (McDonnell 2002)
Brachiate/swing	Juvenile humans (Berinstein & Magalhaes 2009); orangutans; rhesus macaques, baboons, chimpanzees, Himalayan langur (Fagen 1981; Maple 1980; Povinelli 1995); adult bonobos (Palagi 2007) gorillas (Schaller 1963).
Rough & tumble (chase/play fight)	Juvenile humans (Berinstein & Magalhaes 2009; McGrew 1972; Pellegrini & Smith 1998a; Scott & Panksepp 2003; Smith & Connolly 1980); mice (van Praag et al. 2005); tasmanian devils (Burghardt 2005); river otter (Liers 1951); N. American wolf (Brandenburg 1993); horses (McDonnell 2002); adult bonobos (Lewis 2005; Palagi 2007); polar bear; tree shrews; harbor seal; marmosets, tamarinds; rhesus macaques; Lowe's Guenon; orangutans; Patas monkeys, Himalayan langur (Fagen 1981); chimpanzees (Fagen 1981; Lewis 2005) gorillas (Schaller 1963)
Jump/hop/leap	Juvenile humans (McGrew 1972; Scott & Panksepp 2003); orangutans (Lewis 2005; Maple 1980; Povinelli 1995); horses (McDonnell 2002; Stamps 1995); Rhesus macaques (Fagen 1981; O'Neill 1988, 1989; Simpson 1976; Symons 1978); rodents (Wilson & Kleiman 1974); elephant shrews; mouse lemurs; ring-tailed lemurs; patas monkey (Fagen 1981); N. American wolf (Brandenburg 1993); Gorillas (Maestripieri & Ross 2004; Schaller 1963); adult bonobos (Lewis 2005; Palagi 2007)
Run/galumph/ gallop/gambol	Juvenile humans (Fry 2005:56; McGrew 1972; Pellegrini & Smith 1998a; Smith & Connolly 1980; Berinstein & Magalhaes 2009); mice (van Praag et al. 2005); rodents (Wilson & Kleiman 1974); horses (McDonnell 2002; Stamps 1995); rhesus macaques (Fagen 1981; Symons 1978); N. American wolf (Brandenburg 1993); Gorillas (Lewis 2005; Maestripieri & Ross 2004; Schaller 1963); adult bonobos (Lewis 2005; Palagi 2007); tree shrews; rhesus macaques; patas monkeys (Fagen 1981); orangutans (Maple 1980)
Push/pull	Juvenile humans (McGrew 1972; Scott & Panksepp 2003); orangutans (Lewis 2005; Maple 1980); river otter (Liers 1951); N. American wolf (Brandenburg 1993); horses (McDonnell 2002); adult bonobos (Lewis 2005; Palagi 2007); juvenile bonobos (Pika & Zuberbuehler 2008); chimpanzees (Lewis 2005; Fagen 1981)
Climb	Juvenile humans (McGrew 1972; Pellegrini & Smith 1998a; Smith & Connolly 1980); orangutans (Maple 1980; Povinelli 1995); horses (Stamps 1995); rhesus macaques (Fagen 1981; Symons 1978); Gorillas (Maestripieri & Ross 2004; Schaller 1963); chimpanzees; patas monkeys (Fagen 1981).
Spin/twirl/ gymnastics	Juvenile humans (Berinstein & Magalhaes 2009; Scott & Panksepp 2003); captive female orangutans (Maple 1980); North American wolf (Brandenburg 1993); adult bonobos (Palagi 2007); chimpanzees; rhesus macaques; Lowe's guenon (Fagen 1981)
Roll sideways or somersault	Horses (McDonnell 2002); juvenile humans (Pellegrini & Smith 1998a; Scott & Panksepp 2003); adult female chimpanzees (Maple 1980); adult bonobos (Lewis 2005; Palagi 2007); gorillas (Schaller 1963)
Slide	Captive female orangutans (Maple 1980); river otter (Liers 1951)
Swim, water play	Juvenile humans (McGrew 1972); horses (McDonnell 2002); chimpanzees; rhesus macaques (Fagen 1981)

Locomotor play is crucial to development for growing animals. However, growing evidence suggests that locomotor play is important to animals throughout their entire lifespan.

Play is Not Just for the Young

Several play researchers (Byers 1998; Hall 1883; Maestripieri 2004; Vygotsky 1967) have documented a dramatic increase at a similar point in the life cycle followed by a gradual decrease in the frequency of play in several species. This rise and fall indicated to many researchers that there was an end to social, emotional, and physical development, and therefore no longer a need for play, once an individual animal was sexually mature. There is a significant decrease in play behaviors after an animal reaches sexual maturity, but play behaviors actually continue into adulthood. Play activities are readily identified and practiced throughout the life span of species that play. Although frequency drops off, the forms or types of play remain the same (e.g. Burghardt 2005; Pellis & Iwaniuk 2000). Thus, adults maintain these sets of play skills throughout their adulthood.

Table 2 is a collection of play frequencies collected from various studies and reviews on primate play. It provides a comparison of overall play and specifically locomotor play, and differences between adults and juveniles across various primate species. Locomotor play percentages are missing for howler monkeys *(Alouatta Palliata)* and gibbons *(Hylobates lar vestitus)* because the reviewed studies did not distinguish between social play and physical play.

Adult animals' reinforcement of behaviors through play activities maintains the skill level and cognitive sharpness in their use (Goodall 1968; 1986; 1995), or in social situations. For example, lower ranking adult members of a group will initiate play to ease stressful situations (Bekoff 1972; Bekoff & Byers 1981; Stahler 2002). Goodall (1968, 1986) observed adult females with an offspring played more than other adults, which has been confirmed in other

studies (Brown, S., 2009; Fagen 1981; Palagi 2007). See Figure 6 for an example of mother-infant play.

***Table 2**: Time and energy spent on play in different primates, separated by age cohorts.*

Species	Total percentage of time spent playing	Percentage of time spent in locomotor play out of total play time
Juveniles		
Pan Troglodyte	• 10–20% (Lewis 2005)	• **2–9 years**: >2 bouts / observation (van Lawick-Goodall 1968)
Gorilla gorilla	• 20% (Lewis 2005) • males: 18 bouts/hr; • females: 12 bouts/hr (Maestripieri & Ross 2004)	• 8% (Mallavarapu 2009) • 43.4% (Schaller 1963) • 1–2 bouts/ hr (Maestripieri & Ross 2004)
Homo sapiens	• 6% (Pellegrini et al. 1998) • 8–31% (Bock 2009) • 20% (McGrew 1972) • 20% (Smith & Connolly 1980) • 24% (Gosso et al. 2005)	**2–4 years:** • 7% (Rosenthal 1994); • 10% (Field 1994) • 10% (Gosso et al. 2005), • 11% (Bloch & Pellegrini 1989); • 20% (Pellegrini & Smith 1998b) **4–6 years:** • 25-31% (Bloch et al. 2006). • 13% (Bloch & Pellegrini1989) • 13% (Pellegrini & Smith 1998a) • 20–21% (Smith 2010). **Overall:** • 34% (Berinstein & Magalhaes 2009) • 26% (Gosso et al. 2005) • 21–25% (Gosso et al. 2005)
Mandrillus leucophaeus	• 15% (Saczawa 2005)	• 17% (Saczawa 2005)
Adults		
Pan Troglodyte	• 16%; • 18%; • 24%; • 24% (Smith 2005)	• males: <.1 bouts / observation; • females: < .05; • females with an offspring: .25 play sessions (van Lawick-Goodall 1968)
Pongo pygmaeus	• Frequently (Maple & Zucker 1978); • 5% (Saczawa 2005)	• "frequently" (Maple 1980) • 100% (Saczawa 2005)
Pan paniscus	No studies reviewed that measured overall play.	• Play run = 0.5% (Palagi & Paoli 2008) • 9 bouts/ observation (Palagi & Paoli 2008)
Hylobates lar vestitus	• 21% (Reichard & Sommer 1997)	Authors do not distinguish between types of play.
Alouatta palliata	• 1-2% (Baldwin & Baldwin 1978)	Authors do not distinguish between types of play.

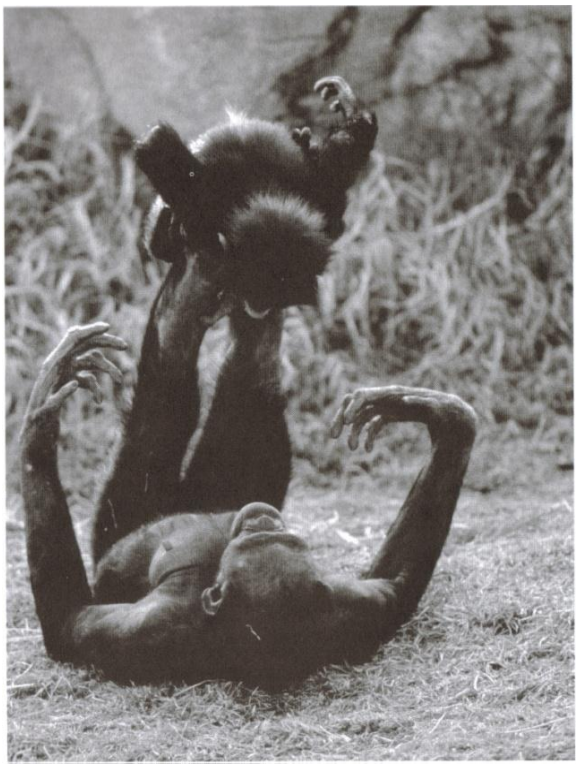

Figure 6*. Mother bonobo ("pygmy chimpanzee," Pan paniscus) bouncing her infant using her feet. Photo and caption published in The Genesis of Animal Play: Testing the Limits, by Gordon M. Burghardt, (2005). Used with permission of The MIT Press.*

One reason play time decreases in adults is because they are too busy procuring food, shelter, and mates, whereas children are not able to do these behaviors without adult help. In light of this, it may not be that play is more important to juveniles, but the most effective way of spending their time (Pellegrini & Smith 1998a). Other than frequency, adult play differs from juvenile play in specific ways. As juveniles mature into adults they begin to take larger risks (Simpson 1976; Sutton-Smith 1997). Adults also focus more on competition and there being a winner or loser, whereas child play is more focused on continuing the game (Fry 2005; Brown, S., 2009).

Along with an overall decrease in play there are also cultural expectations that inhibit human adults from playing altogether. What is considered acceptable amounts and types of play for children is dependent on culture, but there is cross-culturally more tolerance of child play

than adult play (Scott & Willits 1998). Adults in the United States must be productive and stay busy, a reflection of the "Protestant work ethic" (Cokley et al. 2007); at the same time play is often referred to as "child's work." At the turn of the 21st century, play and movement are largely missing from daily life in developed nations. The present pressures to work harder and keep up with international competition, either in the workplace or in school (e.g. McGinn 2009), is creating play and recreation deprivation in adults (OECD 2002; Scott & Willits 1998) and children (Brown, S., 2009). Obesity and other lifestyle diseases are quickly becoming the number one cause of death in the United States (CDC 2008).

Summary

There are universal locomotor movements that are exhibited by all animals during play. They include balance, throwing, jumping, swimming, climbing, and play fighting. Published classification systems for describing these movement behaviors during play have facilitated comparisons across species; human children use the same movements as juvenile primates and are similar in frequency. Comparisons of adult vs. child play have found that the physical characteristics of play remain the same into adulthood, and have benefits for all animals during their entire lifespan. Play is being eradicated from the lifestyles of both children and adults living in developed nations, with obesity and lifestyle diseases becoming the number one cause of death in the United States.

HYPOTHESES

Parkour has been introduced as a physical discipline, and current theories and concepts of play and play research have been reviewed. The question presented in this thesis is whether or not Parkour fits into the concept of innate free-form locomotor play as described by Bock, Burghardt, Fagen, Pellegrini, and other play researchers. Or is Parkour in fact a new, unique sport that had not existed previous to David Belle, Sebastian Foucan, and the Yamakasi?

I present two hypotheses to test this argument:

Hypothesis 1: Parkour fits the definition of play as defined by Bekoff and Byers (1981), Martin and Caro (1985), and the field of play research.

Hypothesis 2: Traceurs exhibit the same innate free-form locomotor behaviors as all animals engaged in locomotor play.

The next portion of this thesis will present evidence and results supporting or disproving these hypotheses. There has been no comparative analysis of Parkour behavior in the academic or general audience literature, and no academic analysis of Parkour movements using comparative methods. Two methods are used to test these hypotheses.

Ethnographic data was collected from personal and secondary interviews, news articles, and journal papers and the data was analyzed for evidence supporting or negating the hypotheses. Second, videos of traceurs performing Parkour were reviewed, and the movement patterns contained within these videos documented to see if the movements can be classified as locomotor play behaviors. All sample designs were approved and cleared through the Western Washington University's Office of Human Subjects Research IRB Protocol Review Standards.

Frequencies of the behaviors were measured to demonstrate whether or not these locomotor behaviors are rare occurrences during typical Parkour practice, and how good a fit they are with traditional free-form locomotor play.

ETHNOGRAPHIC ANALYSIS: METHOD

Ethnography and ethnographic data are commonly used in Anthropology, play research, and many behavioral sciences (Angel 2006; Beach 2003; Bjorklund 2006; Bock 2009; Jonsson 2005; Scott & Panksepp 2003; Sutton-Smith 1997), and is considered a robust method for quantifying and classifying different behaviors.

Sample Design

Primary research was performed by conducting participant observation and interviewing traceurs from the United States and Canada. Some interviews were done specifically for this thesis, but other primary research was reused from other projects. This primary research was supplemented with secondary research from newspaper and magazine articles published in English from Canada, the United Kingdom, and the United States. Secondary data was also gathered from recorded video interviews of some of the original traceurs – David Belle, Stephane Vigroux, and Sebastien Foucan – that were conducted in French and later translated into English.

Because of this method of accumulation, the questions used to interview traceurs were not from a pre-determined set of questions, but rather constructed from an accumulation of research from participant observation, interviews, and secondary research.

Analysis of data

Accumulated ethnographic data was compared to the description and definitions of play as defined by play researchers to determine if and how Parkour could be described as play. Content from interviews and secondary research was analyzed to see if the descriptions of

Parkour met the definition of play laid out by Bekoff and Byers (1981), if it met the criteria laid out by Martin and Caro (1985), and generally met the accepted criteria for play. How observers and traceurs described Parkour behavior was also considered. Observers' and traceurs' descriptions of Parkour movement were analyzed to see how it fit with the accepted definitions of innate free-form locomotor play observed in primates.

There was not a pre-determined set of questions before beginning the research. After accumulating the ethnographic data, the data collected was used to attempt to answer the following questions:

1. How do traceurs define Parkour?
2. What motivates traceurs to perform Parkour?
3. Where did traceurs learn Parkour from?
4. How do traceurs practice or train Parkour?
5. What movements were observed during Parkour?

These questions guided the research accumulation process and some primary research. The majority of the research, both primary and secondary, was conducted without any specific hypotheses in mind. The amount and variety of data sources used, as well as a lack of pre-determined questions, limits any confirmation bias that may or may not have been present.

Suggestions for changes to experimental set-up

The original experiment planned was to conduct more primary research for this thesis, with questions structured specifically for this project. Using a set of uniform pre-determined questions would be useful to repeat this ethnographic research with other traceur communities or with future communities. However, the secondary research proved to be extremely useful and

provided insightful data, and I am deeply grateful for the research performed by other behavioral researchers and journalists.

Summary

Primary and secondary ethnographic research was collected from interviews, previously published research, and general audience publications such as newspaper and magazine articles. This ethnographic data was analyzed to determine if Parkour could be classified as play as defined by play research. Specific criteria regarding how Parkour was defined, how it was trained, and overall perceptions of Parkour according to traceurs was used. Attempts were made to use the data to satisfy or nullify the hypotheses laid out in this thesis.

ETHNOGRAPHIC ANALYSIS: RESULTS

There is substantial ethnographic evidence to support the hypothesis that Parkour can clearly be defined as play and is an adult form of unstructured play. Parkour fits into the definitions of play as defined by play researchers. Traceurs also identify Parkour as play. There are similarities in Parkour practice to juvenile animals practicing movements they will need to perfect to survive in adulthood. Traceurs perceive their environment in new ways, and emphasize internal motivation and skill growth over competitive gain.

Self-Defined as Play

The common definition of Parkour fits well with play researchers' definitions of play. Traceurs themselves describe Parkour as a playful act, and the terms used to describe Parkour are very similar or the same as terms used in play research. Traceurs often use "play" to describe Parkour, commonly using phrases such as "freedom of movement," a "playful discipline," or "play taken one step further."

Traceurs first define Parkour as overcoming obstacles, "a technique which consists of going from A to B using the simplest and most efficient means" (film, dir. Morel 2004), or "using your environment in new ways to overcome that which is in your way," (film, dir. Christie 2003). When asked to elaborate, or even without prompting, traceurs describe Parkour as fun or playful. David Belle describes Parkour as "something playful, like a game. Things they did in the army, but a little more free." (documentary; dir. Biedermann 2006). Sebastien Foucan "likens Parkour to children's games and laments the fact that, as we get older, we forget how to play," (Laws 2005:web).

> “There's an element of play in it, too, but the philosophy is of grown-up play evolved to a discipline.” –Tyson (Huetter 2007).
>
> "It's something that you don't need to compete in. It's all about having fun. There's nothing you have to prove; that's the coolest part." –Unkown (Takahashi 2005).
>
> “It’s about playing, having fun, being comfortable in my body and my environment.” –Dane (Sieh 2007).
>
> “It’s play.” –Brandee (Kelley 2008b)

The actions involved in Parkour have no obvious immediate benefits for the traceur. Practicing Parkour involves exaggeration and repetition of motor acts and the reordering of behavioral sequences. Although traceurs strive for efficiency in their movement with the goal of one continuous path, the sequences of motor acts in typical Parkour training are often incomplete or fragmented, with the traceur often practicing the same skill repeatedly to perfect it and combine it with other skills. The goals change and are malleable, and behavior is unsupervised. The routes traceurs form are not pre-determined by rules or judges; each traceur decides where he or she wants to go and figures out how best to get there. The sequence of behaviors can change each time. They may jump over a bench one time, then vault the bench the next time, experimenting with different behaviors each time they pass an object. There are no pre-determined moves that traceurs must always perform, nor do they perform moves in any particular sequence (Edwardes 2009). Traceurs will practice the same movement or technique repeatedly until they feel they have perfected it, but they are not restricted to certain behaviors. All of this meets the definitions and criteria set out by Pellegrini (2007), Martin and Caro (1985), and Bekoff and Byer (1981). Traceurs define and describe basic Parkour movements as running, jumping, climbing, vaulting, balance, and quadrupedal movement. These definitions and

descriptions used by traceurs to describe Parkour are extremely similar to the terms used in play research to describe locomotor play (e.g. Burghardt 2005; Fagen 1981; Pellegrini 2005).

Playful Training

Traceurs (Belle 2007; Edwardes 2009), often expand on the basic definition of Parkour by saying they train Parkour to be useful in emergency situations, of the idea of *"Etre fort pour être utile"* or "to train to be useful," stemming from the influence of méthode naturelle (Chansanchai 2005; Foucan 2008a, 2008b). The origins of Parkour stem from training for an emergency situation, but Parkour itself is not vital for survival nor does it have any direct purpose towards survival. This idea of training for emergency situations mirrors almost exactly the practice of training as juveniles to be effective adults seen in other animals, such as juvenile macaques practicing a route (O'Neill-Wagner 2009; Simpson 1976). When asked to describe their movements, several traceurs mentioned in interviews how they would like to brachiate like gibbons, be able to climb trees as quickly as monkeys, or even how their quadrupedal movements are similar to those of gorillas (Angel 2006; Kelley 2008a). Fagen has used very similar phrasing when describing the importance of locomotor play: "How does one travel from point A to point B? Choosing routes, navigating obstacles…are not trivial skills." (cited in Bekoff & Byers 1998:56).

Traceurs also describe Parkour by comparing their own movements to play behaviors. Repeatedly, traceurs have written or spoken about how they have been practicing this behavior their whole lives; they have been training Parkour on their own without giving it a name (Kelley 2008b; Law 2005; Sieh 2007). Traceurs are often asked how they discovered or became interested in Parkour. Many described it as:

> "It's like being a kid again. You don't have to worry about how you look doing it, you just do it. It's everything that I used to do as a kid (and many things that I never would

have been able to do as a kid). You can just let loose and let your imagination take over." –Tank (Huetter 2007).

"All you have to do is look at kids on a playground to see that Parkour is a totally natural thing. Some of the most talented traceurs I know are simply the people who never stopped playing from childhood." –Tyson (Huetter 2007).

Traceurs have expressed how the more advanced they become in their training, the more they feel like they are playing as children, are moving more as nonhuman primates, or both. They also describe how Parkour allows them to move as they did when they were children, or state they have "played" this way their whole lives.

Internal Motivation

Students of Parkour are internally motivated by this enjoyment to progress in their training. Traceurs describe a deeper appreciation and understanding of Parkour the longer they train in the discipline, at a point reaching a stage where they no longer need to mimic others' movements and can create routes and solutions on their own, something referred to as a "Parkour lens" or "Parkour vision" (Biedermann 2006; Edwardes 2009; Kelley 2008b). Traceurs also describe seeing environments and objects in new, creative ways, describing park benches, stairs, railings, and brick walls as jungle gyms or play spaces (Angel 2006, 2008; Kelley 2008b). In Figure 7, a traceur uses parking barriers to practice balance and precision.

"At this stage, goals are easily defined and confidence tends to grow quickly with people remembering their childhood escapades and doing things they never thought they would do again." –Tyson (Kelley 2008a).

"I feel a lot of people…look at a parking lot, they don't see anything, but you can do everything. It's a place where I'm at now, and I wasn't before, it's a place I had to work up to." –Brandee (Kelley 2008b)

"I see a world full of potential for movement,…I'm just looking to see how you can interact with the environment, most fluidly move through it, is it possible, is it safe, always interacting with it, imagining this jump, or this climb." –Rafe (Kelley 2008b)

> "It's all about confidence, conquering fears, and achieving flow." – Alex "Wolfbeta" (Law 2005).
>
> "Through applying the basic tools and creating your own, the usefulness [of Parkour] shines through and the world changes. All of a sudden you are set free; it's as if the world was once built entirely for straight lines until the day you discovered how to move on a curve. There are an infinite number of paths you can take in your daily life, some shorter than others, and the tools to take them develop logically from the ones you have already learned." –Tyson (Kelley 2008b)

Figure 7*. A traceur practices balance and precision using parking barriers.*

This is similar to the way that children are internally motivated to continue to learn when engaged in play and unstructured learning (Cherfas 1980; Christie 1998; Coe 2006; Pellegrini 2005; Ryan 2006; Singer & Singer 1990; Singer, Singer, and Schweder 2004). Creativity and innovation are important parts of Parkour, and being able to improvise their own behaviors, rather than simply copy what others have done, shows that the traceur is improving and growing, similar to children's unstructured learning. This is also comparable to the "projects" developed by juvenile rhesus macaques, siamangs, and gibbons as they practice and perfect their locomotor motions through play.

Traceurs describe something similar to Vygotsky's concept of "scaffolding" for learning new skills (Vygotsky 1967). Play has been found to be a great tool for learning (Kuo & Taylor

2004; O'Neill-Wagner 2009; Singer & Singer 1993), and children learn about their world and their environments primarily through engagement and physical play (e.g. Neighmond 2011; Pufall & Pufall 2008).

Feeding into the idea of internal motivation, traceurs often describe Parkour as a non-competitive discipline, that there is no one to compare to except one's own progress. "There's no competition at all, nobody makes fun of you because you can't do something," says Ferret. Danno adds, "Everyone wants to see everyone else achieve and get better." (Laws 2005:web) There are annual Parkour exhibitions and competitions in Europe, Canada, and the U.S. Some are informal, others are highly produced events like *Ninja Warrior* and *American Ninja Warrior* (2007-2011) and *MTV Ultimate Parkour Challenge* (2010). However, the overall attitude in the Parkour community is apathetic toward—and sometimes strongly against—competition. This is similar to how children engaged in play are more interested in keeping the game going, rather than with the end product of an activity (Brown, S., 2009; Fry 2005; Pellegrini & Smith 1998a). This attitude also shares parallels with "fun runs" performed across the United States, or the Bellingham, WA, "Ski-to-Sea" annual race, in which teams of adults will relay race long distances, and while all teams are interested in performing well, most teams participate for the sheer enjoyment of the event.

Summary

The qualitative data on Parkour and traceurs strongly supports the argument that Parkour is a form of play. Traceurs use the same words, terms, and descriptors when describing Parkour as play researchers do to describe play. Traceurs describe feeling playful and creative when they do Parkour. Traceurs improve their skills through internal motivation in the same way that children do during unstructured learning. What drives traceurs to practice Parkour is the same

drive that children feel to jump, climb, hop, skip, and vault over couches and fences. Parkour is primarily non-competitive, with no pre-set rules or terms that must be met, other than getting from point A to point B as fast as possible. All of these criteria fit into the definitions of play as described by play researchers (Bekoff & Byers 1985; Martin & Caro 1981; Pellegrini 1995, 1998).

The qualitative data supports the argument that Parkour is play and confirms the first hypothesis. It also supports the second hypothesis, but does not offer any analysis of the actual locomotor behaviors in Parkour. There is still the question of whether or not Parkour uses the same movements seen in juvenile locomotor play. How does Parkour fit into the pre-established ethograms of locomotor play? The next chapter will discuss the quantitative analysis of video data and how Parkour's movements fit into traditional definitions of locomotor play.

BEHAVIORAL ANALYSIS USING VIDEO DATA: METHODS

The previous chapter provided evidence to support the first hypothesis. However the second hypothesis, that the movements that make up Parkour are predominantly the same movements seen in unstructured play, has not been fully supported by the evidence. The goal is to validate this hypothesis using a content analysis of traceur movement behaviors and coding the movements to determine how best to categorize the movements that make up Parkour.

Sample Design

In order to test the second hypothesis of this thesis, videos of traceur movement were analyzed and behaviors coded based on ethograms previously established by biologists and child development researchers, and the data was compared to previous play studies to see if it correlates with the established research.

Developmental psychologists, biologists, and primatologists have seemingly independently developed similar methods of analyzing play (e.g. Bjorklund 2006; Bjorklund & Brown 1998; Christie 2008; Christie & Johnsen 1983; Pellegrini 1995, 1998; Pellegrini & Smith 1998a; Sutton-Smith 2003). They have both adopted ethological taxonomies to categorize and analyze behaviors seen in their study groups to compare frequency and types of behaviors.

> "Investigators like Groos [1898], Bertrand [1969], Aldis [1975], and Gandelman [1992] described elaborate ethologically-based taxonomies that included many of the same categories now commonly included in descriptions of children's play behaviors… wrestling, pouncing, jumping, boxing, pushing away, chasing, and tagging." (Scott & Panksepp 2003:78)

> "Investigators of children's play behaviors have developed coding schemes that closely resemble those used in animal studies, including activities such as laughing, running, jumping, wrestling, and chasing [Blurton Jones, 1972; Humphreys & Smith, 1984], and they considered these ethological categories to be distinct from rule games, such as skipping, marbles, football, hopscotch, and jump rope." (Humphreys & Smith 1987:204)

This analysis method is common in other fields as well, from visual anthropology (Rose 2007) to neurobiology (Cleland & Teres 2003). Methods laid out by biologists and behaviorists were adopted to measure locomotor behavior in Parkour to see how it fits into play behavior.

To test the hypothesis that Parkour is composed of the same locomotor play behaviors seen in all animals, videos created by traceurs were collected, and the movements in the videos analyzed using content analysis. The behaviors and documented frequency of each behavior were coded. The traceurs' behaviors were analyzed regarding how they fit in to pre-established play behavior ethograms. Parkour movement patterns were coded and categorized into these ethograms in order to determine how Parkour fit into locomotor play behavior.

A series of general movements have been established within the field of play research that are universally seen in human and nonhuman primates and can be considered innate. These specific categories have been used consistently, with basic definitions agreed upon. Of all the locomotor behaviors described in prior play research, the following movement categories were used because they were the most commonly used and described in play studies (e.g. Bateson 2005; Beach 2003; Bekoff 1975, 1981; Bjorklund & Brown 1998; Blanchette et al. 2005; Bock & Johnson 2004; Burghardt 2005; Christie & Johnsen 1983; Coe et al. 2006; Fagen 1981, 1993; Fry 2005; Goodall 1986; Gorilla Ethograms 1991; Gosso et al. 2005; Hughes 1978; Lewis 2005; Liers 1951; Maestripieri & Ross 2004; Maple 1978, 1980; McDonnell 2002; Miller & Byers 1981; O'Neill 1988; Palagi 2007; Pellegrini 2006; Pellegrini, Horvat, & Huberty 1998; Pellegrini & Smith 2005; Pellis & Iwaniuk 2000; Pika & Zuberbuhler 2008; Schaller 1963; Scott & Panksepp 2003; Shore 1997; Sheets-Johnstone 1999; Singer & Singer 1990; Smith 2004, 2005;

Sutton-Smith 1979, 1980, 1997; Symons 1978; van Lawick-Goodall 1968; Wilson 1975). See also Table 1.

Walk	Jump	Play fighting	Slide
Swing/ Brachiate	Run	Gymnastics/ Spin*	Climb
Swim	Push	Somersault/Roll	Balance

**Gymnastics and spin are listed separately in definitions in the Appendix. Full definitions of each term are available in the Appendix.*

Parkour also has a set of movements that have been named and defined. These include jumping, vaulting, climbing, but also more detailed descriptions like tic-tac, cat leap, and so on. A detailed description of each term is also available in the Appendix. The Parkour terms for different movements are very similar to the academic definitions of locomotor movement, but with some differences.

Roll	Vault	Cat Leap	Wall Pass
Underbar	Balance	Quadrupedal	Tic-tac
Run	Brachiate	Precision jump	Climb

For example, locomotor play is broadly defined as play in which an animal is moving its body or using its body to engage in play with another individual. This can sometimes include rough and tumble play, but with the traceurs this mainly meant solitary locomotor movement play. In order to create the ethogram, a set of definitions were created based on play research definitions. Parkour movements were added when behaviors and definitions were not initially easily comparable or identifiable to a play research behavior. The definitions for the ethogram categories are as follows:

> **Running**: fast bipedal movement. Does not include a fast two or three steps into and out of other techniques.
>
> **Vaulting**: moving over an object done with hands on the object in one, fluid continuous movement.

Climbing: using both hands and feet for more than one move to get over an object. This movement can be done either moving up or down.

Jump: using one's feet to leave the ground and propel oneself to another place. Does not include flips or other aerial acrobatics.

Brachiating: movement using only one's arms in a swinging motion forward, releasing with one hand and grabbing with the other. Underbars were included in this category, even though underbars use both hands.

Cat/Catch: catching a wall using the upper body.

Balance: any activity, usually but not exclusively bipedal, that required maintaining equilibrium of the body.

Rolling: turning the body over in a forward motion on the ground.

Quadrupedal: any movement involving both hands and feet to achieve movement on the ground or on a flat surface.

Tic-tac: using the feet to push off a surface. Even though this is not a "traditional" movement code, it was included as separate from jumping since it typically is a sideways motion rather than up and down.

Spinning: turning the body 360 degrees either left or right. More than 360 degrees was considered nonfunctional and therefore in the "Other" category.

Chasing: a person either running after another individual, or being run after.

Sliding: using only one's momentum to push one's body across a surface, usually using the chest or back.

Swimming: any water play.

Play fighting: at least two individuals engaging in combat on friendly terms.

Other: a movement which did not fit into any of the above categories. Includes Scott & Panksepp (2003) category of "gymnastics."

The template of the ethogram created for this thesis below:

Movement	Vid1	Vid2	Vid3	Vid4	Vid5	Vid6	Vid7	Vid8	Vid9	Vid10	Vid11	Vid12
Running												
Vaulting												
Climbing												
Jump												
Brachiating												
Cat/Catch												
Balance												
Rolling												
Quadrupedal												
Tic-tac												
Spinning												
Chasing												
Sliding												
Swimming												
Play Fighting												
Other												

Even though flips are observed in Parkour or free running, it was decided not to include them as a separate behavior code, and instead include them in the Other category. Flipping is included on some play ethograms, but not on others, or it is lumped into an "other" category (e.g. Scott & Panksepp 2003).

Video Data

It was a deliberate choice to use video as the primary medium for data collection and analysis due to the ease at collecting data on Parkour behaviors through video, the ease of documentation, and the ability to review data. Videos were also chosen because of their significance in the world of Parkour (Huetter 2007; Law 2005).

One reason to use videos is because play is often dependent on context, which still photography cannot easily capture, and written logs provide only one person's analysis of the behavior and captures only one part of the action. Video provides documentation of the behavior in its full context that can be re-viewed several times and reviewed by several different people,

and can be analyzed for many different behavior patterns. It is a system commonly used by primatologists, e.g. Haimoff (1981) to study Siamangs, and Nishida and Wallaue (2003) and Goodall (1986) to study chimpanzees. Child development researchers also use video to catalogue and capture data to revisit later. More disciplines are beginning to adopt visual analysis (Cleland & Teres 2003; Rose 2007; Rowe & Myers 2003). Video analysis also provides a wealth of knowledge compacted into a small amount of time or imagery.

Another reason to choose to conduct a behavioral analysis of Parkour videos is the significant role they play in the international Parkour community. Videos are crucial to communicating and learning about Parkour across geographical and linguistic barriers. Traceurs learn techniques, skills, and styles from videos produced by traceurs all over the world.

As such, videos contain the underlying message and locomotor movements of Parkour and are one of the best sources of information about the sport. Although the main goal of the videos for traceurs is to showcase their skill, flow, artistry, and technical abilities, videos also serve as a form of dialogue between the traceurs. Traceurs receive critique and feedback through their videos; and sometimes respond to videos with videos of their own. Videos are also used to demonstrate the geography of a location as well as the traceur's use of it (Kelley 2008b).

Because of this, videos arguably maintain a good overall example of what the “essence” of true Parkour is, or strives to be (interviews with author, 2007-2010). By watching the movements demonstrated in the videos, and not just the videos that showcase traceurs performing the biggest and most dangerous stunts, but by sampling a large enough data sample, a quantitative analysis should provide a reliable sample of what movement patterns make up Parkour, and how they fit into the standard play movement definitions and ethograms.

Data Sample

The data sample was formed from videos referenced in previous interviews and ethnographic data collected on traceurs (Huetter 2007; Kelley 2008a, 2008b). Traceurs were also asked which videos they considered accurate portrayals of Parkour, or what videos inspired them. Each traceur provided between one and 20 videos or names of traceurs. The videos that were sampled are from individuals who voluntarily put demonstrations of themselves doing Parkour on the World Wide Web. The videos used were posted on public sites like YouTube or open Parkour forums. The way the video data was obtained all but excluded a truly random sample. The data sample required the traceurs' input, which influenced the choice of videos. A snowball data collection method was used to collect data, and purposive sampling or quota sample to choose which videos would be analyzed.

All of the videos in the data sample were created by traceurs before the experiment began. Therefore the footage and editing of the videos, and the data sampling, are not influenced by the author or the research goals. Certain criteria were considered when determining which videos to include:

- Analyze no more than six traceurs per video, primarily for ease.
- Analyze no more than two videos featuring the same traceur, and ideally filmed years apart to capture any changes in their training over time. One reason for analyzing a traceur more than once is that it can provide insight into how individuals might showcase different behaviors depending on environmental changes, who they are training with, experience at time of video documentation, and other influences, making longitudinal records of movement behaviors useful for the study. The only exception made for this criterion was to analyze several videos of David Belle, the founder of Parkour. His videos have also been filmed over the course of a decade, in theory capturing and documenting any change in his style of Parkour.

- Balance the number of videos from traceurs from different parts of the world to account for any regional differences in training and movement style. By purposely selecting videos that portrayed different traceurs in different parts of the world – specifically U.S., U.K., France, Australia/New Zealand, Brazil, Germany, Russia, and Latvia – it was possible to collect data that best represented a wide spectrum of regional Parkour styles or techniques.

- Analyze only videos produced by individual traceurs or a Parkour organization, not from film, commercials, or news. Parkour performed and filmed for commercial purposes do not necessarily demonstrate Parkour accurately, and Parkour has often been used commercially or portrayed as an "extreme" performance, thereby minimizing any actual sport or training that is involved. It was decided not to use videos produced by news networks for similar concerns: that the editor of the news story might be editing for dramatic effect, not necessarily accuracy. It was also desirable to document adults doing Parkour of their own volition, not because they were being paid to perform. The only exception made for this criterion was pre-2003 footage of the French traceurs, produced before the influential documentary *Jump London* (2003). Before this documentary, news clips showing the French traceurs were the only videos of Parkour, and Parkour had not yet spread significantly beyond France and the U.K.

- Include videos that encompassed all outdoor settings, environments, and different weather into the data set. The inclusion of this data brings different environmental influencers which potentially effect movement and behaviors (e.g. Beach 2003; Pellegrini & Smith 2005).

This quota sampling method negates potential biases created by the traceurs or myself; therefore, this footage is an appropriate source of data.

Set-up and analysis

Over 5 hours of footage were analyzed. The 68 videos had a mean length of just under 5 minutes each, and it took anywhere from 10 – 40 minutes to code each video for movement depending on the length of the video and amount of Parkour present in the video. Every movement observed in each video was coded. Many of these movements lasted no more than a second. This meant that each video provided an enormous amount of data to analyze; this amount of data is an adequate amount to create a trend of movement patterns and behavior.

Videos were watched without sound so that music, dialogue, or other noises would not distract or influence analysis.

Each individual solitary locomotor behavior observed in the videos was coded. Each movement category was exclusive. The number of times each behavior code was present per individual per video was documented.

If the same individual appeared in more than one video, they were documented as if they were a new person, although other traceurs shown in the video were focused on if available.

Data regarding the environment was also collected. While this data was not analyzed for the purpose of this thesis, it was possible to observe some general trends. A few videos involved indoor gymnastics gyms and indoor hallways, but most footage of Parkour in the data sample was filmed in outdoor environments.

Coding

Each individual behavior observed was coded into one exclusive category based on structural analysis methodologies in play research (Byers & Walker 1995; Fagen 1981; Sutton-Smith 2005). Each angle, shot, and frame was counted as a separate movement. Any time the camera cut away from an action a traceur was doing – due to change of angle, going around a

corner, etc. – it was counted as one isolated movement. A return to that same movement would count as a separate movement, making for a total of two counts. In effect these transitions in camera angle were counted the same as if the traceur had stopped and then started running again. However, if the film-maker showed a single action from different angles or at different speeds, the action was ignored in the second instance. If the same footage had been seen in a different video, it was not counted during that second instance. An example of this would be if a traceur made a video homage to David Belle and included footage from videos previously viewed. If it was unclear whether or not the movement shown in a particular shot was the same footage or same movement shown earlier in the video, or the same movement but taken from a different angle, it was counted as a separate event. Attempts of movement were also counted the same as fully successful movements. For example, if a traceur attempted to catch a wall but failed, or slipped after catching the wall, that action was counted the same as if he or she completed the movement successfully.

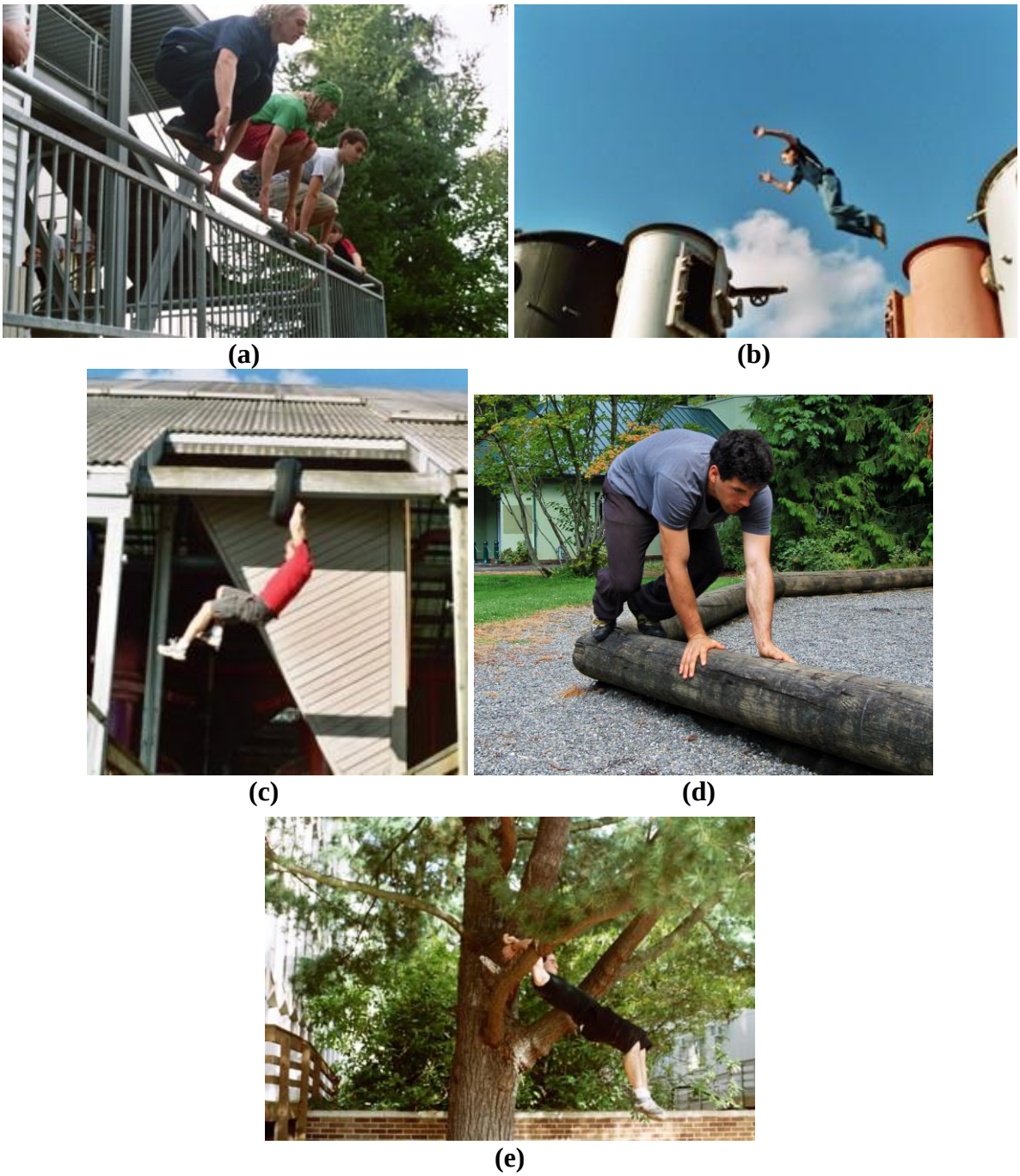

Figure 8*. An example of different Parkour behaviors documented and categorized for analysis; Vault (a); Jump (b); Brachiating (c); and Quadrupedal movement (d). Some movements were less easy to define, such as Underbar (e), which was categorized as a brachiating movement.*

Assumptions and Recommendations

With any research there are dangers of making large assumptions or ignoring important issues. One issue is sampling and collecting data. In short, humans are messy. There is no way to have "perfect" data samples when dealing with human or nonhuman primates, or most experiments done outside a lab setting. However, this "imperfect" data has not stopped anthropologists, ethologists, biologists, and other behavioral scientists from conducting vigorous, thorough experiments. They have compared human play behavior to chimpanzees (Smith 2010); wolves to coyotes to dogs (Bekoff 1975; 1981); and gorillas to orangutans (Maple & Zucker 1978). With this strong precedence of cross-species comparison, this experimental set-up is effective and the population is acceptable for analysis.

Despite best efforts, there were parts of the analysis and coding that were missed or not accurately documented. One issue found with this cataloging system is that it did not directly correspond with the amount of time a traceur spent on each activity. Counting continuous activities such as running and climbing is different than start-and-stop movements like jumping and vaulting. If a traceur ran for 30 seconds and then jumped repeatedly for 10 seconds, in the records the jumps would appear more numerous than the running. No ideal way to resolve this was found. It was decided to count each angle, shot, and frame as a separate movement, as described in the experimental set-up. This likely off-set the above problem to some degree, but this cannot be confirmed, and it did not resolve the problem entirely.

Summary

The experiment goal was to systematically measure movement patterns observed in Parkour and compare them to other play research. The data sample and the methods used to quantitatively measure them were introduced. The data set consisted of publicly available videos

created by traceurs that document traceurs performing Parkour. These traceurs were not paid for any of the performances seen in the videos, nor were videos shot by news agencies or commercial media companies used. The only exceptions to this clause were videos produced before 2003 featuring David Belle and the Yamakazi, since no public footage is available from other sources. All the videos were created from before 2001 to May 2009, before this analysis began.

A snowball method to collect videos was used, and purposive and quota sampling was used to sift through almost 70 videos in order to choose videos that represented Parkour from several different areas of the world and created over the course of a decade. Attempts were made not to analyze more than two videos featuring the same traceur, although exceptions occurred in the case of David Belle. Each video averaged five minutes in length.

Content analysis was used to analyze the behavior contained with the videos. The ethogram was based on previous play researchers' established behavioral ethograms on locomotor play, and counted each movement observed in the videos. Each move was placed into a single, exclusive category. If the movement did not fit into one of the 15 categories of play movement on the ethogram, it was categorized as "Other."

Next, the results of the video data are analyzed. The results of frequency of behaviors seen in each ethogram category and how they compare to other locomotor play data and to previous play research are explored to determine how Parkour fits into the research.

BEHAVIORAL ANALYSIS USING VIDEO DATA: RESULTS

Based on the data, 7,325 individual movements performed by the traceurs were documented. Using the ethogram, they were organized into 16 different categories. Frequencies as a percentage of total movement behaviors are shown in Table 3.

Table 3*. Categories of movement and number of occurrences, including frequency of occurrence per total movements documented. (Frequency does not equal 100 due to rounding of percentages to nearest tenth.)*

Movement	Amount	Frequency in %
Jumping	1758	24%
Vaulting	1400	19%
Running	1146	15.6%
Climbing	606	8%
Other	578	7.9%
Cat/Catch	510	7%
Balance	344	4.6%
Rolling	258	3.5%
Brachiating	249	3.4%
Quadrupedal	132	1.8%
Tic-Tac	120	1.6%
Spinning	118	1.6%
Chasing	45	0.6%
Sliding	34	0.4%
Swimming	16	0.2%
Play fighting	11	0.2%
Total	7325	99.4%

The most common movement types documented were Jumping (24%), Vaulting (19%), and Running (15.6%). After these three types of movement, the frequency of different movement types drops to Climbing (8%), and "Other," (7.9%), and then to lower frequencies of the other different movement types.

Play movement behaviors that are considered standard in play research, but are not always considered standard in Parkour were also documented. These categories – Chasing,

Spinning, Sliding, Swimming, Play Fighting, and Balance – combined made up 7.8% of traceurs' behaviors.

The frequency of behavior categorized as Other decreased in reverse correlation to the age of the video used in the data sample, except for 2009, which was an incomplete year. See Table 4 for a breakdown of "Other" play behavior broken out by year. The category of Other was movement categorized as anything in the Parkour videos that did not fit the common behavior categories used by play researchers. This included flips, gymnastics, other acrobatics or martial arts tricking, using objects such as skateboards or bicycles to increase speed or alter movement, or other miscellaneous movements that did not fit into one of the 15 movement categories.

***Table 4**. Frequency of Other classification per video per year.*

Year	**pre-2005**	**2005**	**2006**	**2007**	**2008**	**2009***
# of videos per year	10	2	12	11	18	13
# of behaviors categorized as "Other"	120	20	108	94	126	110
frequency of "Other" per # of videos	12	10	9	8.5	7	8.5

*2009 up to and including videos released in May 2009.

After initial analysis, it became apparent that some of the different movement categories could be combined into larger groups due to similarity of the type of movement or how the movement behavior was executed by traceurs. It is common to combine categories in order to compare one set of data more easily to other studies of movement (Owens 2009). Several categories were combined based on similarities of movement and on similar groupings of movement created in other studies (Pellegrini & Smith 1998a; Scott & Panksepp 2003). For example, Climbing, Catching, and Brachiating could all be grouped under the category of Climbing, since they all require a similar kind of muscle engagement, upper body coordination, flexibility, strength, and hand-eye coordination, and are often used in similar situations. When

combined, the frequency of these three categories gained a total frequency of 18.6%. Tic-tacs were included in the Jumping category since both movements require explosive leg muscle action and similar physical capability. Adding Tic-tacs into the jumping category gives Jumping a 25.6% behavior frequency. Combining Vaulting and Quadrupedal movement, classified as the same basic movement in previous studies and by traceurs (Parkour Visions 2011), boosted the frequency of this combined category to a 21% frequency. The code "play fighting" includes chasing, running, and rolling (e.g. Pellegrini, Dupuis & Smith 2007; Pellegrini, Horvat & Huberty 1998; Smith 1982). When combined, "play fighting" types of movements create the third most common behavioral type, at almost 20%. See Table 5 for frequencies of all combined categories.

Table 5*. Movement behaviors documented among traceurs grouped in combined categories. Frequencies do not equal 100% due to rounding to the nearest tenth.*

Movement	Amount	Frequency in %
Jumping/Tic-tac	1878	25.6%
Vaulting/Quadrupedal	1532	21%
Play fighting (including running, rolling, chasing)	1460	19.9%
Climbing/Catching/Brachiating	1365	18.6%
Other	578	7.9%
Balance	344	4.6%
Spinning	118	1.6%
Sliding	34	0.4%
Swimming	16	0.2%
Total	7325	99.8%

Indoor vs. outdoor training locations did not seem to affect the types of movement performed. Weather also did not seem to have an effect on type of movement documented, although more sunny days were documented than any other type of weather.

Another benefit of grouping the traceur's play behaviors together into larger behavior categories is to more easily compare it to other play research and determine how traceurs fit into the definitions of locomotor play. Based on these combined categories, all but 8% of Parkour

behavior was identifiable as locomotor play behavior. This means that Parkour can unequivocally be defined as locomotor play.

Summary

Results of the behavioral content analysis were presented in this chapter. The traceur's movements are dominated by three basic movement types: running, jumping, and quadrupedal movement including vaulting. Traceurs spent 59% of their time involved in these three activities. Traceurs are jumping, vaulting, climbing, running and rolling a total of 85% of the time they are performing Parkour. In all, 92% of Parkour behavior was recognizable as locomotor play behavior.

In the next chapter the findings of both the ethnographic and behavioral analyses will be discussed, and whether these experiments met the hypotheses.

DISCUSSION

Based on the evidence provided in this thesis, Parkour is an example of innate free-form locomotor play because it exhibits the same behavior patterns, intent, and enjoyment that have been described and observed in animals and small children. The hypotheses laid out for this discussion were:

Hypothesis 1: Parkour fits the definition of play as defined by Bekoff & Byers (1981), Martin & Caro (1985), and others in the field of play research.

Hypothesis 2: Traceurs exhibit the same locomotor behaviors as all animals engaged in locomotor play.

The ethnographic and behavioral analyses support both of these hypotheses. The ethnographic data confirms the first hypothesis and adds support to the second. The behavioral analysis confirms the second hypothesis and adds support to the first.

Ethnographic Analysis

The ethnographic results show that Parkour is considered a fun, playful act by the traceurs. The ethnographic analysis found that traceurs define Parkour as fun or playful, use the same words and descriptors to describe Parkour as play researchers use when describing play, and compare their movements to behaviors they performed as children or see children performing. There are no immediate benefits to traceurs as a result of practicing Parkour. The goals of Parkour sessions are malleable and change constantly. Many train with the idea of Parkour being useful or helpful in an emergency situation, and the more they train the more they express a feeling of freedom, creativity, and ability to build upon what they have already learned and apply it to new situations. They are internally motivated to train, and there is an ethic in the

Parkour community of no competition, although competitions have sprung up over the years. All of these meet the definition and criteria of play as described in play research, and therefore confirms the first hypothesis. The behaviors described in Parkour can also be classified as locomotor play, but the ethnographic data alone does not offer a quantifiable, comparable method to determine if the movements described meet the definition of unstructured, free-form locomotor play.

Behavioral Analysis

Overall, 92% of all Parkour behavior fits into the play ethograms previously established by play researchers, and therefore can be considered typical locomotor play. The frequencies demonstrate that play movement patterns make up the bulk of Parkour behavior.

By comparing the Parkour data to the movement patterns documented in other species compiled in Table 2, it is apparent that the movements that make up Parkour are also seen commonly and recorded in other primate play, from the smallest rhesus monkey to the oldest orangutan (e.g. Bekoff 1998; Fagen 1981, 1998; Goodall 1995; Lewis 2000; Maple & Zucker 1978; O'Neill-Wagner 2009; Pellegrini & Smith 1998a; van Lawick-Goodall 1968). The analysis of Parkour movement and frequency of locomotor behaviors also mirrors the predominant play movements of hunter-gatherer children (Bock & Johnson 2004; Fouts, Hewitt & Lamb 2001; Jenkinson 2001; Kamei 2005). This indicates that Parkour can and should be classified as innate free-form locomotor play.

One piece of data that is missing from much of the published play research is specific frequencies of each specific locomotor behavior in other play populations, as presented in this thesis. This disallows a direct comparison of frequency of each type of play movement and comparison between traceurs and other primate populations. Another issue with direct

comparison is that mammals also exhibit different frequencies of locomotor play movements based on their respective place in an ecosystem's food chain: animals tend to play using the same movements they would use for evading a predator, or predating (e.g. Burghardt 2005, 2009; Fagen 1981; Lincoln Park Zoo 2010; O'Neill-Wagner 2009). Also, in some studies, human children have been documented as spending almost twice as much time as juvenile chimpanzees, orangutans, and gorillas at play (Pellegrini & Smith 2005; Pellis 2007). Different environments have also been found to affect what play activity is performed and how (Hartle & Johnson 2003; Lewis 2005). All these contributing factors can lead to different experimental results.

However, it is possible to create a trend of movement frequencies observed in the great apes, based on frequency of documentation of certain behaviors in research. Table 2, as well as the evidence presented in previous chapters, suggests a definite trend that Parkour fits well with other types of locomotor play observed in other play populations.

There are other trends that emerged that support Parkour fitting into locomotor play research. For example, most footage of Parkour in the sample of Parkour videos was filmed in outdoor environments. This corresponds with play research showing a specific preference for outside play in all mammals (Kuo & Taylor 2004; Malone 2007; Maple & Zucker 1978; Pellegrini, Dupuis, & Smith 2007; Pellegrini & Smith 1998b).

From this second experiment, it is clear that Parkour is constructed of the same locomotor behaviors documented in hunter-gatherer children, young children in developed nations, and great apes. It does not fit the characterization of a brand-new version of locomotor play, as has been previously claimed (Frumkin 2005; McClean 2005, 2006; Miller & Demoiny 2008; Murphy 2006). Therefore the evidence validates the second hypothesis. This also supports the qualitative ethnographic analysis that Parkour is a form of play. Therefore, both experiments

were able to validate both hypotheses and demonstrate that Parkour is a form of unstructured, locomotor play.

Summary

Both hypotheses have been confirmed by the data presented in this thesis. The ethnographic data provided shows that Parkour fits well into the definitions and descriptions of play that have been established over the past 100 years of play research. The behavioral analysis demonstrates that Parkour is composed of the same behavior patterns seen in unstructured free-form locomotor play in all animals. Based on the ethnographic and historical data, Parkour developed from movement inspired by hunter-gatherer normal movement and play behavior. It offers a playful outlet for its practitioners, and is not a new sport or a primarily political statement as has been claimed by some. It has been shown that 92% of the movements involved in Parkour are basic locomotor play behaviors seen in all primates, not some new stressor.

POSSIBLE NEXT STEPS

This thesis has argued that Parkour is a form of play. Evidence has been offered that supports the hypotheses that Parkour is a form of play and that Parkour fits well with the "primal" or innate locomotor play described by animal behaviorists and child development experts. This thesis has argued against some of the purported negative effects of Parkour. If it is accepted that Parkour is unstructured, free-form locomotor play, what might some of the benefits of Parkour play be?

First, a review of play:

Physical Play is Important

Play, and specifically physical play, has been established as an important component of a healthy mammal's development over the course of its life. First, the fact that locomotor play appears so early in juvenile development (Stamps 1995) suggests its importance to the individual's overall lifelong development. Deprivation of play as a child, or establishing unhealthy play habits, has been linked to juvenile and adult violence (e.g. Brown 1998; Frost & Jacobs 1995). Infants who are not touched or played with will have 20 – 30% smaller brains than infants of the same age (Clements & Fiorentino 2004). Children learn about their world primarily through physical play (e.g. Pufall & Pufall 2008), and if they do not start to practice fine motor skills before two years old, they will never master them (Shore 1997). Play socializes individuals and teaches cultural expectations (Byers 1994; Christie 1983; Singer 1990). Children who have not been allowed free time to play do not have as much restraint, coordination, or critical thinking skills as their playful peers (Greenberg 2004; Spiegel 2008). While an individual can learn how to function as an adult without play, it is not done as easily or thoroughly (Bekoff

1998). Play is thought to be so essential in humans for optimal development and in fostering physical, cognitive, emotional, and social well-being, that it is recognized as a right of every child by the United Nations High Commission for Human Rights (Office of the United Nations High Commissioner for Human Rights, 1990).

We Learn All Our Lives

A human's brain develops fastest between 0 and 10 years of age (e.g. Ginsburg 2006), the time of life during which play is the most common. This led several play theorists to assume that play was used mainly as a way to form a child into an adult, and was an optional, truly non-functional behavior for adults (Allen & Bekoff 1994; Ansel 2005; Christie 1998; Kamei 2005; Millar 1981; Olfman 2005), and in some theories it was proposed that locomotor play disappeared entirely from the adult's repertoire of behavior (Burghardt 2005; Byers 1998).

New studies are proposing a revised theory about the use and importance of play throughout an animal's lifespan. Play researchers (e.g. Brown, S., 2009) are beginning to propose that play is a tool that animals possess, use, and need throughout their entire lives, and may be a useful tool for adult learning (Diamond 2001; Miller 2005). Sports psychologists are also beginning to propose a model of life-long development and growth (Whaley 2007). Several studies have found that personality traits are relatively steady but can still change after age 50. Rather than being set in stone, it is being argued that "people are active agents in their development," (Whaley 2007:653) and can choose to encourage this enhancement in themselves throughout their lives through biological, social, or cognitive stimulation (i.e. play). This is being referred to as the *life span development model* (Whaley 2007) – that we have the capacity to develop mentally and physically over humans' entire life span. Several studies (Brown 1998; Cherfas & Lewin 1980; Chick 1998; Etnier 1997; Forencich 2001; Galloway et al 2006; Kuo &

Taylor 2004; Miller 2005; Netz 2007; Scott & Willits 1998; Steinberg et al. 1997; Whalley 2001) suggest human minds are highly plastic throughout the entire life span, within multiple contexts, and are constantly adapting to biological, social, and cognitive changes. Anthropologists (Kaplan et al. 1997, 2000; Tucker & Young 2005) back up the sports psychology model in their findings that skills needed for food procurement may not be mastered until middle age in humans, depending particularly on whether or not the humans are living in an environment with easily extracted food. Tucker & Young (2005) found in some hunter-gatherer groups that mastery of harvesting tubers did not occur until age 35–45. This indicates that humans are still learning and developing past the traditionally thought peak of mental development.

New geriatric studies and research on the adult brain and behavior have found play to be important to a healthy, long life. Ding et al. (2006) found that exercise in adults had a positive effect on the neural plasticity of the hippocampus. Etnier et al. (1997) and Kramer et al. (1999) found similar positive results correlated with exercise and playful activities. Whalley (2001) and others (e.g. Forencich 2001; Sheets-Johnstone 1999) have found that without play and exercise, the brain's cognitive abilities atrophy and quite literally wither away. There is also a correlation between the amount of play seen in a species and that species' mean lifespan (Burghardt 2005).

Fagen suggests that play can act as a buffer against changing environments, "sociobiology without the sex" (1981:268), so it makes sense that play would also buffer against environmental changes and stressors into adulthood. Fagen was originally a proponent of life history theory (1977), but later (1981) suggested an *exercise physiology* model. Once a physical skill or exercise is mastered, it does not need to be practiced as much; less is needed to maintain than to build. Fagen views adult play as a chance to practice or maintain a physical skill rather than learn and repetitively practice the skill as observed in childhood. Play frequency drops in

adults, but the work of the above-mentioned theorists suggests play may potentially continue to be used to maintain and brush up on needed skills. Fagen designed his model specifically to explain physical play, but the model could be expanded to include cognitive or social skill-building. The dominant play theory developed over the latter half of the 20th century sees play as a type of scaffolding or cross-training for the brain (e.g. Burghardt 1998; Piaget 1953; Vygotsky 1967). Vygotsky's metaphor of scaffolding as a model for childhood learning may be applicable throughout the entire lifespan.

Play can also be useful for adults in social situations the same way it is for children. Gray (2009) proposes hunter-gatherer groups form their bands using the same play strategies that children use to form play groups. Adults who participate in team sports also report having close bonds with their teammates (e.g. Galloway et al. 2006).

Deficit of Physical Play in Adults

As mentioned before, play and movement are largely missing from daily life in developed nations at the start of the 21st century, with schools and work eliminating play from people's lives (e.g. McGinn 2009; OECD 2002; Scott & Willits 1998), and eliminating spaces for both adults and children to play (discussed by Forencich 2001; Brown S. 2009), despite years of research demonstrating the importance of play in a healthy childhood and education (e.g. Brown, S., 2009; Chaker 2006). Obesity and other lifestyle diseases are quickly becoming the number one cause of death in the United States (CDC 2008), and without physical play and engagement, humans physically and cognitively atrophy and die (Forencich 2001; Kramer et al. 1999; Sheets-Johnstone 1999; Whalley 2001).

Figure 9*. A 2009 Parkour seminar in Bellevue, WA, featuring traceurs of all ages.*

Parkour as a Possible Outlet for Adults' Need to Play

If we accept the conclusions in this thesis that Parkour is a form of play and that both hypotheses have been supported by the evidence provided within this thesis, it is then possible to hypothesize that Parkour may provide many of the same benefits as play. It may be that individuals gain similar biological, social, or cognitive stimulation from Parkour as are gained from other forms of locomotor play.

There is significant ethnographic evidence to support this idea. As discussed earlier in this thesis, many traceurs say they have been moving in ways similar to Parkour their entire lives. This fits into the life-long development model (Netz 2007; Whaley 2007), and is also supported by Bock and Johnson (2004).

It is also possible that Parkour "allows" adults to play. Whereas children are mostly allowed to perform free-form, unstructured locomotor play (e.g. Pellegrini 2005), most adults in developed nations are not (OECD 2002). It may be that because Parkour is a very loosely

structured method of movement, it gives adults "permission" to play. Figure 9 demonstrates a woman training Parkour with her young grandson.

Other possible benefits of Parkour for adults include:

Benefits of general exercise

Based on the qualitative analysis of movement behaviors demonstrated in this thesis, interviews with traceurs, and other analyses (Angel 2006, 2008; Christie 2005; Edwardes 2009; Foucan 2008a; Germain 2008; Geyh 2006), there is evidence that suggests Parkour provides similar physical and neurological stimulation as other types of locomotor play. Traceurs report physical and cognitive stimulation while they run, jump, climb, hop, vault, and crawl over obstacles, and if they are out with a training partner, social stimulation as well. All of this hopping and vaulting also requires a lot of creativity (Bavinton 2007; Biedermann 2006; Edwardes 2009; Foucan 2008b; Kelley 2008a, 2008b). Exercise, and not just in physical play, has been connected to cognitive development, neural plasticity, and creativity in people of all ages (Blanchette et al. 2005; Brown 1998; Burghardt 200; Byers & Walker 1995; Ding et al. 2001; Etnier et al. 1997; Kramer et al. 1999; Ramocki 2002; Steinberg et al. 1997). However, further work needs to be done to demonstrate the connection between Parkour and these cognitive benefits more thoroughly.

Better spatial and environmental awareness

Understanding one's physical environment is one of the main benefits of play (Bekoff & Byers 1998; Bronfenbrenner 1979; Brown, N., 2009; Fagen 1993; Ginsberg et al. 2006; Hartle & Johnson 1993; Malone 2007; O'Neill Wagner 2009). Parkour trains balance and proprioception (Edwardes 2009; Foucan 2008b; Parkour Visions 2011), which decreases in older adults without continual practice (e.g. Howe et al. 2008). Parkour also appears to provide a better understanding

of one's overall environment and surroundings, as discussed in a study by the author (Kelley 2008b), and by several others (Angel 2007; Bavinton 2007; Daskalaki et al. 2008; Law 2005; Lightwing 2005; Mörtenböck 2007).

Lower injury rates than soccer

Several medical journals have published papers arguing the dangers of Parkour (Frumkin 2005; Krikler 2007; McClean 2005, 2006; Miller & Demoiny 2008; Murphy 2006). However, if Parkour is made up of the same basic locomotor movements performed by all mammals, it is possible to counter that theoretically Parkour would be no more dangerous for humans than any other type of free-form locomotor play (e.g. Burghardt 2005; Fagen 1993). The Parkour Visions gym in Seattle, WA, reports an injury rate of 4 per 1000 hours, which is half the rate of recreational soccer in the U.S. (Parkour Visions 2011). More research is needed to study injury rates of traceurs compared with other sports.

Summary

Play is known to have developmental benefits, such as promoting both physical and neural growth. Play has traditionally been considered a "children's-only" activity; however, new research and insight is revealing that adults also need play in order to continue developing cognitive and physiological health. This thesis has demonstrated that Parkour behaviors are the same as other innate locomotor play behavior. It is possible that Parkour is a form of locomotor play that appeals to adults for the same reasons it appeals to children, and may provide similar benefits as other types of physical play. Possible research queries would be to determine whether Parkour provides similar physiological and cognitive benefits as other types of locomotor play.

CONCLUSION

In this thesis it has been demonstrated that Parkour fits well into the parameters of play established through the field of play research. Parkour meets the criteria and definitions of play, and is correctly described as a form of basic locomotor play. Both qualitative ethnographic and quantitative behavioral data were used to demonstrate that Parkour is predominantly made up of elementary play behaviors that have been documented in multiple primates, including orangutans, chimpanzees, gorillas, and juvenile humans.

The history of Parkour also supports this conclusion. The originators of Parkour say they were inspired by children's play (Biedermann 2006). Georges Hébert, the founder of *méthode naturelle* from which Parkour stemmed, was inspired by indigenous groups in Africa and how they moved and developed a system based on their movements. From its very origins, Parkour has been inspired by natural movement and play.

Furthermore, we can observe that through Parkour, these quintessential play behaviors can be continuously used into adulthood – and not just for work, either. New studies in geriatric research are addressing how adults use and benefit from physical play. This study could only explore the benefits of adult play on a superficial level – further steps should be taken to explore the potential benefits of Parkour for adults. It is my hope that the research contained in this thesis can be applied to other studies of play, and advance play research.

APPENDIX

A. Sutton-Smith's Categorization of Types of Play, from *The Ambiguity of Play* (1997).

- Biological/Progress (skill building)
- Fate (gambling)
- Power (hegemony)
- Identity-bonding (politics, religious ceremony)
- Imaginary (acting)
- Self (leisure play)
- Frivolity (Mardi Gras)

B. Definitions

B1. Definitions of locomotor play behaviors as used in this thesis and as accepted in play research (e.g. Bekoff 1972; Pellegrini & Smith 1998a, 2005; Scott & Panksepp 2003).

Running: Moving bipedally at a fast pace.

Jumping: Moving from one place to another using simply the force of one's legs to propel oneself into the air. Jump. Leaping off the ground on either one or two feet.

Swimming: Water play, either partially or fully submerged.

Rolling: Turning oneself over foot to head to foot, touching the ground, on a horizontal plane. One completed revolution from stomach to back to stomach while the child is lying on the floor.

Brachiating: Using arms, catching and releasing, to carry oneself from point A to point B.

Spinning: Turning one's body left or right while standing in place repeatedly; does not include flips, rolling on the vertical plane. One completed revolution on the person's axis either while seated or standing.

Vaulting: A jump over an object assisted by pushing the arms off the obstacle.

Balance: Maintaining balance on an object while moving or standing still

Quadrupedal: Movement on horizontal using all four limbs, including crawling. Locomotion on hands and knees across the floor.

Wrestling/Play Fighting: Combative or competitive play.

Pushing/pulling/lifting/stretching/hanging: Manipulating an object or oneself.

Gymnastics: Each gymnastic move was coded as one behavior and included the following motions: somersaults, jumping jacks, cartwheels, handstands, arabesques, pretending to walk a tightrope (Scott & Panksepp 2003).

B2. Definition of Parkour Movements/Techniques (Parkour Visions 2010)

The English words for movements as seen and labeled in Parkour, with the French terms for the same movements in parentheses.

Roll (Roulade): Similar to the roll used in grappling martial arts. The body is rolled across the ground shoulder first, ending at the opposite hip. Arm placements differ person to person and school to school.

Vault (Passement): Any jump that incorporates the use of the arms to overcome the obstacle. The following are various types of vaults:

- **Monkey/Kong Vault (Saut du Chat)**: A vault where the body passes over the obstacles with the legs in between the arms. This is called a squat over vault in gymnastics. One of the most versatile vaults; excellent for clearing long and high objects and getting extra distance.
- **Two-Handed Vault (Passement)**: Two hands are placed on the obstacle and the legs come over to the side. Known as a flank vault in gymnastics. This is a very simple fault and is often used to introduce beginners to some of the more advanced vaults.
- **Single-Hand Vault (Passement)**: Same as above, but only one hand is placed on the obstacle. Also called a flank vault in gymnastics.
- **Speed Vault (Passement)**: A variation of the single-hand vault, but as the name implies the key to the speed vault is *speed*. The form is similar to a hurdle over an obstacle, but with the body leaning sideways and the hand tapping the obstacle as you go over.
- **Lazy Vault (Passement)**: A type of vault where the obstacle is approached obliquely and the legs pass over the obstacle first; one or two hands can be used, and are placed on the obstacle as the body passes over it.
- **Turn Vault (Demitour)**: A vault during which the body changes direction 180^{o} from their original position.
- **Reverse Vault (Reverse)**: A vault where the body turns over behind the hands completing a 360^{o} turn over the obstacle.
- **Dash vault (Passement)**: A vault where the traceur jumps over the obstacle and puts his hands down as his legs pass the obstacle to help push him off.
- **Kash Vault (Saut Du Chat)**: A vault which begins like a cat/kong but finishes like a dash. A squat through vault in gymnastics terminology.

- **Pop Vault (No known French term)**: A vault where a foot is placed on the obstacle first to pop the traceur up and give her enough height to perform another vault, typically a kong or two-handed vault.

(Saut Du Fond): A jump from height.

Arm Jump/Cat Leap (Saut Du Bras): A jump where the traceur lands with his hands on the top of an obstacle and his feet on the obstacle.

Precision Jump (Saut de precision): A jump where a traceur lands on a precise surface like a rail, or wall ledge. Generally refers to a standard standing broad jump technique. Both legs jump together and the arms swing forward to help initiate forward momentum.

Gap jump: Any jump that clears a gap between two objects.

Wall Run/Pass (Passe Muraille): Technique involving running toward a wall and then converting the forward momentum into a jump. A wall pass involves a traceur taking one or more running steps up a vertical surface and catching on the top with her hands in order to pull herself up and onto or over the obstacle.

Tic tac (Tic tac): A technique where the traceur pushes of of one object with her foot to gain height and reverse momentum in order to overcome another obstacle.

Underbar: A move where the traceur jumps feet first through an opening and grabs a bar at the top to aid him through.

Reverse Underbar: Similar to move defined above except the body goes between the hands first, then turns so the feet can land first.

Balance (Équilibre): Refers to any type of balancing.

Brachiating (Laché): A move where one swings from an object, releases and grabs another. Examples include a tree branch or scaffolding.

C. Videos Used for Data Set

Includes link to video online, year of release, time length of video, description or name of video if known, types of behaviors catalogued in video, and environment(s) in which the video was shot.

1: 2008 *Parkour Tag, Round 1*, (0:59) chasing, climbing, jumping, rolling, sliding, cat leap, inside: http://www.youtube.com/watch?v=-LHpqyWQfwI

2: 2009 (4:40) climbing, vaults, jumping, running, sliding, chasing, rolling, cat leap, outside urban, rural: http://www.youtube.com/watch?v=rFOkY1dNE-U

3: Kazuma 2001 (7:00) flips, running, climbing, jumps, vaults, spinning, rolling, sliding, balance, cat leap, outside urban, rural: http://www.youtube.com/watch?v=Y8q4a2JmhQA

4: *GoGirls* 2008 (3:09) outside, urban – running, vault, balance, climbing, rolling, spinning, climbing, brachiating, cat leap: http://www.youtube.com/watch?v=s-Mqq0Z7eg0

5: (4:01) 2006 urban outside – (Use of space) jumping, vaulting, climbing, balance, spinning, rolling, cat: http://www.youtube.com/watch?v=WkHPQPozDRs *kids say the traceurs look like monkeys (also has kids jumping, balance, 2:03-2:09)

6: (5:35) pre-2007, early video, famous landmarks, urban, outside; jumping, running, vault, balance, spin, climb, quadrupedal, roll, cat leap (brachiating?): http://www.youtube.com/watch?v=2DaaJVynaLU

7: (1:54) pre-2007 early video (early 90s?), outside, urban; vault, cat leap, run, jump, roll, spin: http://www.youtube.com/watch?v=tHK3gtVhi2A

8: *SamParkour* 2009 (6:53), urban, outside, – flip, jump, roll, run, climbing, balance, vault, cat leap, slide, : http://www.youtube.com/watch?v=N-9Uu9nkDJs

9: *Quest for Movement* – Oleg Vorslov: bar play Dvinsk Clan (Russian Climbing 2008/2007 (9:59) – outside, playground; brachiating, balance, swinging, climbing, running, spinning, flipping, starts 3 min in: http://www.youtube.com/watch?v=mjaIxuZ126g

10: *Trip to Tasmania*, 2008 (2:19) urban; cat leap, climbing, vault, jump, flip, running: http://www.youtube.com/watch?v=8r57KXUW0t8

11: *Whatcom Falls* 2007 (5:46) – outside, rural; http://www.youtube.com/watch?v=PVc8btZeAsg

12: *Rafe Sampler 2006/2007* (3:34) rural, outside; vault, jump, running, chase, balance, brachiating, tic tac, cat leap, kong, roll, climb/wall run, slide, precision: http://www.youtube.com/watch?v=BrXwxOBGjx4

13: *Forest play* 2008 (1:15) outside, rural; running, vaulting, brachiating, kong to precision, jumping: http://www.youtube.com/watch?v=NIWmKffKgss

14: *Tyson sampler*, 2007 (1:30) urban, outside; turn vault, precision jump, cat leap, wall climb, jump, double kong, running, rolling, slide, tic tac, wall flip: http://www.youtube.com/watch?v=25ODHqE2AcM

15: *Feb Femme Jam*, 2009 (2:47); Bizzy vault, outside, urban, vaults, rolls, balance: http://www.youtube.com/watch?v=DLxKh1ATgWc&feature=related

16. *Barnz tour* 08/09 (6:47); Urban, outdoor: http://www.youtube.com/watch?v=Hc_G6wxF6kw

17. *Physical graffiti: The Chase;* 2008 (2:54) running, chase, outdoor, urban: http://www.youtube.com/watch?v=6qLkv6nP044

18. *A.D.A.P.T. Parkour* cert (2008) (3:19): Outside, park setting, urban, forest: http://www.youtube.com/watch?v=02JgWHhgxr0

19. Parkour Generations: *training with Kazuma*, Ohio 2008 (6:39): Outdoor, park setting, tree: http://www.youtube.com/watch?v=S2xw24SaAEg

20. Daniel Ilabaca, *Liverpool to Lisses*, February 2006 (5:30); outdoor, urban, park: http://www.youtube.com/watch?v=sZjS1y-88rI

21. Evolution-Le Parkour, 2006 (6:15); Outdoor, urban: http://www.youtube.com/watch?v=IjQxIRWZu0c

22. Extreme game of Tag (Parkour/Free Running) 2006, (5:58): Urban, outdoor, park: http://www.youtube.com/watch?v=6qhgIdP3l3I

23. Worldwide traceuse project 2009 (2:41): outdoor, urban: http://www.youtube.com/watch?v=d_jQgzjtOTs

24. Dubai, Chase Jarvis. Outside, urban. 2:50 (2009): http://www.youtube.com/watch?v=TsqfGL5DZJ4

25. *Poetry in motion* 2008(4:53); Outdoor, urban, park: http://www.youtube.com/watch?v=QrdSBvtYn2M

26. *Coyote y Nestor* 2009 (3:29), outdoor urban: http://www.youtube.com/watch?v=K5OR4Ngledc

27. Pip Andersen - Jumping around (HQ) 2009 (2:19), outdoor, urban, park, old ruins, indoor gym: http://www.youtube.com/watch?v=zXhu3qjQpGU

28. Daniel Arroyo, *2 environments, 1 mind* 2009 (2:21), outdoor, park, rural, urban:

http://www.youtube.com/watch?v=klOqihm4S7U

29. David Belle, *SpeedAirMan*, pre-2004 (2:38), urban, outside: http://www.youtube.com/watch?v=kWJHSyjVMY8

30. David Belle & Cyril Raffaelli, *On Avance Toujours*, pre-2005, (2:49), outdoor, urban; indoor, gym; rural, tree: http://www.youtube.com/watch?v=huv2sTalt7o

31. Daniel Ilabaca, Chase Armitage, Sao Paolo January 2008 (8:12), outdoor, park setting; indoor, gym: http://www.youtube.com/watch?v=ziqZCypCnFs

32. Recently in Puget Sound Parkour 2009 (3:20), outdoor, urban park, Parkour starts at 0:14: http://www.youtube.com/watch?v=PTJkBY3rDnM

33. railwork at gasworks Michael rendier 2008 (0:31); outdoor, urban: http://www.youtube.com/watch?v=PztwqhCVNHw

34. Tyson Cecka, *In Between Classes Parkour Training* 2006 (1:02); urban, outdoor: http://www.youtube.com/watch?v=PBGLRLheBTM

35. speeders Parkour 2009 (3:43); urban, outdoors, rural, trees: http://www.youtube.com/watch?v=8pqCsrhzZkQ

36. *Cambridge Joy*, PhilyDee, chase armitage, and danny ilabaca 2007 (7:17); urban, outdoor, http://www.youtube.com/watch?v=rXQBnD-dGXI

37. *Bit of Cambridge Steez*, PhilyDee 2008 (2:28); urban, outdoor: http://www.youtube.com/watch?v=kS8dGZSeg6Q

38. *Parkour and Freerunning – Bumbaflex* 2009 (4:27); outdoor, urban, tree, park: http://www.youtube.com/watch?v=bmO7b7quQzQ

39. *Gloom Skwad* - Livewire, Philly D, Jashman, Neill 2008 (4.32); outdoor, urban: http://www.youtube.com/watch?v=E8Dbo7SeIdg

40. *The New NextGen* 2006 (3:56); outdoor, urban, tree http://www.youtube.com/watch?v=cPmJShx7okA&feature=channel_page

41. *la releve, etre et durer, le Parkour*, pre-2005 (8:58); urban, outdoor; indoor parking structure: http://www.youtube.com/watch?v=b5LMyi_IEU4

42. yamakasi (founders clip) *haute categorie* pre-2007 (3:51); urban, outdoor; park setting, nature: http://www.youtube.com/watch?v=li3Wd_2_Y-4

43. Parkour Training Barnz 2006 (2:19); outdoor, park, urban, tree: http://www.youtube.com/watch?v=XP422bXIBBw

44. Dim Monk 2006 (3:25); urban, outdoor, park:
http://www.youtube.com/watch?v=jn0ZiEP8WZc

45. Russian Parkour (Team PAWA) 2006 (2:34); indoor, parking structure, gym; outdoor, parking structure, urban:
http://www.youtube.com/watch?v=Do0S6C_xEvE

46. Russians in Tunisia 2006 (3:05); outdoor, urban, beach:
http://www.youtube.com/watch?v=ey7gkTBGKA4

47. Dvinsk clan – Le Parkour part 2, 2008 (8:25); outdoor, park, urban:
http://www.youtube.com/watch?v=1dMz----M3Y

48. Dvinsk clan 2, 2005 (6:41); outdoor, urban:
http://www.youtube.com/watch?v=nrc_hb9q-fM

49. Parkour in Madagascar – David Belle 2007 (1:47); outdoor, jungle, park, beach, urban:
http://www.youtube.com/watch?v=-T202-47NOg

50. Nature with David Belle and Cyril Raffaelli 2006 (1:27); outdoor, natural:
http://www.youtube.com/watch?v=8y07EHmy7D0

51. Vigroux Brothers Parkour 2001/2003 Footage (2:25); outdoor, urban, park:
http://www.youtube.com/watch?v=ASu88gc31wc

52. Parkour-1 day ,1 location, play. 2009 (4:50); outdoor, urban, structures:
http://www.youtube.com/watch?v=Nb_VZVbDz7w

53. An interview with Stephane Vigroux, Craig Pentak intv. 2008 (8:41); outdoor, urban structures: http://www.youtube.com/watch?v=_d1AxUPPcF8

54. Parkour generations: *Visons*, 2007 (6:00):
http://www.youtube.com/watch?v=O-KQYi_ZI5Y

55. David Belle, Stade2; pre-2001 (3:33); urban structures, outdoors; playing in trees:
http://www.youtube.com/watch?v=nFK41-iBmmk

56. TVD2, T.V. spot with traceurs, pre-2003 (1:53); outdoor, urban structures, indoor mall:
http://www.youtube.com/watch?v=T2ws7zaCUzE

57. Le Parkour, report TV Pathe Sport canal +, pre-2003 (6:07); urban park setting, buildings:
http://www.youtube.com/watch?v=D9LZNBV42Ow

58. Entrevista 1997 with David Belle & Sebastian Foucan (3:42); urban, park setting, structures:
http://www.youtube.com/watch?v=Ldl6qsCKQew

59. Entrevista a David Belle em Berlim, 2006 (6:48) director Nela Biedermann; outside, urban; inside gym; factory inside & out: http://www.youtube.com/watch?v=XxoCWSmxKN4

60. David Belle in California, 2005 (4:55); outside, beach: http://www.youtube.com/watch?v=iCze2UvywEY

61. Trace elements Parkour Melbourne 2008 (4:48); urban, playground equipment, tree: http://www.youtube.com/watch?v=XKPD6wsvoK8

62. Trace Elements Hanging Rock Australia 2008 (2:38); rural, trees, rocks: http://www.youtube.com/watch?v=PADVonxs3Tk

63. Stephane Vigroux Documentary, pre-2007 (35 minutes, documentary); urban, buildings, trees: http://video.google.com/videoplay?docid ... &plindex=0

64. *Get a Move On* 2009 (1:10); outdoor, urban, industrial, sand: http://www.youtube.com/watch?v=QmTLUjskchk

65. *Physical Graffiti: Parkour Is*, 2008 (3:02); urban, structure: http://www.youtube.com/watch?v=1mX6g3z_yQQ

66. *Urban playground: Bristol Parkour* 2007, (5:37); outdoor, urban, park: http://www.youtube.com/watch?v=vf5sIJNPrjY

67. Latvian 2007 summer sampler (7:44); outdoor, urban, abandoned buildings, urban; outdoor, woods, trees: http://www.youtube.com/watch?v=Um7e0YcgsTk

68. *The Outside In: Female Parkour* 2007 (3:48); outdoors, urban; indoor, gym: http://www.youtube.com/watch?v=9WkZcP9jTqc

BIBLIOGRAPHY

Adidas
Advertising shoes designed specifically for free-running:
http://www.youtube.com/watch?v=V3QPSv2jO1o, (accessed September 6, 2011).

Allen, Collin and Marc Bekoff
1994 Intentionality, social play, and definition. Biology and Philosophy. 9(1):63-74. Springer Netherlands.

American Parkour
2009 American Parkour Practical Parkour Contest Results:
http://www.americanParkour.com/content/view/3806/1/ (accessed May 30, 2009)

Angel, Julie, Dir.
2006 Parkour Documentary. Julie Angel Films. London, UK.
http://www.youtube.com/watch?v=WkHPQPozDRs (accessed September 6, 2011).

Angel, Julie, Dir.
2007 Jump Westminster. Documentary. Distributed by Parkour Generations, London, UK.
http://www.Parkourgenerations.com/videos.php?details&id=4 (accessed September 6, 2011)

Angel, Julie
2008 Personal website documenting her research leading to her PhD dissertation in visual anthropology through the Screen Media Research Center at Brunel University, UK.
http://www.julieangel.com/research.html (accessed September 6, 2011).

Ansell, Nicola
2005 Children, Youth and Development. London: Routledge.

Atkinson, Michael, and Kevin Young
2008 Deviance and Social Control in Sport. Chapter 3 "Youth Tribes in Sport." Human Kinetics Inc.

Atkinson, Michael
2009 Parkour, Anarcho-Environmentalism, and Poiesis. Journal of Sport and Social Issues. 33(2):169-194. Beverly Hills, CA: Sage Publications.

Baldwin, J.D. & J.I. Baldwin
1978 Exploration and Play in Howler Monkeys (Alouatta palliata). Primates 19(3):411-422, July.

Barber, Nigel
1991 Play and Energy Regulation in Mammals. The Quarterly Review of Biology, The University of Chicago Press.

Bateson, Patrick
2005 The role of play in the evolution of great apes and humans. *In* Pellegrini, A. and Smith P., The Nature of Play: Great Apes and Humans. New York: The Guilford Press.

Batt, Thomas Alan

2003 A study of the element of play in the teaching of composition, Electronic Doctoral Dissertations for University of Massachusetts Amherst.

Bavinton, Nathaniel
2007 From obstacle to opportunity: Parkour, leisure, and the reinterpretation of constraints. Annals of Leisure Research. 10(3-4):391. Australian & New Zealand Association for Leisure Studies Journal (ANZALS).

Beach, Betty A.
2003 Rural Children's Play in the Natural Environment. *In* Lytle, Donald E. (ed.) Play and educational theory and practice. Westport, Conn. : Praeger.

Bekoff, Marc
1984 Social Play Behavior. BioScience. 34(4):228-233. American Institute of Biological Sciences.

Bekoff, Marc and Byers, John Alexander
1981 A critical reanalysis of the ontogeny and phylogeny of mammalian social and locomotor play: An ethological hornet's nest. *In* K. Immelmann, G. Barlow, M. Main, & L. Petrinovich (Eds.), Behavioral development. (pp. 296-337). Cambridge: Cambridge University Press

Bekoff, Marc and Byers, John Alexander (eds.)
1998 Animal Play: Evolutionary, Comparative, and Ecological Perspectives. Cambridge: Cambridge University Press.

Bekoff, Marc; Hill, Harriet L.; Mitton, Jeffry B.,
1975 Behavioral Taxonomy in Canids by Discriminant Function Analyses, Science, 190(4220): 1223-1225.

Belle, Jean-François
2007 L'initiateur, Raymond Belle. Sport Media Concept: Official David Belle website. http://www.sportmediaconcept.com/Parkour/Raymond-Belle_r4.html (Accessed February 16, 2009).

Berinstein, S & L. Magalhaes
2009 A study of the essence of play experience to children living in Zanzibar, Tanzania. Occupational Therapy International; 16(2):89-106. John Wiley & Sons

Biedermann, Nela, Director
2006 Entrevista a David Belle em Berlim, Film: http://www.youtube.com/watch?v=XxoCWSmxKN4 (Accessed September 6, 2011).

Bjorklund, D.F. and R.D. Brown
1998 Physical play and cognitive development: integrating activity, cognition, and education. Child Development. 1998 Jun. 69(3):604-6.

Bjorklund, D.F.
2006 Mother knows best: Epigenetic inheritance, maternal effects and the evolution of human intelligence, Developmental Review, 26:213–242.

Blanchette, David M., Ramocki, Stephen P., O'del, John N., and Casey, Michael S.

2005 Aerobic Exercise and Cognitive Creativity: Immediate and Residual Effects, Creativity Research Journal, 17(2&3), 257-264.

Bloch, M. N., Kennedy, D., Lightfoot, T., & Weyenberg, D. Eds.
2006 The child in the world/The World in the Child: Education and the configuration of a universal, modern, and globalized childhood. New York: Palgrave MacMillan

Bloch, Marianne N. and Anthony D. Pellegrini
1989 The Ecological Context of Childrens Play. New York: Ablex Publishing.

Bock, J.
2004a New Evolutionary Perspectives on Play: An introduction. Human Nature 15(1):1-3.

Bock, John
2004b "What makes a competent adult forager?" *In*: B. Hewlett and M. Lamb, eds., Hunter-Gatherer Childhoods: Evolutionary, Developmental, and Cultural Perspectives. Hawthorne, NY: Aldine Transaction.

Bock, John
2009 Evolutionary Anthropology and the Study of Childhood. *In*: D. Lancy, J. Bock, and S. Gaskins, eds. The Anthropology of Learning in Childhood. Lanham, MD: Alta Mira Press.

Bock, John, and Sarah E. Johnson
2004 Subsistence Ecology and Play Among the Okavango Delta Peoples of Botswana, Human Nature, 15(1): 63-81.

Brandenburg, Jim
1993 Brother Wolf: A Forgotten Promise. Northword Press; New edition.

Bronfenbrenner, Urie
1979 The Ecology of Human Development: Experiments by Nature and Design. Cambridge, MA: Harvard University Press.

Brown, Stuart
1998 Play as an organizing principle: clinical evidence and personal observations. *In* Bekoff, Marc and John Alexander Byers (eds.) Animal Play: Evolutionary, Comparative, and Ecological Perspectives. Cambridge: Cambridge University Press.

Brown, Stuart
2007 Invited lecturer, Seminar on Play, Seattle, WA

Brown, Stuart
2009 Play: How It Shapes the Brain, Opens the Imagination, and Invigorates the Soul. New York, Avery Publishing.

Brown, Neill
2009 Art of Displacement: Parkour as a challenge to social perceptions of body and space. Hosted by Parkour Generations.
http://www.Parkourgenerations.com/articles.php?id_cat=2&idart=21 (accessed September 6, 2011)

Burghardt, G.M.

1998 The evolutionary origins of play revisited: Lessons from turtles. *In* Bekoff, Marc and John Alexander Byers (eds.) Animal Play: Evolutionary, Comparative, and Ecological Perspectives. Cambridge: Cambridge University Press.

Burghardt, G. M.
2001 Play: Attributes and neural substrates. *In* Blass, E.M., Ed., Handbook of behavioral neurobiology. Developmental psychobiology, developmental neurobiology and behavioral ecology: Mechanisms and early principles, Vol. 13, pp.327-366. New York: Kluwer Academic/Plenum.

Burghardt, Gordon M., Ed.
2005 The Genesis of Animal Play: Testing the Limits. Cambridge, Mass:MIT Press. Figure 2.2 published with permission from the author.

Burghardt, Gordon M.
2009 email correspondence with author.

Byers, John A., and Curt Walker
1995 Refining the Motor Training Hypothesis for the Evolution of Play. The American Naturalist, 146(1): 25-40.

Byers, John A.
1998 Biological effects of locomotor play: getting into shape, or something more specific? *In* Bekoff, Marc and John Alexander Byers (eds.) Animal Play: Evolutionary, Comparative, and Ecological Perspectives. Cambridge: Cambridge University Press.

Canon
2008 Canon's Let's Play! Campaign Takes Freerunning to the Streets of London. Digital Signal Universe. http://www.digitalsignageuniverse.com/content6.html, (accessed June 16, 2009).

Canon Europe
2008 Parkour Generations promotion for Canon video camera. www.canon-europe.com/freecording (accessed February 16 2009).
Original 2005 Shoot Action with a Wide Angle. You Connect online magazine. Iss.13, July 2005. http://www.canon-europe.com/you_connect/july2005/wideangle/ (accessed Jan. 8, 2007).

Cazenave, N., Michel G.
2008 The practising of free running in adolescent from the suburbs: between sensation seeking and narcissistic reinforcement. Neuropsychiatrie de l'enfance & de l'Adolescence. 55(3): 154-159.

Cecka, Tyson
2008 Personal interview. Executive Director of Parkour Visions. http://pnwpa.com (accessed September 6, 2011).

Centers for Disease Control and Prevention (CDC)
2007 CDC Study Finds No Increase in Obesity Among Adults; But Levels Still High, 2005–2006. last updated December 2007. Centers for Disease and Prevent, Atlanta, GA. http://www.cdc.gov/nchs/data/databriefs/db01.pdf

Chaker, Anne Marie
2006 Rethinking Recess: As More Schools Trim Breaks, New Research Points to Value Of Unstructured Playtime. October 10; Page D1 .The Wall Street Journal.

Charmante, M.
2007 Real Player Manifesto. Eludamos: Journal for Computer Game Culture. Online: eludamos.org (accessed January 12 2009).

Chansanchai, Athima
2005 "For traceurs, walk in park is no picnic: Channeling Spiderman with adult discipline." Seattle Post-Intelligencer, 12/19/05.

Cherfas, Jeremy; and Roger Lewin, eds.
1980 Not Work Alone: a cross-cultural view of activities superfluous to survival. Beverly Hills, CA: Sage Publications.

Chick, Garry
1998 What is Play for: sexual selection and the evolution of play. Keynote address presented at the annual meeting of The Association for the Study of Play, St. Petersburg, FL, February 1998.

Chimpanzee Sanctuary Northwest
2011 http://www.chimpsanctuarynw.org/blog/. (accessed September 7, 2011)

Christie, James & E. P. Johnsen
1983 The Role of Play in Social-Intellectual Development. Review of Educational Research, 53(1):93-115.

Christie, James Frederick
1998 Play: A medium for emergent literacy development. Play from birth to twelve: Contexts, perspectives, and meanings. Garland Publishing.

Christie, James Frederick.
2008 The SBRR approach to early literacy instruction. *In* Justice, Laura M. Justice and Carol Vukelich (eds.) Achieving Excellence in Preschool Literacy Instruction. Guilford.

Christie, Mike, director
2003 Jump London. 60 min. Optomen Television. Channel 4 London, UK.

Christie, Mike, director
2005 Jump Britain. 60 min. Optomen Television. Channel 4 London, UK.

Cleland, TA, and JJ Teres
2003 Inexpensive ethography using digital video. J Neurosci Methods. 125(1-2):1-6. New York, NY. Elsevier.

Clements, Rhonda L. and Leah Fiorentino, eds.
2004 The child's right to play: a global approach. Westport, Conn.: Praeger.

Cokley, Kevin; Komarraju, Meera; Pickett, Rachel; Shen, Frances; Patel, Nima; Belur, Vinetha; Rosales, Rocio
2007 Ethnic Differences in Endorsement of the Protestant Work Ethic: The Role of Ethnic Identity and Perceptions of Social Class. Journal of Social Psychology. 147(1):75-89. Heldref Publications.

Coe DP, JM Pivarnik, CJ Womack, MJ Reeves, and RM Malina

2006 Effect of physical education and activity levels on academic achievement in children. Medicine and Science in Sports and Exercise. 38(8):15-9.

Creasey, G. L., Jarvis, P. A., & Berk, L.
1998 Play and social competence. *In* O. N. Saracho & B. Spodek (Eds.), Multiple Perspectives on Play in Early Childhood Education (pp. 116-143). Albany, NY: State University of New York Press.

Curtis, Henry Stoddard
1917 The Play Movement and Its Significance. New York: The MacMillan Company.

Darwin, Charles
1871 The Descent of Man, and Selection in Relation to Sex. London: John Murray.

Daskalaki, Maria; Alexandra Stara; Miguel Imas
2008 The 'Parkour Organisation': inhabitation of corporate spaces. Culture and Organization, 14(1): 49 – 64. Routledge, Taylor & Francis Group.

Diamond, Marian C.
2001 Successful Aging of the Healthy Brain. presented at the Conference of the American Society on Aging and The National Council on the Aging March 10, 2001, New Orleans, LA First Joint Conference.

Ding, Q, and Vaynman S, Souda P, Whitelegge JP, Gomez-Pinilla F.
2006 Exercise affects energy metabolism and neural plasticity-related proteins in the hippocampus as revealed by proteomic analysis. European Journal of Neuroscience 24(5):1265-76.

Discovery Channel
2009 Time Warp – "Parkour Beauty" - Free running masters perform urban ballet in front of Time Warp's high speed cameras. Time Warp, Discovery Channel. 2009 Discovery Communications, Inc. http://www.discoverychannel.co.uk/video/time-warp-Parkour-beauty/ (accessed October 31, 2011)

Dumas, Jean-Phillipe
2005 Aux origines de la "méthode naturelle" : Georges Hébert et l'enseignement de l'éducation physique dans la Marine française. Revue Internationale d'Histoire Militaire (In French).

Edwardes, Dan
2009 Parkour. New York: Crabtree Publishing Company.

Edwards, Carolyn Pope
2000 Children's Play in Cross-Cultural Perspective: A New Look at the Six Cultures Study Cross-Cultural Research. 34:318 - 338. Beverly Hills, CA: Sage Publications.

Elliot, Margaret E.
1978 Play With A Purpose: A Movement Program for Children. 3rd Edition. New York: Harper and Row, Publishers, Inc.

Etnier J.L., Salazar W., Landers D.M., Petruzzello S.J., Han M. & Nowell P.
1997 The influence of physical fitness and exercise upon cognitive functioning: A meta-analysis. Journal of Sport and Exercise Psychology, 19:249-277.

Fagen, Robert M.

1977 Selection for Optimal Age-Dependent Schedules of Play Behavior. The American Naturalist. 111(979):395-414.

Fagen, Robert
1981 Animal Play Behavior. Oxford University Press.

Fagen, Robert
1993 Primate juveniles and primate play. *In*: Pereira ME, Fairbanks LA (eds), Juvenile primates: life history, development and behavior. University Of Chicago Press.

Forencich, Frank
2001 Play As If Your Life Depends On It: Functional Exercise & Living For Homo Sapiens. Seattle, WA: AtlasBooks (Go Animal).

Forencich, Frank
2007 Seminar on Play, Seattle, WA

Foucan, Sébastien
2008a Free Running: Find your way. London, UK: Michael O'Mara Books Limited.

Foucan, Sébastian
2008b George Hébert and the Natural Method of Physical Culture. Urban Free Flow. http://www.urbanfreeflow.com/the_core_level/pages/archives/methode_naturelle.htm (accessed October 29, 2008).

Fouts HN, Hewlett, BS and Lamb, ME
2001 Weaning and the nature of early childhood interactions among Bofi foragers in central Africa. Human Nature, 12:27-46.

Frost, Joe L, and Paul J. Jacobs
1995 Play Deprivation: A Factor in Juvenile Violence. Dimensions of Early Childhood, 23(3):14-20.

Frumkin, K.
2005 Bilateral Calcaneal Fractures and "Free Running": A Dangerously Cool Emerging "Sport". Annals of Emergency Medicine. 46(3):300-300.

Fry, Douglas P.
2005 Rough-and-Tumble Social Play in Humans. *In* Pellegrini, Anthony and Peter K. Smith (eds). The Nature of Play: Great Apes and Humans. New York: Guilford Press.

Fu, Cheryl
2004 Parkour : gaming in the city. Master's thesis, McGill University, Canada. http://www.arch.mcgill.ca/prof/mellin/arch671/winter2004/student/Fu/index.html (accessed September 7, 2011)

Fuggle, Sophie
2008 Discourses of Subversion: The Ethics and Aesthetics of Capoeira and Parkour. Dance Research 26:204-222. DOI 10.3366/E0264287508000194.

Galloway, Shaun M., Mark Groves, Tracey Devonport

2006 Emotional Intelligence and friendship patterns among Sport Studies Students. CELT Learning and Teaching Projects 2005/2006. Institute for Learning Enhancement (ILE). Wolverhampton, UK:University of Wolverhampton. http://hdl.handle.net/2436/7587

Germain, Duncan, director
2008 Pilgrimage. Documentary, 90 min. self-produced. Burlington, North Carolina, USA.

Geyh, Paula 2006 "Urban Free Flow: A Poetics of Parkour," M/C Journal, 9(3). http://journal.media-culture.org.au/0607/06-geyh.php (access September 7, 2011)

Ginsburg, Kenneth and the Committee on Communications and Committee on Psychosocial Aspects of Child and Family Health
2006 "The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds" Clinical Report: Guidance for the Clinician in Rendering Pediatric Care. American Academy of Pediatrics.

Giordano, Steve
1976 The making of a documentary film on autism entitled *Children apart: the autistic*. Thesis (M.Ed.)--Western Washington State College.

Goodall, Jane
1986 The Chimpanzees of Gombe: Patterns of Behavior. Boston: Bellknap Press of the Harvard University Press.

Goodall, Jane
1995 Chimpanzees and Others at Play. ReVision, 17(4):14-20. Spring Issue. Sebastopol, CA: ReVision Publishing.

Gorilla Ethograms, January 1991, compiled by The Gorilla Behavior Advisory Group, affiliated with the Gorilla SSP, Wisconsin Primate Research Center (WPRC) Library at the University of Wisconsin-Madison: http://pin.primate.wisc.edu/aboutp/behavior/gorillas2.html (access September 7, 2011).

Gosso, Y., Otta, E., Morais, M., Ribeiro, F., & Bussabb, V.
2005 Play in hunter-gatherer society. *In* Pellegrini, Anthony and Peter K. Smith (eds.) The Nature of Play: Great Apes and Humans. New York: Guilford Press.

Grandin, Temple and Catherine Johnson
2009 Animals Make Us Human: Creating the Best Life for Animals. Houghton Mifflin Harcourt.

Gray, Peter
2009 Play as a Foundation for Hunter-Gatherer Social Existence. The American Journal of Play 1(4). New York: The Strong Institute.

Griffiths, M.D., Mark N. O. Davies and Darren Chappell
2003 Online computer gaming: a comparison of adolescent and adult gamers. Journal of Adolescence. 27(1): 87-96. The Association for Professionals in Services for Adolescents. Elsevier Science Ltd.

Groos, Karl
1898 The Play of Animals. New York: D. Appleton and Company.

Groos, Karl
1901 The Play of Man. New York: D. Appleton and Company.

Grudowski, Mike
2000 Parcourse Redux. Outside Magazine, May, 2000. Archive: http://outside.away.com/outside/magazine/200005/200005body1.html (accessed February 16, 2009).

Haimoff, Elliott H.
1981 Video analysis of siamang (hylobates syndac-tylus) songs. Behaviour, 76(1/2):128-151.

Hall, G. Stanley
1883 The Contents of Childen's Minds. Princeton Review 2:249 - 272.

Hartle, Lynn and James Johnson
1993 "Historical and contemporary influences of outdoor play environments" *In* Hart, Craig H. ed., Children on Playgrounds: Research Perspectives and Applications. Suny Series, Children's Play in Society. State University of New York Press.

Hielscher, Jonas and Jiri Heitlager
2005 Wanderer - Location Independent GPS-Game. Presented at the Third International Workshop on Pervasive Gaming Applications, May 2006, in Dublin, Ireland. http://www.pixelsix.org/index.php?id=10

Hughes, Miranda
1978 Sequential Analysis of Exploration and Play. International Journal of Behavioral Development, 1(1):83-97.

Huetter, M.E.
2007 The Internet's Contributions to the Discipline of Parkour. Presented at the Northwest Anthropological Conference, Pullman, WA, 2007.

Huizinga, Johan
1938 Homo Ludens. Boston: Beacon Press.

Humphreys, Anne P. and Peter K. Smith
1987 Rough-and-tumble play, friendship and dominance in school children: Evidence for continuity and change with age. Child Development 58:201-212.

Hynes, Janette
2008 Positive Mental Attitude (PMA) League, history:
http://www.leaguewebsite.co.uk/pmafl/leaguehistory.pl (accessed February 5, 2009).

ICM Research
2008 research poll done on behalf of PlayDay, United Kingdom:
http://www.playday.org.uk/PDF/Playday-2008-opinion-poll-summary.pdf (accessed October 31, 2011).

Jenkinson, Sally
2001 The Genius of Play. Hawthorn Press.

Jonsson, Hjorleifur Rafn.
2005 Mien Relations: Mountain People and State Control in Thailand. Cornell University Press.

Kamei, Nobutaka
2005 “Play Among Baka Children in Cameroon,” *In* B. Hewlett and M. Lamb, eds., Hunter-Gatherer Childhoods: Evolutionary, Developmental, and Cultural Perspectives. Hawthorne, NY: Aldine Transaction.

Kelley, M. Elizabeth
2008a Go Play Outside: the physical discipline of Parkour as an agent of play for young adults. Presented at The Association for the Study of Play annual meeting, Tempe, AZ, 2008.

Kelley, M. Elizabeth
2008b A Collaborative Look at How Traceurs View, Engage With, and Redefine Their Environment. Poster at the American Anthropological Association’s Annual Meeting, San Francisco, CA, 2008.

Kornblum, Janet
2007 'Look, Ma, no hands' -- or feet. USA Today. 12/04/2007

Kramer, A.F., Hahn, S., Cohen, N.J., Banich, M.T., McAuley, E. Harrison, C.R., Chason, J., Vakil, E., Bardell, L,. Boileau, R.A., & Colcombe, A.
1999 Ageing, fitness, and neurocognitive function. Nature. 400:418-419. New York: Macmillan Publishing Group.

Krentz, Arthur A.
1998 Play and Education in Plato's Republic. Presented at the Twentieth World Congress of Philosophy, in Boston, Massachusetts from August 10-15, 1998. The Paideia Archive. http://www.bu.edu/wcp/Papers/Educ/EducKren.htm. (accessed September 6, 2011)

Krikler, Steve
2007 An open and shut case? Injury. 38(8):877 – 878. Elsevier.

K-Swiss
2007 K-Swiss commercial with Anna Kournikova, Tyson Cecka, Victor Lopez: http://www.youtube.com/watch?v=eMDULfCIXic. (accessed September 6, 2011)

Kuba, Michael J.; Byrne, Ruth A.; Meisel, Daniela V.; Mather, Jennifer A.
2006 When Do Octopuses Play? Effects of Repeated Testing, Object Type, Age, and Food Deprivation on Object Play in Octopus vulgaris. Journal of Comparative Psychology, 120(3):184-190. Washington, DC: American Psychological Association.

Kuo, Frances and Andrea Faber Taylor
2004 A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study. 94(9):1580-1586. American Journal of Public Health . American Public Health Association.

Kural, René
2010 Changing spaces for sports. Sport in Society. 13(2):300 – 313. London: Taylor & Francis.

Law, Jaclyn
2005 “PK and Fly.” This Magazine, May-June. http://www.thismagazine.ca/issues/2005/05/pkandfly.php (accessed October 31, 2011).

Lazarus, Moritz

1883 Ueber die Reize des Spiels (On The Benefits of Play). Berlin, Dümmler.

Le Corre, Erwan
2008 Personal interview. Also documented on website: http://www.movnat.com (accessed September 6, 2011)

Lewis, Kerrie P.
2000 A Comparative Study of Primate Play Behaviour: Implications for the Study of Cognition. Folia Primatol 71(6):417-421. doi:10.1159/000052740.

Lewis, Kerrie P.
2005 Social Play in the Great Apes. *In* Pellegrini, Anthony and Peter K. Smith (eds.) The Nature of Play: Great Apes and Humans. New York: Guilford Press.

Liers, Emil E.
1951 Notes on the River Otter (Lutra canadensis). Journal of Mammalogy. 32(1):1-9. American Society of Mammalogists.

Lightwing, Chris, director
2006 T.O.D., documentary; part of film Parkour Journeys. Catsnake Studio Productions, U.K.

Lincoln Park Zoo
2010 Balls, Bubbles, Barrels & Bear Hugs. Fact sheet. Lincoln Park Zoo, Chicago, IL. http://www.lpzoo.org/mul_article_aap.php (accessed July 10, 2010)

Loizos, Caroline
1967 Play behaviour in higher primates: a review. *in* Primate Ethology By Desmond Morris, Darryl Bruce. p. 176.

Maestripieri, Dario and Stephen R. Ross
2004 Sex Differences in Play Among Western Lowland Gorilla (Gorilla gorilla gorilla) Infants: Implications for Adult Behavior and Social Structure. American Journal of Physical Anthropology, 123:52–61.

Malina, Robert M
2006 Weight Training in Youth-Growth, Maturation, and Safety: An Evidence-Based Review. Clinical Journal of Sport Medicine. 16(6):478-487. Wolters Kluwer Health. Riverwoods, IL. doi:10.1097/01.jsm.0000248843.31874.be

Mallavarapu, Suma, T.S. Stoinski, M.A. Bloomsmith, T.L. Maple
2006 Postconflict behavior in captive western lowland gorillas (Gorilla gorilla gorilla). American Journal of Primatology. 68(8):789–801, doi:10.1002/ajp.20279

Malone, Karen
2007 The Bubble-Wrap Generation: Children Growing Up in Walled Gardens. Environmental Education Research, 13(4):513-527.

Maple, T. & E.L. Zucker
1978 Ethological studies of *play* behavior in captive Great Apes. In E.O. Smith. (Ed.), Social Play in Primates (pp. 113-141).

Maple, Terry
1980 Orangutan Behavior. Van Nostrand, Rheinhold, New York.

Martin P., and Caro T.M.
1985 On the functions of play and its role in behavioral development. Advances in the Study of Behavior 15:59-103. New York: Academic Press.

McClean, C; and J Oakshott, P Patel, R Heywood, M Darbyshire and J Pike.
2005 A Displaced Paediatric Metaphyseal Fracture Of A Distal Tibia And Fibula Sustained During Parkour - A Potentially Dangerous Recreation From France. Journal of Orthopaedics. 2(3)e4. http://www.jortho.org/2005/2/3/e4

McDonnell, S.
2002 Equid play ethogram. Applied Animal Behaviour Science. 78(4): 263 – 290. Elsevier.

McGinn, Daniel
2009 The Decline of Western Innovation: Why America is falling behind and how to fix it. NEWSWEEK, Nov 16, 2009. http://www.newsweek.com/id/222979 (access September 7, 2011)

Merriam-Webster's French-English Dictionary, pg. 255. Merriam-Webster Inc., 2000 edition.

Mervyn's California
Tyson Cecka performing free-running in commercial for Mervyn's California.
http://www.youtube.com/watch?v=IY4OEwiTHMM (accessed October 31, 2011)

Millar S.
1981 Play. *In* D. McFarland, ed., The Oxford Companion to Animal Behavior. 457-460. Oxford University Press.

Miller, Greg
2005 Computer Game Sharpens Aging Minds. Science. 11/25/2005, 310(5752):1261.

Miller, J; and S. Demoiny
2008 Parkour: A New Extreme Sport and a Case Study. The Journal of Foot and Ankle Surgery 47(1): 63 – 65. Elsevier.

Miller, Michelle N, and John A Byers
1991 Energetic cost of locomotor play in pronghorn fawns. Animal Behaviour, 41(6):1007-1013.

Morel, Pierre, dir.
2004 Banlieue 13. Film. Luc Besson Production, France.

Mörtenböck, Peter
2007 Free Running and the Hugged City. Thresholds #30. The MIT Press.

Murphy, Z.
2006 Parkour Craze Reaches New Heights. Pediatrics. Nov. 2006, 118(5):1961. American Academy of Pediatrics.

National Center for Health Statistics (NCHC)

2007 Table 73: Leisure-time physical activity among adults 18 years of age and over, by selected characteristics: United States, 1998, 2004, and 2005. National Center for Health Statistics, Center for Disease Control and Prevention. U.S. Government.

Neighmond, Patti
2011 Think You're An Auditory Or Visual Learner? Scientists Say It's Unlikely. Shots, NPR Health Blog. August 29, 2011. National Public Radio.

Netz, Yael
2007 "Physical Activity and Three Dimensions of Psychological Functioning in Advanced Age: Cognition, Affect, and Self-Perception." *In* Tenenbaum, Gershon & Robert C. Eklund, Eds., Handbook of Sport Psychology. New York: Wiley.

Nike
One of several commercials featuring traceurs for Nike Presto shoes: http://www.youtube.com/watch?v=YpkSb04fA_4; (accessed June 16, 2009)

Nishida, Toshisada
2004 Lack of 'group play" in wild chimpanzees. Pan Africa News. 11(1): http://mahale.web.infoseek.co.jp/PAN/11_1/11(1)_02.html (accessed May 19, 2010)

Nishida, Toshisada, William Wallaue
2003 Leaf-pile pulling: An unusual play pattern in wild chimpanzees. Brief Report: American Journal of Primatology. 60(4):167 – 173.

Office of the United Nations High Commissioner for Human Rights
1990 Convention on the Rights of the Child http://www2.ohchr.org/english/law/crc.htm (accessed October 31, 2011)

O'Neill, P.L.
1988 Developing effective social and environmental enrichment strategies for macaques in social groups. Lab Animal, 17:23-24.

O'Neill, P.L.
1989 Short-term and long-term benefits of environmental enrichment on laboratory raised rhesus monkeys (*Macaca mulatta*). American Association of Zoological Parks and Aquariums Regional Conference Proceedings, 616-625.

O'Neill-Wagner, Peggy
2009 Personal email correspondence with author.

Organisation for Economic Co-operation and Development (OECD)
2002 OECD Employment Outlook 2002. Statistical Annex, Table F, p. 320. OECD Publishing.

Ortega, Marcella
2006 Urban sport uses UNM as playground. New Mexico Daily Lobo. University of New Mexico, Albuquerque, NM, (Sept. 7, 2006).

Owens, Kathryn
2009 Personal correspondence with the author.

Oz, Mehmet
2007 Parkour, without the suicide. Esquire Jul.2007, 148(1):56.

Palagi, E.
2007 Sharing the motivation to play: the use of signals in adult bonobos. Animal Behaviour. 75: 887-896 Part 3.

Palagi E., & T. Paoli
2008 Social play in bonobos: not only an immature matter. In: THE BONOBOS: Developments in Primatology: Progress and Prospects. pp. 55-74, DOI: 10.1007/978-0-387-74787-3_4

Parkour Visions (formerly Pacific Northwest Parkour Association) website, "Parkour Terminology" 2011 http://pnwpa.com/resources/Parkourterminology.php (accessed September 7, 2011)

Patrick, George T.W.
1916 The psychology of relaxation. Boston: Houghton Mifflin.

Pellegrini, Anthony D.
2005 Recess: Its Role in Education and Development. Mahwah, N.J.: L. Erlbaum Associates.

Pellegrini, A. D., Dupuis, D., & Smith, P. K.
2007 Play in evolution and development. Developmental Review, 27:261-276.

Pellegrini A. D., Horvat M., Huberty P.
1998 The relative costs of childrens' physical play. Animal Behaviour, 55(4):1053-1061.

Pellegrini, A.D., and Peter K. Smith
1998a Physical Activity Play: Consensus and Debate. Child Development 69(3):609-610. Society for Research in Child Development.

Pellegrini, Anthony D., and Peter K. Smith
1998b The development of play during childhood: forms and possible functions. Child Psychology & Psychiatry Review. 3(2):51-57.

Pellegrini, Anthony and Peter K. Smith (eds).
2005 The Nature of Play: Great Apes and Humans. New York: Guilford Press.

Pellis, S.M. and Iwaniuk, A.N.
2000 Adult-adult play in primates: A comparative analysis of its origin, distribution, and evolution. Ethology. 106:1083-1104.

Pereira, M.E., & L.A. Fairbanks, eds.
1993 Juvenile Primates. New York: Oxford University Press.

Philadelphia Zoo
2010 Western Lowland Gorilla Fact Sheet. Philadelphia Zoo Website: http://www.philadelphiazoo.org/zoo/Meet-Our-Animals/Mammals/Primates/Western-Lowland-Gorilla.htm (accessed September 7, 2011).

Piaget, Jean
1953 The Origins of Intelligence in Children. London: Routledge and Kegan Paul.

Piaget, Jean
1962 Play, Dreams and Imitation in Childhood. New York: Norton.

Pika, Simone & Klaus Zuberbuhler
2008 Social games between bonobos and humans: evidence for shared intentionality? American Journal of Primatology. Mar2008. 70(3):207-210.

Play With a Purpose – Development & Learning Products for Young Children.
2009 http://www.pwaponline.com/ (accessed March 10, 2009)

Pratt, Murray
2008 Urban Displacement and Plurality at the Movies. Politics of Culture, Society for French Studies Conference Proceedings. University of Oxford.

Prince of Persia: The Sands of Time (2010), dir. Mike Newell, Walt Disney Pictures.

Pufall, Peter B.; Pufall, Elizabeth.
2008 The Relationship between Play and Culture. Human Development, 51(5/6):390-398. doi:10.1159/000170901

Ramirez, Marc
2007 Parkour practitioners leap, bound and tumble in their urban playground. Seattle Times. August 26, 2007. The Seattle Times Company.

Ramocki, S. P.
2002 Creativity Interacts with Fitness and Exercise. The Physical Educator Late Winter: 8-17.

Rawe, Julie
2007 Student Stuntment. TIME Magazine. Apr. 5. TIME Inc.

Ribnik, R.
1982 A short history of primate field studies: Old World monkeys and apes. In: Frank Spencer, editor, A History of American Physical Anthropology, 1930-1980. San Diego, CA: Academic Press, pp.49-73.

Reichard, Ulrich and Volker Sommer
1997 Group Encounters in Wild Gibbons (Hylobates lar): Agonism, Affiliation, and the Concept of Infanticide. Behaviour. 134:1135-1174. The Netherlands:BRILL Publishing House.

Rose, Gillian
2007 Visual Methodologies: An Introduction to Interpreting Visual Materials, 2nd edition. Beverly Hills, CA: Sage Publications.

Roth, Tim
2006 Sebastien Foucan hired for 'Casino Royale': Pioneer of "Parkour" booked for special stunt job. CommanderBond.net . http://commanderbond.net/article/3081 (accessed April 28, 2008).

Rowe, Noel and Marc Myers

2003 “Photography and video for field researchers” *In* Setchell, Joanna M. and Deborah J. Curtis, eds., Field and Laboratory Methods in Primatology: a practical guide. New York: Cambridge University Press.

Ryan, Zoe, Ed.
2006 The Good Life: New Public Spaces for Recreation. New York: Princeton Architectural Press.

Saczawa, Mary
2005 The Types and Duration of Play in a Solitary Species (Pongo pygmaeus) versus a Social Species (Mandrillus leucophaeus). Oxford Journal of Anthropology, 1 (Spring 2005).

Saville, Stephen John
2008 Playing with fear: Parkour and the mobility of emotion. Social & Cultural Geography. 9(8):891-914. Taylor & Francis. doi:10.1080/14649360802441440

Schaller, George
1963 The Mountain Gorilla: Ecology and Behavior. University of Chicago Press.

Schore, A.N.
2000 The self-organization of the right brain and the neurobiology of emotional development. *In* M.D. Lewis & I. Granic, Eds., Emotion, Development, and Self-Organization, (pp. 155-185). New York: Cambridge University Press.

Scott, David; Fern K. Willits
1998 Adolescent and Adult Leisure Patterns: A Reassessment. Journal of Leisure Research. 30.

Scott, Eric and Panksepp, Jaak
2003 Rough-and-Tumble Play in Human Children. Aggressive Behavior, 29:539–551.

Sedig, Kamran
2008 From Play to Thoughtful Learning: A Design Strategy to Engage Children with Mathematical Representations. Journal of Computers in Mathematics and Science Teaching. 27(1):65-101.

Sheets-Johnstone, Maxine
1999 The Primacy of Movement, Johns-Benjamin Vol. 14, Advances in Consciousness Research.

Shore, R.
1997 Rethinking the Brain: New Insights into Early Development. New York, NY: Families and Work Institute, pp. 16-17.

Sieh, Cat
2007 Parkour: it’s fast, fluid and fun. Outdoors Section. The Bellingham Herald. Apr. 7, 2007.

http://sim.sstwo.net/yamakasi.html
2006 The Yamakasi. Description of the Yamakasi and the movie featuring the Parkour team. (accessed September 6, 2011).

Singer, Jerome L.
1973 Child's World of Make-Believe: Experimental Studies of Imaginative Play. New York: Academic Press.

Singer, Dorothy G., & Jerome L. Singer

1990 The House of Make-believe: Children's Play and the Developing Imagination. Cambridge, MA: Harvard University Press.

Singer, JL, DG Singer, and AE Schweder.
2004 Enhancing Preschoolers' School Readiness Through Imaginative Play with Parents and Teachers. *In* Clements, Rhonda L. and Leah Fiorentino, Eds. The child's right to play: a global approach. Westport, Conn.: Praeger.

Singer, Dorothy G., and Jerome L. Singer
2007 Imagination and Play in the Electronic Age. Harvard University Press.

Smith, Peter K.
1982 Does play matter? Functional and evolutionary aspects of animal and human play. The Behavioural and Brain Sciences, 5:139-184.

Smith, Peter K.
2004 Play: Types and functions in human development. *In*: B.J. Ellis and D.F. Bjorklund, Eds., Origins of the social mind: evolutionary psychology and child development, pp. 271–291. New York: Guilford Press.

Smith, Peter K.
2005 Social and Pretend Play in Children, In Pellegrini, A.D. & Smith, P.K., Eds., The Nature of Play: Great Apes and Humans. New York: The Guilford Press.

Smith, Peter K.
2010 Children and Play. West Sussex: U.K.: John Wiley & Sons.

Sothern, Melinda S.; Loftin, J. Mark; Udall, John N.; Suskind, Robert M.; Ewing, Thomas L.; Tang, Si Chin; Blecker, Uwe
2000 Safety, Feasibility, and Efficacy of a Resistance Training Program in Preadolescent Obese Children. American Journal of the Medical Sciences. 319(6):370-375. Birmingham, AL: Southern Society for Clinical Investigation.

Spencer, Herbert
1873 The Study of Sociology, New York, D. Appleton and Company.

Spiegel, Alix
2008 Old-Fashioned Play Builds Serious Skills, NPR, February 21, National Public Radio. http://www.npr.org/templates/story/story.php?storyId=19267988. (accessed September 7, 2011)

Sprite
Commercial featuring free-running: http://www.youtube.com/watch?v=r9ZSCj9Fc9g, (accessed September 7, 2011)

Steinberg, H., Sykes, E. A., Moss, T., Lowery, S., LeBoutillier, N., and Dewey, A.
1997 Exercise Enhances Creativity Independent of Mood. British Journal of Sports Medicine 31(3): 240-245.

Stahler, Daniel R. and Stahler, Douglas W. Smith, and Robert Landis
2002 The acceptance of a new breeding male into a wild wolf pack. Canadian Journal of Zoology. 80(2): 360–365. NRC Research Press. Canada.

Stapleton, Scott and Susan Terrios
2010 Le Parkour: Urban Street Culture and the Commoditization of Male Youth Expression. International Migration. Published online. doi:10.1111/j.1468-2435.2010.00616.x

Stockton, Shreve
2009 The Daily Coyote. Blog. http://www.dailycoyote.net/. Copyright Shreve Stockton.

Stoel-Rives LLC
2008 Advertisement for Stoel-Rives LLC law firm, http://www.youtube.com/watch?v=8LHvTkxYvzw, (accessed September 7, 2011)

Sutton-Smith, Brian
1979 Play and Learning, New York: Haldsted Press.

Sutton-Smith, Brian, Ed.
1980 Play and Learning. John Wiley & Sons Inc.

Sutton-Smith, Brian
1997 The Ambiguity of Play. Cambridge, MA: Harvard University Press.

Sutton-Smith, Brian
2005 Foreword *In* Burghardt, Gordon M., ed. The Genesis of Animal Play: Testing the Limits. Cambridge, MA.: The MIT Press.

Symons, D.
1978 Play and Aggression: A Study of Rhesus Monkeys. New York: Columbia University Press.

Takahashi, Marina
2005 Parkour takes leap in popularity in U.S., By Marina Takahashi, The Seattle Times, Living Section, September 12 2005 issue. The Seattle Times Company.

Taylor, Gretel
2008 Locating: Place and the Moving Body. Submitted in partial fulfilment for the Degree of Doctor of Philosophy. Victoria University, Melbourne, Australia.
http://bodyplaceproject.com/text%20files/Gretel_Taylor.pdf (accessed May 19, 2010).

Turnbull, Colin M.
1972 The Mountain People. New York: Simon & Schuster.

van Lawick-Goodall, Jane
1968 The behaviour of free-living chimpanzees in the Gombe Stream Reserve. Animal Behaviour Monographs, 1:161-311.

Visalberghi, Elisabetta, Elsa Addessi, Valentina Truppa, Noemi Spagnoletti, Eduardo Ottoni, Patricia Izar and Dorothy Fragaszy.
2009 Selection of Effective Stone Tools by Wild Bearded Capuchin Monkeys. Current Biology 19(3):213-217.

Vygotsky, L.S.
1967 Mind and Society. Translated from 1930 Russian edition. Harvard University Press.

Washburn, Sherwood
1978 Human evolution: Biosocial perspectives, edited with Elizabeth McCown. Benjamin/Cummings Pub. Co. Menlo Park, California

Weiner, Adam
2009 The Physics of Free Running: Before you leap, look to Newton. The Break Down, Popular Science Magazine. Posted 05.06.2009 (http://www.popsci.com/entertainment-amp-gaming/article/2009-05/physics-free-running) (accessed September 7, 2011)

Weisler, Ann; McCall, Robert R.
1976 Exploration and play: Resume and redirection. American Psychologist. 31(7):492-508. doi:10.1037/0003-066X.31.7.492

Whaley, Diane
2007 "Life Span Development Approach to Studying Sport and Exercise Behavior" *In* Tenenbaum, Gershon & Robert C. Eklund, Eds., Handbook of Sport Psychology. New York: Wiley.

Whalley, Lawrence
2001 The Ageing Brain. Columbia University Press.

Wilkinson, Alec
2007 No Obstacles: Navigating the world by leaps and bounds. Reports and Essays. New Yorker. April 16 2007. New Yorker Magazine Inc.

Wilson, Susan C. and Devra G. Kleiman
1974 Eliciting Play: A Comparative Study. American Zoologist 14(1):341-370. doi:10.1093/icb/14.1.

Wilson, E.O.
1975 Sociobiology, The New Synthesis. Cambridge: Belknap Press.

Yamakasi: About
2009 The Yamakasi. http://sim.sstwo.net/yamakasi.html (accessed February 16, 2009).

Zeitoun, A. (Director)
2001 Yamakasi: les samouraï¨s des temps modernes, Europa.

Zimmerman, Caroline
2007 Urban Monkeys. McGill Daily, Montreal QC. 96(31):12 (Jan. 29, 2007).

Zinn, Harry, and Alan Graefe
2007 Emerging Adults and the Future of Wild Nature. International Journal of Wilderness 13(3). US Federal Forest Service.

Zucker, Evan L., M. Beth Dennon , Stephanie G. Puleo, Terry L. Maple
2004 Play profiles of captive adult orangutans: A developmental perspective. Developmental Psychobiology 19(4):315 – 326.