The author seeks to expand the notion of the “play cycle,” first introduced in 1998, to include the “functional cycle,” with its “perceptual cue,” touted by Jakob von Uexküll. He also discusses Simon Nicholson’s theory of “loose parts” and James J. Gibson’s notion of “affordances.” He outlines the impact of these and his now-revised play cycle and its perceptual cues on professional playwork and other play-related activities, especially those in preschool, child care, and the early years of education. Key words: functional circle; Jakob von Uexküll; play cycle; play process; playwork

Introduction

In 1998, Gordon Sturrock and Perry Else introduced the “play cycle” (Sturrock and Else 1998). The play cycle is described as the “process of play” (Else 2011, 287), in which the focus lies on process rather than on the outcomes of play (Newstead and King 2021). This is a key feature of playwork practice in the United Kingdom (UK), underpinned by the eight playwork principles (Playwork Principle Scrutiny Group 2005). Playwork in the UK is defined as “a highly skilled profession that enriches and enhances provision for children’s play. It takes place where adults support children’s play, but it is not driven by prescribed education or care outcomes” (SkillsActive 2010, 3).

In addition to playwork, the play cycle has been used in other play-related contexts in child care and the early years of education (King and Newsread 2021) and in working with children diagnosed with autism (Conn 2016). Since its introduction in 1998, the play cycle now underpins playwork professional practice, playwork education, and playwork training (King and Newstead 2020).

Sturrock and Else (1998) developed their theory within the fields of depth psychology and therapeutic epistemology and constructed the play cycle. The
play cycle has six elements: metalude, play cue, play return, play frame, loop and flow, and annihilation. They expressed this as a formula of \( L(Ludic \text{ or Play Cycle}) = \text{Metalude} (M-L) \cdot \text{Time} (T>) \cdot \text{Active Development} (@) \cdot \text{Loop and Flow} (§) \), in which the content and meaning of play is situated in a therapeutic context with reference to Donald Winnicott, Ken Wilber, and Carl Jung (King and Sturrock 2020).

The play cycle continued to feature in their individual writing and thinking, for example Sturrock’s interpretation of Winnicott’s “third area” (Winnicott 1971), which Sturrock (2003) called “the ludic third, and Else’s incorporation of Wilber’s (1980) transpersonal view of human development into an “integrated play framework” (Else 2009).

A review of the play cycle (King and Sturrock 2020) provided a theoretical background for each of its elements. For example, the play cue can be linked to the concept first used by Bateson (1955, 1972) and the play frame by Goffman (1974), who built upon the work of Bateson. For a fuller theoretical understanding of the six elements of the play cycle, see the first chapter of \textit{The Play Cycle: Theory, Research, and Application} (King and Sturrock 2020).

In 2018 King and Newstead undertook a study of the understanding of the play cycle by playwork practitioners and, in particular, how they viewed each of its six elements twenty years after the authors had presented a seminal paper about it at the International Play Association (IPA) triennial conference in Colorado. A review of the playwork literature found variations in how each of the six elements of the play cycle had been originally defined in the Colorado paper. These variations were reflected in an online survey, which resulted in a revision of the each of the six elements to reflect both the current understanding by playworkers and the original definitions provided in the Colorado paper, changing two elements from the original paper and revising the descriptions of all the elements (King and Newstead 2020; King and Sturrock 2020).

The revised six elements of the play cycle now are: pre-cue; play cue; play return; play frame; flow; and annihilation (King and Newstead 2020), with clear definitions for each element that enable a more consistent use and understanding of the play cycle in both education and professional practice and that supports the empirical research of \textit{The Play Cycle: Theory, Research, and Application} (King and Sturrock 2019). A revised formula was also developed: \( L(Ludic \text{ or Play Cycle}) = \text{Pre-Cue} (P-C) \cdot \text{Time} (T>) \cdot \text{Active Development} (@) \cdot \text{Loop and Flow} (§) \) (King and Sturrock 2020).

As a playwork theory, the play cycle has supported professional practice for
both playworkers (King and Newstead 2019a) and child care workers (King and Newstead 2019b), allowing practitioners to focus more closely on play behavior and to be more consistently observant. The two studies showed that, although the play cycle was first introduced and developed within playwork as a theory, it continues to be useful for playwork practice, education, and training.

The play cycle has also been used to develop an observational tool—the play cycle observation method (PCOM)—that records the process of play. Two pilot studies have shown it to be a reliable way to record the play cues and play returns that form play cycles. The first study, using video, recorded marked similarities among the play cycles of the participants (King 2020). The second pilot study was undertaken in real time in a preschool setting with high interrater reliability using Cohen Kappa (King, Atkins, and Burr 2021). The PCOM records play cues and their rate of return (play return) to establish play cycles. The play return can come from both human and nonhuman sources. For example, an object in the environment may be the play return children need to form their play cycle. The PCOM has implications for anybody who works with children in a play context that includes day nurseries, preschool, and educational settings.

For play to take place—and for play cycles to form—an environment, or a play space, needs to be available. The play space will vary in size and shape and with the objects available and the people who use them. In turn, whatever children want to do in the play space will be determined by these factors. The play space therefore may consist of natural or person-made structures and include people, animals, and objects—anything a person perceives from the environment, or what Gibson (1986) calls “affordances.” An affordance comprises a “resource or support that the environment offers an animal; the animal in turn must possess the capabilities to perceive it and to use it” (Gibson, Cornell, and Gill 2017), where “it is a mistake to separate the natural from the artificial as if there were two environments, artefacts have to be manufactured from natural substances. It is also a mistake to separate the cultural environment from the natural environment, as if there were a world of mental products distinct from the world of material products” (Gibson 1986, 130).

Gibson referred to such an environment as involving the activities of looking, listening, touching, and sniffing. And what a person perceives from this environment will vary, as Heft (2003) explains: “At a minimum, affordances are specified relative to an individual. More than that, however, affordance meaning is also typically established by a feature’s relation to a broader environmental context. This claim is most easily supported with reference to cases where the
same object can have different functional meanings in different environmental contexts” (172).

The availability of manipulatable objects with which children can play finds theoretical support in what Nicholson (1971) calls the “theory of loose parts,” based on the idea that “in any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it” (30). Basically, the more things in an environment that can be used, manipulated, changed, created, or destroyed, the more the environment can offer for play. Nicholson’s theory of loose parts is now widely accepted, both within the playwork profession (Wilson 2010) and in other play and child-related fields like childhood development (Gibson et al. 2017), preschool instruction (Maxwell et al. 2008), child care (Olsen and Smith 2017) and the early years of education (Gull et. al. 2019; Flannigan and Dietze 2017). How children interact with the play space, who is in the space, and what resources are available have been linked to Gibson’s affordances. Children’s play and affordances have been considered in relation to playwork by King and Sills-Jones (2018), to preschool by Sandseter (2009) and to the early years of education by Little and Sweller (2015).

The three concepts of the play cycle, loose parts, and affordances—and how they interact in children’s play—resemble what Sturrock and Else (1998) termed “ludic ecology,” the “field of internalized play,” meaning the “internalized play space of the child and its meeting with the external world” (83). The theory of the play cycle and the meeting of the internal world of the child with the external world still lacks a theoretical basis for establishing how the play space promotes or initiates children’s play—that is, how it sparks the pre-cue. This forms the focus of this article, in which we offer an addition to the play cycle—the play environment that can help initiate play, based on von Uexküll’s functional circle (von Uexküll 1982).

**The Theoretical Model of the Play Cycle in Brief**

The Colorado paper that first introduced the play cycle used several theories from depth psychology, which shaped the original theoretical model (King and Sturrock 2020). These included Winnicott’s (1971) potential space, Bateson’s (1955, 1972) play cues, Goffman’s (1974) play frames, and Csiksmihalyi’s (1975) flow that linked with the process of play to establish a play cycle connecting children’s inner and outer worlds. The focus on the process of play allowed
us to assert that children control their own play (initiated consciously or subconsciously) supported by adults (playworkers, child care workers, preschool workers, and others). Children’s play aims not to satisfy any adult-generated outcomes, even educational ones. If adults control the play cycle, it becomes subject to what Sturrock and Else (1998) term “adulteration.” So the play cycle considers the adult role in supporting the process of play using a four-level intervention hierarchy (Sturrock and Else 1998; Sturrock, Else, and Russell 2004). The initial hierarchy was established in a therapeutic context, but it has since come to support the day-to-day practice of playworkers (King and Newstead 2020) and child care workers (King and Newstead 2022) as they facilitate children’s play. The four levels in the play cycle are play maintenance, simple involvement, medial intervention, and complex intervention (Sturrock and Else 1998; Sturrock, Russell, and Else 2004).

Play maintenance calls for the adult involved to take a more observational role and simple involvement allows them to act as a resource (providing materials, for example). Both play maintenance and simple involvement require the adults to remain passive and not to get actively involved in the play cycle. A more active role for the adults in the play cycle occurs with medial intervention and complex intervention. For medial intervention, the adults often respond to children’s play cues inviting them into the kids’ play. In complex intervention, both the children and adults may be issuing play cues in a kind of deep play—for example, role play or fantasy play (see King and Temple 2018).

The play cycle has, during the last twenty years, supported playwork practice, education, and training, and it has provided a theory for play in other contexts like child care. The interaction between the playing child and the environment will influence the play cues that emerge from the child’s inner world into the outer world, forming a play cycle. However, before play cues are emitted, the environment (and the objects, both human and nonhuman, in the environment) may stimulate the pre-cue (or the conscious or unconscious thought that results in a play cue). This appears to constitute a missing thread from the play cycle theory—one that should be included when we consider von Uexküll’s (1982, 2010) functional cycle. This missing thread, too, forms a major focus of this article.

**Von Uexküll’s Functional Cycle**

Von Uexküll’s (1982, 2010) functional cycle is based on the ethological study
of animal behavior and the patterns formed by the interaction of animals and their surrounding environment. We call this interaction of living organisms and systems that so interested von Uexküll “biosemiotics.” In biosemiotics, animals and their environments are considered a single system. This system von Uexküll called an umwelt (von Uexküll 1982, 2010). An umwelt is a “subjective universe” (von Uexküll 1982, 29) experienced subjectively by the animal. Feiten (2020) explains von Uexhull’s umwelt this way: “The Umwelt constitutes the sum total of the subject’s experience, but the process in which the organism constructs its own Umwelt is not conscious and not accessible to the subject in its experience. Instead, the meaningful objects and the space in which we encounter them appear to us as objective reality” (2).

Von Uexküll refers to the environment—and what the environment contains—as a “meaning carrier” (von Uexküll 1982, 26). What the environment offers for any animal may be perceived differently and provide a different meaning to the animal. The interaction between an animal and the environment thus may differ, as Heft (1988) says, in relation to affordances. Von Uexküll (1982) suggests that each object carries a meaning perceived by an animal but influenced by the environment and its contents. Von Uexküll’s umwelt and meaning carrier have the same properties as the affordances developed by Gibson. For Gibson (1986), these affordances refer “to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment” (127) and what the environment can offer the animal.

Here, both von Uexküll and Gibson are talking about the relationships between environments and animals in which “objects are experienced ultimately in terms of their functional significance” (Reybrouck 2012, 321), and each parallels each other’s theories (Feiten 2020). Von Uexküll’s original subjective nature of the umwelt developed into a dual description of properties of the organism reciprocal with properties of the environment. This resembles Gibson’s (1986) concept of affordance in relation to the subjective “fact of behavior” of the individual but also the objective “fact of the environment” (Futlot and Turvey 2019, 305). Another link between von Uexküll and Gibson is the notion of “the specificity of organism–environment mutuality” in which information “couples the organism’s perceptual organs to the ecological properties of its environment” (309) as a behavioral system.

In relation to play, Pellis and his colleagues suggest an initial universal behavioral system in which “the structural components are the same and the functional associations of those components are similar,” allowing different lin-
eages to use the same core, causal processes to produce comparable outcomes repeatedly (Pellis et. al. 2019, 6). This idea fits the play cycle’s process of play, whether that play involves the locomotor, object, or social play types proposed by Burghardt (2005) or the more typical five types of play—physical play, object play, social play, creative play, and rough and tumble (Whitebread et al. 2012). The same process of pre-cue and play cue applies to any type of play. Pellis and his colleagues call it a “play syndrome,” one that makes “all play behavior systems one system, but one that may have different behavioral manifestations” (Pellis et al. 2019, 6). Such behavioral manifestations constitute the different types of play in the play cycle or functional cycle that governs how children interact with the environment.

Meaning Carriers and Loose Parts

When we consider the play environment—the space and the objects in the space—and the people who inhabit it (whether other children or adults), both become potential meaning carriers. These meaning carriers have two properties. The first relates to what von Uexküll (1982) termed the “perceptual cue” that an animal picks up from the environment (or the object—that is, objective structure received by the subjective animal). The animal issues, in turn, an “effector cue,” its response to the meaning carrier. The effector cues are “mostly imprinted upon other properties of the meaning carrier” (31) that the animal will use for its own purpose. Von Uexküll called this the “meaning-utiliser” (30). He suggested that the perceptual cue, which came from the meaning carrier, and the responding effector cue, which came from the animal, together form a functional cycle: “Because every behavior begins by creating a perceptual cue and ends by printing an effector cue on the same meaning-carrier, one may speak of a functional circle that connects the meaning-carrier with the subject.” For example, a child may see a cardboard box in the play environment. The cardboard box becomes the meaning carrier by catching the attention of the child as a perceptual cue. The cardboard box (meaning carrier) has properties that children will use for their own purposes. They don it like a hat, or squat on it like a seat, or kick it like a football. The importance of the play space potentially provides perceptual cues related to the need for many different resources, which Nicholson (1971) called variables. The loose parts (or meaning carriers) in the environment offer more objects with different properties that children can perceive (perceptual cue) and
use (effector cue). The more loose parts, the more the environment affords to the child. The link between Nicholson’s concept of loose parts and Gibson’s concept of affordances with playwork has been well established (Lester and Maudsley 2007; King and Sills-Jones 2018). In relation to the play cycle, the two concepts of loose parts and affordances offer a notion about what children can perceive in the space—in essence, the play space around them.

The Play Cycle as a Functioning Cycle

Figure 1 shows the play cycle. The pre-cue within the child's inner world emits the play cue to the child's outer world. Here, the play cue is picked up by a group of children who respond to the play cue (play return). The play return goes back to the child's inner world and forms the play cycle. The play cycle continues, and the play cues and play returns continue as the play goes into the state of flow. The play cycle exists in the play space and has a boundary (physical or nonphysical) that forms the play frame. Eventually the play cycle or play frame loses meaning and the play cycle gets annihilated (see King and Sturrock 2020).

The play cycle focuses on the process of play (Sturrock and Else 1998),

![Figure 1. The play cycle](image-url)
which allows us to consider it in any play-related context. For example, the different types of play put forward by Burghardt (2005), Hughes and Melville (2002), and Whitebread et al. (2012) will involve children creating or being involved in play cycles. In addition, play has been described in educational, therapeutic, and developmental contexts and used to meet educational, therapeutic, or developmental outcomes. However, to get such outcomes, there has to be a process, and it is in this process that the six elements of the play cycle can be used to describe either in isolation or in conjunction with a more objective focus for play. Whatever the context or the type of play, for it to take place the environment has to be able to stimulate and provide the resources needed.

The functional cycle clearly has resonance with the play cycle (King and Sturrock 2020; Sturrock and Else 1998), and this can be seen in Burghardt's (2005) argument that von Uexküll's concept of the functional cycle unites the external and internal stimuli by viewing motivation as an internal mechanism in relation to animal social play. Burghardt explains how the “cue bearer can be the physical environment as well as the specific object” (135) in which the “responses by an animal to an object or another animal can in turn alter the features of the object or produce responses by the object” (6).

When the perceptual cue comes from the environment, an object or person in the environment will send information from the objective outside world that may stimulate the pre-cue within the child's inner world. This results in the play cue (von Uexküll called it the effector cue) being emitted. If the play cue (or effector cue) gets picked up—or a play return happens—then the play cycle forms. The environment, the objects, and the people within that space all become meaning carriers to the child, and the formation of the play cycle within the play frame forms the meaning utilizer. Kyttä (2002) called these potential affordances (meaning carriers) and actualized affordances (meaning utilizers). The more objects (meaning carriers), the more potential affordances there are for children to use to engage in play and to auctualize the affordances, which could be the different types of play children engage in (meaning utilizers).

The play cycle enables children to merge their subjective inner worlds to the objective outer world. This interaction of the inner and outer world reflects von Uexküll's umwelt because it “describes how the physiology of an organism's sensory apparatus shapes its active experience of the environment” (Feiten 2020, 2). Figure 2 expands on the original diagram of the play cycle created by King and Sturrock (2020) and also includes the placement of four hierarchical levels. For play maintenance, the adult is situated outside the play frame and takes on
an observer role. Simple involvement occurs when the adult acts as a resource and is situated just inside the play frame but is not active in the child's play cycle. For medial intervention, the adult may receive a cue to play and be active in the play cycle. In complex interventions, such as role play, both children and adults may take on roles, in which case the play has both the adults and children issuing cues (although the adults have to be careful not to take over the play cycle and adulterate it). In both medial interventions and complex interventions, the adults have a more active role in the play cycle.

The play cycle containing both the child's subjective inner world and the objective outer world reflects von Uexküll's umwelt. As Feiten (2020) wrote: “In order to account for subjective experience, we have to consider both the scientific perspective on an organism from the outside and its own experience from the inside” (6).

The subjective experience can receive an external perceptual cue from the environment, the play space, and everything that it contains, that is, Nicholson's loose parts. This can consist of both organic and inorganic content, which includes natural objects (e.g., trees), built objects (e.g., walls), moveable objects

Figure 2. Expanded play cycle including four hierarchical levels of adult intervention
Theoretical Expansion of the Play Cycle

(e.g., cardboard boxes), other animals, and people as sources for the external perceptual cue, or what von Uexküll called meaning carriers. The meaning of the external perceptual cue will be different for each person and in relation to the umwelt in which “the meaningful objects and the space in which we encounter them appear to us as objective reality” (Feiten 2020, 1).

Implications of the Functional Cycle for the Play Cycle

Von Uexküll’s functional cycle provides a relevant addition to the play cycle. The close links between how organisms perceive their environment relate to the objective outer world perceived by the child’s inner world as set out in the play cycle. We need to include the external perceptual cue, von Uexküll’s meaning carrier, from the external environment, but it should not to be confused with the play cue issued by the child as the stimulus for the pre-cue.

Although children may know how they want to play before they get to play spaces, pre-cues may—consciously or unconsciously—have already determined the play cues to be issued and may need stimuli from the external environment. However, it is possible that something in the external environment, whether a person or an object, may be perceived and processed by the child, which then forms an idea (pre-cue) to play. In this case, although the perceptual cue from the external environment is not deliberately aimed at the child, the child’s senses will perceive an idea to play. For example, if there are other children in the play space, a child may perceive them (perceptual cue) and want to play with them, so he or she sends out a play cue. If, for example, other children in a play space send a cue to the child, this is not a perceptual cue, it is a play cue from other children with an invitation to play. Perceptual cues are not intentionally sent, they are perceived; play cues have intent.

As well as linking with the pre-cue, the external perceptual cues from the external environment can provide a theoretical link with the ideas of affordances and loose parts. Both affordances and loose parts are commonly cited in the playwork literature when both organic and inorganic aspects of the environment can provide stimuli through smell, touch, taste, sound, and sight—what Hughes (2012) called part of the “playwork menu.” Perceived cues from the external environment can come through one or more of the five senses and be processed within a child’s inner world. As von Uexküll (1982) wrote: “The guide-rope of each functional cycle, insofar as it runs through the animal’s body, is the ner-
vous system, which, beginning with receptors (sense organs), guides the current stimulation through the central perception and effect organs to the effectors” (146). The response to the perceptual cue from the external environment could then be an idea to play, a pre-cue that may become a play cue.

Although the play cycle first originated to support playwork practice, the concept can be applied to any environment in which children play. This includes in preschool, child care, the early years of education—and in therapeutic contexts. In addition, the theories of loose parts and affordances have become commonplace in playwork thinking. Although the play cycle focuses on the process of play and applies to any type of play, the theory lacks the link between the environment and how it and the objects within it may stimulate (consciously or unconsciously) through von Uexküll’s perceptual cue within the functional cycle. It proves a useful addition to the play cycle.

The perceptual cue provides the relevant theoretical link between von Uexküll’s functional circle and the pre-cue (i.e., the conscious or unconscious idea to play), the initiation of the play cue from the child’s inner world emitted into the outer world. Von Uexküll’s perceptual cue also provides a theoretical link between loose parts and affordances to the play cycle, two concepts strongly related to play across different contexts. What children perceive from the environment (perceptual cue) will depend on what lies in the play space, the people, and resources available. Kyttä’s (2002) study of children’s mobility considered two aspects of affordances, those which are perceived to come from the environment and those which are actualized by the individual. The environment offers different types of affordances, including structural, functional, and social (Heft 1988; Hyvönen and Juujärvi 2005; King and Howard 2014), and they reflect the fixed structures, objects, and people that could provide perceptual cues. Kyttä referred to the environments that have the least actualized affordances as “wasteland” and “cell” but called those with more actualized affordances “glasshouse” and “Bullerby.” The more potential affordances the environment offers, the more an individual can actualize them. To put it another way, the more objects to play with, the more types of play can be actualized.

**Conclusion**

The play cycle first introduced by Sturrock and Else (1998) and revised by King and Newstead (2020) and King and Sturrock (2020) have underpinned play-
work education, training, and practice over the last twenty years. Von Uexküll’s functional cycle, especially its perceptual cue, offers an important addition to the play cycle. The perceptual cues arise from children’s external environments (the outer world) and, through their senses, can initiate an idea to play, or a pre-cue (King and Newstead 2020). The perceptual cues relate to the properties of the external environment, the loose parts (Nicholson 1971) and affordances (Gibson 1986), two theories already embedded in playwork thinking. The revision of the play cycle can provide further theoretical support for playwork education, theory, and practice, and for other professions that focus on the process of play in preschool, child care, and the early years of education.

References


Gibson, Jenny Louise, Megan Cornell, and Tim Gill. 2017. “A Systematic Review of


The authors investigate the personality traits of parents and children and their significant influence on the behavior of the other. Using the HEXACO model of personality, the authors examine the behavior of one hundred parent-child dyads on a playground to understand broader parent-child relationships. Their analyses reveal two opposed types of parental behavior (engaged parents versus unengaged parents) and child behavior (introverted cautious play versus autonomous energetic play) on the playground. The authors assert their study demonstrates that the personality traits of both parents and children as measured by the HEXACO model play a significant role in parental and child behaviors during play and in broader interactions. Key words: HEXACO; parent-child behavior; parent-child interaction; personality traits

The personalities of parent and child significantly influence each other’s behavior, as transaction models of parenting suggest. That these characteristics evidence important associations with parent and child interactions (Belsky 1984; de Haan, DeKovic, and Prinzie 2012) is especially apparent in the literature on the personality traits of parents and children (Coplan, Reichel, and Rowan 2009; Wilson and Durbin 2012). In particular, personality traits help explain the variance in parenting and parent-child behavior (Belsky 1984).

Indeed, a wide range of personality traits can help parents flexibly respond to their children (de Vries et al. 2016). Many studies have shown that the personality traits of parents have important links with their behavior and its outcomes for children (Belsky 1984; Clark, Donnelian, and Robins 2018; Prinzie et al. 2004; Wilson and Durbin 2012). Children’s personality traits, too, have important implications for their behavior and for their parents’ behavior (Belsky 1984; de Haan, DeKovic, and Prinzie 2012; Prinzie et al. 2004; Wilson and Durbin 2012).

Although many of these studies have used personality traits to study parents and temperamental traits to study children in early to middle childhood...
Armour et al. 2017; Coplan, Arbeau, and Armer 2008), temperamental traits, which are largely biological, prove less useful for understanding the influence of children on parental behavior in middle childhood, a period in which children are more strongly affected by their environment (Buss and Plomin 1986; Rothbart and Bates 1998). Personality traits are, thus, more appropriate because they represent the interaction between a child’s predisposition and the environment (Buss 2009). Additionally, when comparing how individual differences in parents and children influence each other’s behavior, it is important to use concurrent measurements (de Haan, DeKovic, and Prinzie 2012).

The HEXACO Personality Inventory (a six-dimensional model of human personality) helps address these gaps and offers several important advantages for studying personality traits associated with parent-child behavior. The HEXACO is a new personality model with stronger theoretical, empirical, and cross-cultural support than other personality models like the so-called “big five” (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism—eds.) (Goldberg 1990). The HEXACO scale includes honesty-humility (selfishness versus selflessness), emotionality (empathic worrying versus callousness), extraversion (sociable versus introverted), agreeableness (patient versus reactive), conscientiousness (diligent versus careless), and openness (curious versus conventional) (Ashton and Lee 2020).

The HEXACO’s unique combination of personality factors allows important distinctions between social motivations related to parent-child interactions and play behavior. In particular, the HEXACO’s emotionality trait is perhaps the most important trait from a parent-child perspective not explicitly represented by a trait in other personality models. The attachment and worry-related aspects of emotionality can therefore provide unique information about the motivations of parent and child behavior. The HEXACO has been shown to be relevant for studying personality traits and behavior in both children and adults (MacDonell and Willoughby 2020; Sergi et al. 2019; Sharma and Nagle 2018). However, to our knowledge, the HEXACO has not yet been used to study parent-child behavior explicitly. Therefore, we conducted an exploratory study using HEXACO personality traits and real-time observations of parent and child play behavior.

**Parent and Child Behavior**

The behavior of parents and children can influence each other (e.g., Clark, Don-
Various studies suggest that parents and children respond to each other’s cues and characteristics, which mutually shape each of their behaviors (Coplan, Arbeau, and Armer 2009; Clark, Donnelian, and Robins 2018; de Haan, DeKovic, and Prinzie 2012). Belsky (1984) was one of the first to explain this in the context of explicit personality traits by suggesting that personality traits of both the parent and the child significantly influence each other’s outcomes. This may be especially relevant at the behavioral level because personality traits regulate how individuals perceive, respond to, and behave in various situations (Back, Schmukle, and Egloff 2009). Additionally, as with other dyadic social relationships, the personality traits of one person make up a crucial component of the other person’s environment and have important effects on behavior (Asendorpf and Wilpers 1998).

**Parents’ Personality Traits**

How parents perceive and interact with their children by way of parental personality can explain the parent-child relationship (Bahrami et al. 2019). Some researchers have suggested that parents’ personality traits may even play a stronger and more consistent role in parent-child interactions compared to children’s personality traits, because adult traits are more stable than those of children (Belsky 1984; de Haan, DeKovic, and Prinzie 2011; Prinzie et al. 2009). Compared to previous models of personality (e.g., the “big five”), the HEXACO provides more insight about the adaptive nature of some personality traits. Importantly, the HEXACO highlights how ranking higher or lower for each of the six traits appears advantageous to individuals in different contexts (Ashton and Lee 2007). These theories can also be applied to parenting. For example, the HEXACO’s emotionality trait, which ranks high in sentimentality, empathy, and feelings of attachment (Ashton and Lee 2007), may help parents become more attuned to their children’s needs and feel more attached to and protective of them.

HEXACO’s emotionality trait is composed of four facets: sentimentality, dependence, fearfulness, and anxiety (Lee and Ashton 2004). We suspect that these four facets may be tapping into two different aspects of parenting. For example, previous research suggests that parental responsiveness and involvement and parental anxiety have significantly different outcomes for children.
(Belsky, Fish, and Isabella 1991). Thus, parsing the HEXACO emotionality trait as emotionality-attachment (which includes sentimentality and dependence) and emotionality-worry (which includes fearfulness and anxiety) may provide information that will help us understand the underlying parent-child interactions.

Additionally, HEXACO’s honesty-humility (being more selfless) and agreeableness (patience and forgiveness) (Lee and Ashton 2004) may also influence parenting because being more selfless and tolerant may help parents prioritize their children’s needs and desires over their own. Such traits may also have important effects on the behavior of children (Paulussen-Hoogeboom et al. 2007). As mentioned, for children the personality traits of their parents may be an important environmental feature (Asendorpf and Wilpers 1998). Thus, a child’s behavior can be perceived as a response to his or her parent’s personality (Bowby 1960; Dishion and Patterson 1997). Researchers have found that parents who are more sensitive and warmer better understand their children's perspectives and prove more responsive to their children's needs (Reuben et al. 2016). As a result, parents who are warm and sensitive likely promote more positive developmental outcomes in their children, such as independence and sociability (Newton et al. 2014; Patte 2002). Parents’ personality traits therefore likely evoke specific behavior in children (Oliver, Guerin, and Coffman 2009).

Child’s Personality Traits

Of course, an important contributor to children’s behavior may be their own personalities (Back, Schmukle, and Egloff 2009; Zhang et al. 2018). Studies have shown that children who ranked higher for HEXACO’s honesty-humility trait exhibited less problematic behavior (MacDonell and Willoughby 2020). Higher rankings for HEXACO’s honesty-humility, conscientiousness, and extraversion traits were also associated with accomplishment in school (Sergi et al. 2019). Higher rankings for HEXACO’s emotionality and agreeableness related to children’s autonomy and social relationships (Sharma and Nagle 2018).

Children’s personality traits may also elicit different behaviors and interactions from parents (Haan, DeKovic, and Prinzie 2012), as seen in the literature about temperament. Children with difficult temperaments and poor self-control evoked more negative and harsher parental behaviors (Clark, Donellan, and Rob-
Children who showed signs of fearfulness and social inhibition elicited overprotective and inconsistent parenting (Coplan, Reichel, and Ronan 2009; Lenuga and Kovacs 2005). Parents may therefore also be shaping their behavior according to children's traits (Armour et al. 2018; Belsky 1984).

**Current Study**

We explored how parents’ and children's HEXACO personality traits influence actual parent and child supervision and play behavior on a playground. Actual observations may reveal important nuances within the parent-child dyad that may help provide a deeper understanding of this complex relationship (Mortensen and Cialdini 2010). We used a person-centered analysis to examine parent and child play behavior to seek insight into how the distinctive configurations of parent and child behavioral patterns relate to the personality variables (Metsäpelto and Pulkkinen 2003). Additionally, we chose to conduct our observations on a playground because it allowed us to observe parents in a public setting where parents and children are already accustomed to being watched. We restricted our participant sample to parents who had children between six and ten years of age because this is likely the stage when early personality traits begin to manifest as a result of significant changes in childhood social structures (Caspi and Moffitt 1993).

We predicted that parents who ranked higher for emotionality-attachment would be more engaged and involved in their parenting. We also predicted that children who showed greater levels of conscientiousness—and therefore were less likely to be impulsive and difficult—would elicit more interactive parenting. With regards to children's play, we predicted that parents who ranked higher for emotionality-attachment, but not emotionality-worry, would have children who exhibited more socially valued child behaviors such as sociability and creativity in their play (Savelieva et al. 2017). We predicted that children with greater levels of extraversion, conscientiousness, and agreeableness would also display these socially valued child behaviors in their play, given that these traits are associated with better psychosocial functioning (Vanhalst et al. 2013), social relationships (Ciarrochi and Heaven 2009), less problematic behavior (De Fruyt et al. 2008), and creativity (Baas et al. 2013). Finally, we predicted that children who ranked higher for emotionality-attachment and emotionality-worry would seek more contact with their parents.
Method

Participants
We recruited one hundred parent-child dyads (seventy-one mothers and twenty-nine fathers) from a local park in Southern Ontario. The majority of the parents reported to be between thirty-one and forty years of age (54 percent); 18 percent reported to be between twenty-one and thirty years; 26 percent, between forty-one and fifty years; and 2 percent above fifty-one years.

Compared to the average Canadian, the majority of participants reported they were of the same wealth (65 percent); 2 percent reported they were a lot less wealthy; 13 percent reported they were less wealthy; 18 percent they were wealthier; and 1 percent reported they were a lot wealthier. A majority of the participants were married (61 percent); 18 percent said they were in a relationship; 4 percent were divorced; and 16 percent were single. A majority of the participants described themselves as Caucasian (82 percent) while the rest of the sample said they were Black, Asian, Indigenous, Hispanic, or Other. The average age of the children in our sample was 7.34 years old ($SD = 1.26$) and 52 percent were boys.

Measures

Observations of Parent Behavior
Based on qualities that have been previously suggested to be important dimensions of parenting (e.g., Lotzin et al. 2015) and using Likert scales ranging from one to seven (extremely low to extremely high), we measured five parenting behaviors: communication (i.e., speaking with the child); affection (i.e., physical displays such as hugging, kissing or patting); monitoring (i.e., showing an awareness of the child’s location during our observation); interaction with child (i.e., playing, helping, or feeding the child); and sitting on their own. These observations were conducted by two trained researchers to reduce subjective biases in observations. Observations from both researchers were averaged for the analysis. The interrater reliability using Cohen’s $\kappa$ was excellent across all measured behavior (Altman 1999): $\kappa = .84$, $p < .01$ for communication; $\kappa = .88$, $p < .01$ for affection; $\kappa = .81$, $p < .01$ for monitoring; $\kappa = .87$, $p < .01$ for interaction with child; $\kappa = .91$, $p < .01$ for sitting on their own on.
Observations of Child Play Behavior
Using Likert scales ranging from one to seven (extremely low–extremely high), we measured six types of observable child behaviors on the playground: extraversion (e.g., interacting and playing with other children), independence from parent (e.g., less running back to parent), level of energy (e.g., lots of running across the playground), contact seeking (e.g., frequently running back to parent), creativity (e.g., playing with park equipment in creative ways), and prudence (e.g., playing cautiously with less risky behavior). These observations were conducted by two researchers to reduce subjective biases in observations. Observations from both researchers were averaged for the analysis. The inter-rater reliability for using Cohen’s κ was, again, excellent across all the measured behavior (Altman, 1999): κ = .93, \( p < .01 \) for extraversion; κ = .74, \( p < .01 \) for independence from parent; κ = .79, \( p < .01 \) for level of energy; κ = .80, \( p < .01 \) for contact seeking; κ = .73, \( p < .01 \) for creativity; and κ = .82, \( p < .01 \) for prudence.

Parents’ Personality Traits
Parents completed the twenty-four-item Brief HEXACO Inventory self-report (De Vries 2013). The inventory consisted of six factor-level scales of personality. Each factor included four items on a Likert scale ranging from one to five (strongly agree to strongly disagree). Sample items include: “I find it difficult to lie” for honesty-humility; “When it comes to physical danger, I am very fearful” for the fearfulness factor of emotionality; “I sometimes can’t help worrying about little things” for the anxiety factor of emotionality; “When I suffer from a painful experience, I need someone to make me feel comfortable” for the dependence factor of emotionality; “I feel strong emotions when someone close to me is going away for a long time” for the sentimentality factor of emotionality; “I like to talk with others” for extraversion; “Even when I’m treated badly, I remain calm” for agreeableness; “I make sure that things are in the right spot” for conscientiousness; and “I like people with strange ideas” for openness to experience.

Children’s Personality Traits
Parents also completed a modified observer report of the Brief HEXACO Inventory to rate their children’s personality traits. The reliability coefficients for each personality factor for this measure are known to be low due to the low number of items for each personality factor However, this measure is shown to have strong predictive value (de Vries 2013).
Procedure

After we received clearance from the university’s research ethics board, we approached parents at a local park and provided them with a brief verbal description of the study. We used incomplete disclosure by telling parents that we were observing children’s play behavior to keep parents’ behavior from becoming skewed (e.g., extremely positive parenting) because the parents knew that their behavior was being observed. We also asked participants if they or their children had any diagnoses or disorders. Those who reported any type of diagnoses or disorders (e.g., autism spectrum disorder) were not included in the study because our aim was to examine typical parent-child dyads.

After parents agreed to participate in the study and confirmed their children’s ages, two researchers conducted twenty-minute observations of parent and child play behavior while the parents filled out the questionnaires. The researchers asked parents and their children to do what they normally would do when they came to the park. The park included two playgrounds (with jungle gyms, slides, swings, and teeter-totters) and a splash pad. Grass covered large areas of the park, and benches offered places to sit on its perimeter. Children engaged in solo play, play with other children at the park, and play with their parents. In terms of play behavior, children engaged in a variety of physical and imaginative play. All researchers had been previously trained to conduct observations using sample parents and children at the park. The study lasted approximately twenty-five minutes (we started our observations five minutes after obtaining parent and child consent to allow enough time to prevent the children from becoming aware they were being observed). Participants received ten dollars cash for their participation.

Results

All our variables met criteria for missingness, univariate assumptions, and multivariate assumptions (Tabachnick and Fidell 2013). We conducted four latent profile regressions models using MPlus version 8.4 (a software program for analyzing data) in order to examine types of parent and child behavior at the park. Latent profile analysis holds that responses to a set of observed behaviors indicate an underlying latent variable with a finite number of mutually exclusive profiles or subtypes (Muthén and Muthén 2006). We used this model to create
a more global measurement for observing parenting and child behavior, and then we regressed the parenting and child behavior styles using four models of parent and child personality traits. Two of the regressions concerned parental behavior, using each model of parent and child personality traits. The other two concerned child behavior, using each model of parent and child personality traits. Given our smaller sample, we did not conduct highly complex statistical analyses or compare differences between mothers and fathers. But, notably, our sample size does not appear to be a concern for latent profile analysis (Tein, Cox, and Cham 2013).

**Correlations**

Pearson $r$ correlations showed that the self-reported emotionality-attachment of parents related to sitting less often on their own, to more monitoring, and to a higher ranking for child prudence. The self-reported extraversion of parents also related to a higher ranking for child prudence. The self-reported conscientiousness of parents was related to lower rankings for child creativity and prudence (see figure 1).

The extraversion that parents reported for their children related to the children’s extraverted behavior on the playground. The conscientiousness that parents reported for their children related to a higher ranking for parent communication and parent affection, and also to parents sitting less often on their own, to higher rankings for parent interaction and parent monitoring, to children more often contact seeking from parents, and to children showing less independence from parent (see figure 1).

**Latent Profile Regression Model**

**Parenting Behavior.** Our latent profile analysis showed two profiles of parenting behavior, $LMR = -975.752$, $p = .00$, adjusted $LMR = 321.52$, $p = .01$; bootstrapped likelihood ratio test $= -975.75$, $p = .00$ (Tein, Coxe, and Cham 2013): a more engaged parenting behavior (34.71 percent), in which parenting behavior ranked high on communication, affection, interaction with child, and monitoring and a less engaged parenting behavior (62.29 percent), in which parenting behavior ranked high on parents sitting on their own.

In the latent profile regression model, we also examined the relationship
Parent-Child Playground Behavior and HEXACO Personality Traits

between parent and child personality traits independent of parenting behavior using two logistic regressions. Our results showed that the self-reported emotionality-attachment of parents related to more engaged parenting behavior ($B = .76, p = .03$, odds ratio = .47). The conscientiousness parents reported of their children also related to more engaged parenting behavior ($B = .81, p = .03$).

**Child Behavior.** Our results showed two profiles of child play behavior, $\text{LMR} = -1107.52, p = .00$, adjusted $\text{LMR} = 125.95, p = .01$; bootstrapped likelihood ratio test $= -1107.52, p = .00$ (Tein, Coxe, and Cham 2013): an autonomous, energetic play (70.71 percent), in which children ranked high on extraversion, independence from parents, and energy and an introverted, cautious play (27.29 percent), in which children ranked high on seeking contact from parents, creativity, and prudence.

We also conducted two logistic regressions with the latent profile regression model to examine the relationship between parent and child personality traits independent of child play. We did not find any significant associations between parent personality and child play behavior. However, we found that children whose parents ranked them higher for extraversion were more likely to belong to the autonomous energetic play group ($B = 1.22, p = .06$, odds ratio = 3.38) and that children whose parents ranked them higher for conscientiousness were more likely to be related to the shy or dependent group ($B = -.67, p = .09$, odds ratio = .51). These results were not significant using our initial two-way analyses, but we note that they would have been if we had chosen a one-way analysis consistent with our initial hypotheses. We therefore cautiously note a potentially meaningful statistical trend toward relationships between child personality and play-group membership. Given that there is an ad-hoc element to discussing these relationships as trending toward significance, we emphasize the need to treat our specific findings cautiously (Matsunanaga 2007; Rubin, 2017; Vigden and Yasseri 2016).

After our initial analyses, we ran parent and child personality traits together in order to explore whether our initial results would hold when we controlled of each other’s personality traits. When we placed parent and child personality traits together in the same model to predict parenting behavior, we found that parent personality traits were no longer significant. However, the conscientiousness parent reports of their children still predicted more engaged parenting behavior ($B = .94, p = .03$, odds ratio = 2.56). Additionally, when we placed parent and child personality traits together in the same model to predict child
play behavior, we found that parent personality traits were still not significant but that higher rankings for extraversion (B = 1.48, p = .02, odds ratio = 4.33) and lower rankings for conscientiousness (B = -.94, p = .02, odds ratio = .39) from parents of their children predicted autonomous energetic play behavior. This replicates the marginally significant findings presented in previous paragraphs, giving us more confidence in the likelihood of the links between child personality and play behavior.

**Discussion**

The purpose of our study was to explore whether parent and child HEXACO personality traits influenced actual parent and child play behavior on a playground. We separated the HEXACO emotionality trait into emotionality-attachment (which includes sentimentality and dependence) and emotionality-worry (which includes fearfulness and anxiety) to better understand the underlying factors related to parenting behavior. Our study supported this distinction between the two in the context of parenting. Most of our findings on the links between personality and play behavior in parents and children also proved consistent with our predictions.

To begin with, our observations of parent and child behavior depicted two types of behavioral patterns on the playground. One parenting style entailed engaged parents. These parents spent more time watching, talking to, and playing with their children. These behaviors resemble the grouped characteristics of the authoritative parenting style, which includes high rankings for communication, nurture and affection, and discipline (the latter similar to the monitoring behavior observed in our study) (Baumrind 1967). The second parenting style that we observed in the majority of the parents entailed a less involved parenting style. This second group of parents were more hands-off and generally let their children explore and play on their own.

We also found two child play behavioral styles on the playground. The first group of children were more interactive with other children, less dependent on parents, and more energetic in their play. We labelled this group as engaging in autonomous, energetic play. Similar to our findings, sensation seeking and extraversion have also been grouped together in previous behavioral studies (Glicksohn, Naffuliev, and Golan-Smooha 2007). Additionally, high levels of energy have been frequently associated with extraversion (Cullen-Lester et al.
The second group of children were more dependent on their parents, showed more creativity in their play, and were more careful in their play. We labelled this group as engaged in introverted, cautious play. Previous studies have shown similar associations between emotionality and emotional dependence and higher prudence (Delgado-García et al. 2010). Overall, similar findings from previous studies provide theoretical validity for our parent and child behavior configurations and further strengthen our parent and child behavioral groups.

Next, we found that parents who reported higher levels of emotionality-attachment belonged to the more engaged parenting group. Previous observational studies have similarly found that parents who were more affectionate more often engaged in interactive play (Langlois et al. 1995). Thus, parents with a tendency to seek emotional support from others and to feel strong emotional bonds with others may more often engage and interact with children on playgrounds. These parents may also feel more sentimental toward family members (Lee and Ashton 2004). We did not find any associations between emotionality-worry and parenting behavior in our study, possibly because our playground offered a relatively safe environment and may not have elicited much worry from parents. Perhaps had we conducted our observations in a crowded theme park or in a different, higher-risk area there would have been a greater need for worry (e.g., of a child getting lost, or being scared, or getting injured), and we may have found significant links between parent behavior and emotionality-worry. Therefore, our split of HEXACO’s emotionality appears to have been useful, but we must urge caution against a general application of this finding.

Children’s personality traits also predicted parents’ behaviors. Children who rated higher for conscientiousness had more engaged parents. This finding was also significant in our post hoc analysis that examined parent and child personality traits together to predict parenting behavior. In fact, children’s conscientiousness was the only significant parent or child personality trait that predicted parenting behavior in the post hoc analysis. This fits with the pattern of results in previous studies that have found less difficult children (measured through temperament) related to more involved parenting behavior (Clark, Donnellan, and Robins 2018; Liu et al. 2019). Yet it seems somewhat counterintuitive for parents to feel the need to engage and interact with children who are more cautious and less impulsive. This might be so because involved parents raise more conscientious children (Kochanska, Murray, and Harlen 2000; Van Heel et al. 2019). Another explanation might hold that parents feel a need to intervene by encouraging cautious children to engage in play. This explanation highlights the
potential bidirectionality of parent-child personality traits and should be more thoroughly investigated in future studies.

In terms of children's play behavior, we found that children rated higher for extraversion trended toward more autonomous, energetic play. This may be so because extraverted children are more social, less withdrawn, and more likely to enjoy playing with other children (Davydenko et al. 2020; Lee and Ashton 2004). We also found that children rated higher for conscientiousness trended toward shy and dependent play behavior. This fits with research showing that conscientious children are more likely to demonstrate caution and less impulsive play behavior (Berk and Meyers 2013; Eisenberg et al. 2014). We found the same pattern of results in our post hoc analysis, in which we examined parent and child personality traits together.

We did not find any associations between children's emotionality-attachment or emotionality-worry and seeking contact with their parents. Again, this may be so because the playground setting does not trigger any of the attachment- or worry-related children's personality traits when parents are always within sight on the playground. Similarly, our finding of no relationships between parents' personality traits and children's play behavior may also be explained in the context of the playground. Children's behavior on the playground, which mostly involves active play, may be less driven by parents' personality traits compared to children's own personality traits. Had we measured a more interactive form of play, parents' personality traits may have played a larger role.

Finally, as mentioned, our post hoc analysis showed that children's personality traits had a larger effect on parent and child playground behavior than on parents' personality traits. Although this makes intuitive sense for children's play behavior, we surprisingly found that children's personality mattered more even for parenting behavior than for parent's personality traits. However, it appears that few other studies have found similar patterns when they examined both parent and child personality traits as they relate to children's behavior (Bates et al. 2012; Clark, Kochanska, and Ready 2000; de Haan, DeKovic, and Prinzie 2012; Oliver, Guerin, and Coffman 2009; Wilson and Durbin 2012). As children grow older, parental influence on their behavior may become more complex and less directly related. Other environmental factors may interact with parental influence to predict children's behavior (Wachs 2000). Perhaps a moderation or mediation analysis with a larger sample could reveal these complex associations.
Limitations

It is worth noting that our sample size was too limited to test for small effects or complex interactions. However, previous studies that directly observed parent and child behavior used similar-sized or smaller samples (e.g., Clark, Koski, and Ready 2000; Hawes and Dadds 2006; Slatcher and Trentacosta 2011). We were also unable to test for different effects based on the gender of parent or child and thus leave it to future research to determine if there are indeed different patterns (e.g., if women tend to have higher emotionality scores than men). Additionally, given the playground we used in our study, we were unable to test for how HEXACO’s emotionality-worry may be associated with parenting or how emotionality-attachment and worry may be associated with children’s behavior and interactions with their parents. Since ours is the first study to separate HEXACO's emotionality into attachment- and worry-related traits, future studies may consider replicating our findings in other contexts to discover how these two aspects of emotionality may be related to parent and child behavior. More specifically, in what other contexts would attachment- and worry-related traits benefit or hinder parenting and parent-child behavior? This might require the use of the full-length version of the HEXACO (one hundred items), which was not feasible in our study given our time constraints (i.e., parents could not fill out two hundred questions while at the park). The playground environment also limited the examination of more in-depth parent-child interactions and their associations with parent and child personality traits. Future studies may want to use a more interactive context to parse how personality traits influence parent-child interactions.

Conclusion

Given these limitations, our study takes a first look at how the HEXACO can explain parent-child interaction and children’s play behavior on the playground but requires further exploration. Our results suggest that some parent and child personality traits may be associated with parent-child play engagement and behavior. Given the importance of play for children’s social and physical development, our findings can provide information to help children engage in different types of play. Our findings can also help all parents make a more conscious effort to promote different types of play for their child, especially for parents who may
not exhibit high levels of the sentimental- and attachment-related personality traits. Overall, our findings may help identify ways to help children who have difficulty establishing strong attachments with their parents, with making friends, and with engaging in other social behavior on the playground.

References


Lotzin, Annett, Xiaoxing Lu, Levente Kriston, Julia Schiborr, Teresa Musal, Georg Romer,


