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JASON MARIO DYDYNSKI

Semiotic Modeling of Cuteness in Cartoon Characters/Mascots

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UNIVERSITY OF TARTU
Press

Department of Semiotics, University of Tartu, Estonia

The Council of the Institute of Philosophy and Semiotics of University of Tartu has, on May 25th, 2021, accepted this dissertation for defence for the Degree of Doctor of Philosophy (in Semiotics and Culture Studies).

Supervisors: Professor Timo Maran, PhD, University of Tartu
Nelly Mäekivi, PhD, University of Tartu

Opponents: Professor Joshua Paul Dale, PhD, Tokyo Gakugei University, Japan
Professor Massimo Leone, PhD, University of Turin, Italy

The thesis will be defended at the University of Tartu, Estonia, on August 27th, 2021 at 12:15, in Jakobi 2–336.

The publication of this dissertation has been funded by the European Union through the European Regional Development Fund (Centre of Excellence in Cultural Theory, CECT).

The University of Tartu ASTRA Project PER ASPERA (2014–2020.4.01.16-0027), which is financed by the (European Union) European Regional Development Fund; Estonian Research Council's research projects IUT2-44 "Semiotic modelling of self-description mechanisms: Theory and applications"; PRG314 "Semiotic fitting as a mechanism of biocultural diversity: instability and sustainability in novel environments"; PUT1363 "Semiotics of multispecies environments: agencies, meaning making and communication conflicts".

ISSN 1406-6033
ISBN 978-9949-03-632-5 (print)
ISBN 978-9949-03-633-2 (pdf)

University of Tartu Press
www.tyk.ee

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ACKNOWLEDGEMENTS

Hi Mom!

I wanted to give big thank you to everyone who helped me along the way. The biggest thank you to my advisors Nelly Mäekivi and Timo Maran. Your advice was critical for improving my ideas and helping me become more academical. I have to more than anyone thank Nelly Mäekivi for guiding me since my MA, being a cowriter, dealing with my constant updates and need for feedback, listening to me complain, watching countless Disney and Pixar movies with me, and so much more. THANK YOU! (The capital letters express my emphasized gratitude).

I have to give a huge thank you to all of my cowriters for their collaboration, inspiration, and guidance: Sookyung Cho, Christine Kang, Karl Kruusamäe, and Robert Valner. It was fun working with you all and hopefully we get to do some cool stuff in the future. Additionally shout outs to *Haru Bus*, *Giggle Bug Entertainment,* and Tequila that hedgehog for providing objects of research analysis and actively encouraging my research and its outcomes.

In getting this dissertation together, I also wanted to thank my "sons": Sven Anderson, Kyle Davidson, and Chloé Davidson. You all helped me get this beast together and kept me from going crazy. Thank you also to Djuddah Arthur Joost Leijen and Jüri Kaljundi for the amazing opportunities and helping me develop my teaching and professional skills.

Of course, I also have to acknowledge the support I received from my friends and family to get me through it all and act as my emotional support team: Coco and Jorge, for providing equal amounts of fun and support; Maarja, for our joint existential crises; Deanna my sister, who will be mad at me if I don't give her a shout out. There are so many more people who contributed to me getting through this in some way... But enough thanks, let's get this dissertation started.

LIST OF FIGURES

LIST OF ORIGINAL PUBLICATIONS

I. Dydynski, Jason Mario 2020. Modeling Cuteness: Moving towards a biosemiotic model for understanding the perception of cuteness and Kindchenschema. *Biosemiotics* 13: 223–240.

II. Dydynski, Jason; Mäekivi, Nelly 2018. Multisensory perception of cuteness in mascot and zoo animals. *International Journal of Marketing Semiotics* 6: 2−25.

III. Sookyung, Cho; Dydynski, Jason; Kang, Christine 2021. Universality and specificity of the Kindchenschema: a cross-cultural study on cute rectangles. *Psychology of Aesthetics, Creativity, and the Arts* (forthcoming).

IV. Valner, Robert; Dydynski, Jason Mario; Cho, Sookyung; Kruusamäe, Karl 2020. Communication of hazards in mixed-reality telerobotic systems: the usage of naturalistic avoidance cues in driving tasks. *Human Factors*. https://doi.org/10.1177/0018720820902293.

V. Dydynski, Jason Mario; Mäekivi, Nelly 2019. Darwin's antithesis revisited – a zoosemiotic perspective on expressing emotions in animals and animal cartoon characters. *Sign Systems Studies* 47(1–2): 205−233.

VI. Dydynski, Jason; Mäekivi, Nelly 2021. Impacts of cartoon animals on human-alloanimal relations. *Anthrozoös* (forthcoming).

The contribution of the author in jointly written papers:

Paper II: The article was jointly written. I was primarily responsible for the sections on the biological approaches to cuteness, cuteness as a design factor, congruence and incongruence of the senses, as well as the implications of cuteness for products and services.

Paper III: I assisted in the development of the research project, formation of the questionnaire, and data collection for Estonian subjects. In manuscript preparation I was responsible for the introduction and conclusions in addition to jointly working on the literature review.

Paper IV: I was responsible for the formation of the objective and initial research questions of the research project. In manuscript preparation, I was responsible for the introduction and discussion.

Paper V: The article was jointly written. I was primarily responsible for the sections on The Principles of Animation, anthropomorphism and emotions, as well as the case study.

Paper VI: The article was jointly written. I was primarily responsible for the sections on cartoon/artificial animals, expected alloanimals, and the role of accessibility in human-alloanimal relationships.

INTRODUCTION

Cuteness as a term is rather evocative in nature; hearing the term you may think of anything ranging from babies and puppies to Hello Kitty and Pokémon, or even the way someone sounds or acts. Generally, the term is associated with youthful appearances, but it can also be associated with whimsicality and playfulness (For a deeper understanding of the definition and conceptualizations of cuteness see Paper II). While generally associations to cuteness are subjective, there is underlying connectivity at the basis of these perceptions that garners the ongoing interest of researchers, including myself.

The genesis of cuteness as an academic and scientific concept stems from *Kindchenschema* (Lorenz 1981), a term used to describe a series of traits associated with human infants that generates an affective response from their caretakers (for a detailed discussion on *Kindchenschema* see Paper I). It should be noted that even before Lorenz's introduction of *Kindchenschema* in 1943, these traits of infants generating affection had been explored through the vantage of theoretical biology by high-profile researchers, such as Charles Darwin (1872) (see Paper V). From this initial schemata, the conceptualization and decoding of cuteness has been taken on by various scientific fields of research across numerous disciplines. Studies looking at cuteness in theoretical biology have focused primarily on the schemata of cuteness as present in various species as well as the commonalities between those species and humans (e.g. Theofanopoulou et al. (2018) explored care-taking responses in domestic species; Borgi and Cirulli (2015) analyzed caretaking preferences towards animals; Chersini et al. (2018) examined human perception of cuteness in dogs). Psychological studies have focused on human perception of *Kindchenschema* in infants, adults, and other species (e.g. Volk & Quinsey (2002) explored perceptions towards cute infants; Friedman & Zebrowitz (1992) investigated cross cultural perceptions of *Kindchenschema* in human faces). Aesthetics and design have approached the characteristics of cuteness as pertinent to objects and goods (e.g. Nenkov & Scott (2014) assessed how cute goods can increase consumption; Allison (2003) analyzed the proliferation of cute goods and their effect on the marketplace). Continued interest in the concept of cuteness has yielded a field of its own, that of cuteness studies (Dale 2016). For a deeper dive into the varying explorations and approaches to cuteness see Paper I.

General interest in the field has grown in popularity as cuteness has cemented itself as a dominant form of popular aesthetics. The field of cuteness explores the perception, reception, and understanding of all things cute, with scholars possessing a wide range of backgrounds (Dale 2016). Research outputs from these studies have applications namely in cultural studies, marketing, product design, and animation, but there is additional potential for the relevance of cuteness studies in additional fields such as animal conservation (see e.g. Paper VI) and human robotic interaction (see e.g. Paper IV). With the field of cuteness ever-expanding and becoming increasingly cross-disciplinary, it

becomes even more critical to reflect on its theoretical foundations as well as assess the potential for applications, and this research seeks to do just that as its core premise.

Despite cuteness having developed into its own research field, *Kindchenschema* still acts as the genesis for much of the existing research, though more recent studies have sought to add additional classifications of cuteness. One such category is that of whimsical cuteness (Nenkov & Scott 2014), which describes a form of cuteness associated with a sense of whimsy or fun (e.g. a bear shaped sandwich cutter or toaster that burns hearts onto your toast). Another popular category is that of *kawaii* (Nittono & Ihara 2017), which is used to describe a sense of lovability, childishness, and innocence or shyness. Popular characters such as Hello Kitty have traditionally been described as *kawaii*, but the term can also be used to describe styles of clothing or even one's handwriting (i.e. more rounded and less rigid) (Ngai 2005). These various categorizations are described as distinct phenomena from the *Kindchenschema* as they are seen as separate from the infant and caregiver responses described by Lorenz. Though the separation and categorization of cuteness is not so simple in application because the complex interaction between our biosemiotic perceptions of the world and socio-cultural phenomena complicates the picture. Much of the existing research into cuteness equate simple sets of features, schemas, or aesthetic sets to perceptual wholes. It then becomes necessary to garner a greater understanding of the relationship between the individual features and perceptual whole of a given subject and incorporate how cultural and personal biases come into play.

In exploring this relationship, this dissertation is positioned within the realm of cuteness studies, but it rather takes a biosemiotic approach to the study of cuteness in order to expand on and re-evaluate existing scientific approaches to cuteness. Biosemiotics is suitable because it allows for examination of the signification and communication of cuteness as a natural process, which is largely what its foundational theory, that of the *Kindchenschema*, sought to do. Even more than that, biosemiotics accounts for culturally specific communication and tertiary modeling, which accounts for symbolic and representational thinking (See Paper I). To narrow the focus, I have chosen to concentrate on the human perception of cuteness of cartoon animals, animals, and in design primarily within this dissertation. A biosemiotic lens provides an analytical approach and toolbox needed for understanding the perception of cuteness at the human level, the role of anthroposemiotics, as well as how these perceptions are carried into both perceptions and interactions with animals and animal representations (zoosemiotics). The usage of biosemiotic theories and their relevance in this dissertation will be explored further in the methodology section.

This research looks to answer the following three research questions and their related sub questions:

1) *How can biosemiotics be applied to the study of cuteness? What models and typologies can be applied and how can these analyze the perception of cuteness?*

    i. What theoretical basis is there for extending the perception of Kindchenschema to animals, representations of animals, objects, or abstract features?

    ii. How do non-visual traits contribute to the perception of cuteness?

    iii. Is the cuteness response to Kindchenschema universal or are there cultural and personal variables that impact responses?

2) *What does the application of cuteness in different contexts enable to reveal/find out about the perception of cuteness as a whole ?*

3) *What are the implications in applying semiotic understanding/analysis of cuteness to cartoon/mascot characters?*

    iv. In addition to the features of the Kindchenschema, what multisensory perceptual cues are utilized in the creation of cute cartoon characters and mascots?

    v. What role does anthropomorphism and umwelt play in the perception of cuteness in animal characters/mascots?

Each of the publications that compose this dissertation expand upon these research questions. There are six articles in total. All have been written and published over the course of my doctoral studies (2017 to 2021). The articles are not listed in this dissertation by publication date, but rather they are ordered thematically based on the development of the methodology and core research questions. The main research themes of the six publications selected for this dissertation will be described below.

These papers draw from varying theoretical backgrounds and target domains, though the primary research questions are addressed to some degree in all of the articles. Due to the cross-disciplinary approaches utilized by these articles, I will take a synthetic approach to form a meaningful whole in this introduction. My approach to this dissertation is interdisciplinary in nature as I seek to create a synthesis of biosemiotic ideas and cuteness studies. In this way, I analyze the primary theories of cuteness studies such as *Kindchenschema* and culturally specific categorizations of cuteness such as *kawaii* and *hygge* are analyzed within the context of biosemiotic theories such as umwelt, multisensory perception, and Modeling Systems Theory. These connections and theoretical backgrounds are described within the methodology of this disser-

tation. While my research is primarily informed by biosemiotics and cuteness studies, theories of animation and aesthetics have also informed my analysis and act as a foundation for the expansion and implementation of my research. For example, in Paper II I explore expectation confirmation theory (Oliver 1980), a theory stemming from consumer aesthetic research, as it relates the reception of cute phenomena. Additionally, Papers V and VI draw their foundational inspiration from theories and principles used in animation studies such as The Principles of Animation and bestial ambivalence. The models and analysis utilized throughout this dissertation primarily inform the field of cuteness studies, but the results and conclusions of my work are relevant to a variety of applied fields such as marketing, design, animation, animal welfare; thus, I am to be inclusive in this introduction. In summarizing the potential fields of application: Papers II seeks to offer perspectives for marketing and design professionals; Paper IV offers practical considerations for telerobotic designs; Papers V and VI, in particular, provide theoretical knowledge for the field of animation in the conceptualization of characters and their broader reception. Additionally, through this dissertation, I introduce semiotic studies across various disciplines with the aim of encouraging future, multidisciplinary interest and collaborations with semiotics. Papers III and IV bring together scholars from various disciplines (e.g. semiotics, engineering, and design science), creating a multidisciplinary approach by applying my perspectives on semiotics and cuteness studies to normative aesthetics (Paper III) and robotics (Paper IV).

Each paper contributes to the discussion around three primary research questions and sub-questions. Paper I focuses primarily on the first research question as it directly applies biosemiotic models to the understanding of cuteness via the use of Modeling Systems Theory. It touches on all three of the sub-questions to various extents. Paper I provides an extensive literature review of the existing studies and basis for cuteness, which brings out many of the existing gaps in the present theory and delves into the first research question in detail. This sets the stage for the dissertation as a whole and brings attention to various theoretical gaps in the field of cuteness studies. Additionally, Paper I provides an in-depth case study applying the biosemiotic ideas introduced in the analysis of cartoon characters which brings the third research question into focus.

Paper II then builds off this by looking at the heavy visual bias that exists in cuteness studies by introducing the multisensory perception of cuteness, thus exploring the first research question further with a particular focus on sub-question ii. This paper additionally explores the concept of cuteness as it applied in marketing, which brings the second research question into focus further.

Paper III and IV take an applied approach to cuteness research and focus on the second research question through varied approaches. Paper III looks at cuteness through the perspective of normative aesthetics and discusses the abstraction of the *Kindchenschema* and the universality of cuteness. The outputs of this study are then explored in an experimental setting, where the validity of cuteness as a visual cue is tested within the context of a telerobotic operation scenario (Paper IV). Paper IV looks more directly at applying the abstract forms

of cuteness in an applied context as to whether the caretaker response still triggers in an AR environment.

Paper V and Paper VI explore the third research question directly rather focusing on cuteness as present in cartoon characters. Paper V additionally explores the second research question by directly exploring the less touched on aspect of movement in cuteness as present in cartoon animals and addresses the role of emotion and expression both in the realm of cuteness and affection. Additionally, the introduction and discussion of Darwin's antithesis aligns well with the first research question. Both articles employ the semiotic typology of artificial animals in addition to umwelt in their investigations bringing in the first research question as well. All papers in essence touch on the second research question as they seek to examine the applications of cuteness and discuss how existing models of cuteness are relevant in various scenarios, but some more than others.

The following sections seek to expand on the theoretical discussion briefly introduced in this chapter through the interweaving of the various articles and their core discussions. Each theory will be discussed as it relates to and explores the primary research questions and their respective sub questions. Through this theoretical and methodological discussion, this dissertation will arrive at some general conclusion with forward looking remarks at the potential of future studies stemming from my research.

1. METHODOLOGY

In pursuing the three primary research questions and their respective sub-questions, I face the challenge of developing an interconnected methodology as each question requires disciplinary and theoretical approaches. In this way, a pragmatic research approach was taken to best address the respective research questions in a variety of contexts. Thus, the methodology of this dissertation is based in the extensional usage of biosemiotic and zoosemiotic theories as relevant in the context of cuteness studies.

By first taking a synoptic approach to the foundational theories of cuteness studies, I am able to identify a series of theoretical gaps. After identifying potential theoretical gaps, I employ a variety of biosemiotic theories to build theoretical connective structures. I then go on to employ these theories through the analysis of various cute phenomena. Such an approach allows me to both establish a theoretical basis for my claims as well as test them in analytical and quantitative contexts.

My biosemiotic basis for modeling the perception of cuteness was primarily established through the usage of the concepts of umwelt (Uexküll 1982), multi-sensory perception (Elliot 2006), and Modeling Systems Theory (Sebeok & Danesi 2000). These theories allow me to address the underlying schematic forms that compose the perception of cuteness and further explore socio-cultural and personal factors that may influence it. I build upon these ideas through the incorporation of various semiotic scholars including Dagmar Schmauks (2000); Thomas A. Sebeok (1990; 1994); Dario Martinelli (2010) as well cuteness scholars Joel Gn (2016; 2018); Stephen Jay Gould (1979), among others. I additionally employ theories found in animation studies most notably The Principles of Animation (Thomas & Johnston 1981) and bestial ambivalence (Wells 2008).

The main research objects of this dissertation are cartoon animals and mascots. I examine popular characters, cute products, as well as animated films. It should be noted that other-than-human animals are used as objects of discussion, but no research was conducted directly on or with them for the purposes of this dissertation. I conduct two specific case studies on cartoon characters: Hana the Diver from *Haru Bus* (Paper I) and Poppy the HedgeHog from *Giggle Bug* (Paper IV) with the express consent of their publishers. The selection of each particular research object is explained more in their respective methodologies. Two practical research experiments were conducted: a survey looking at the perception of cuteness in rectangles and an artificial reality (AR) robot driving experiment. These experiments provide additional qualitative data to support the extension and application of the proposed theories.

The following section will explore the aforementioned authors and theories as they relate to the methodology and how they are utilized in the various papers included in this dissertation. This will help connect all the articles into one dissertation and highlight the primary theories brought out within the papers; it

will also better explain the pragmatic selection and usage of each respective theory.

1.1. Theoretical Background

In establishing a theoretical background, I explored various pathways opened up by the methodology using the primary research questions as a basis for pushing certain theoretical connections over others.

1) *How can biosemiotics be applied to the study of cuteness? What models and typologies can be applied and how can these analyze the perception of cuteness?*

This question is particularly impactful as it requires me to examine how contemporary cuteness studies interpret Lorenz's research as well as how contemporary theories of biosemiotics have developed since Lorenz's times. From an initial reading of the literature within the context of biosemiotic theories, I generated a series of sub questions pertaining to the perception of cuteness as stemming from *Kindchenschema*:

> *i. What theoretical basis is there for extending the perception of Kindchenschema to animals, representations of animals, objects, or abstract features?*
>
> *ii How do non-visual traits contribute to the perception of cuteness?*
>
> *iii Is the cuteness response to Kindchenschema universal or are there cultural and personal variables that impact responses.*

In exploring these sub-questions, I created three theoretical tracks in which I employ the most relevant biosemiotic theories as a foundational basis. From there I made interconnections between the theories and expanded on based on the additional sub-research questions that arose:

> *iv In addition to the features of the Kindchenschema, what perceptual cues are utilized in the creation of cute animal cartoon characters?*
>
> *v What role does anthropomorphism and umwelt play in the perception of cuteness in cute animal cartoon characters?*
>
> **vi What role does tertiary modeling (i.e. culturally specific signifiers) play in the perception of these characters?*

I will introduce the theories as they are employed in the various papers in relation to the primary and secondary research questions of this dissertation and discuss how they are employed in the various papers. Doing so will provide additional context for the primary research question and frames the biosemiotic toolkit behind this research. The interconnection between the various theories as well as the general underlying thematic focus of my usage of these theories are depicted in Figure 1.

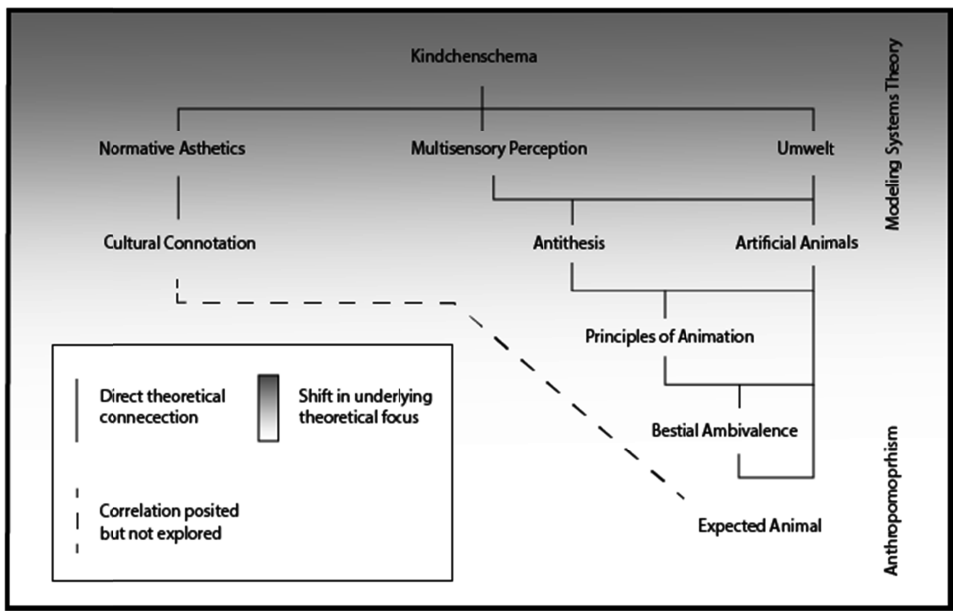

Figure 1. Theoretical connection chart (diagram by author, 2021).

1.1.1. Umwelt

One of the primary issues arising from a cursory glance of the *Kindchenschema* is how the extension and the perception of the caregiver response would transfer over to both animals, animal representations, and objects. While Lorenz (1981) had previously posited the extension of his schema to both dolls and animals, he did not offer a means of this extension, merely stating that this set of characteristics associated with the human infant is so poignant we recognize this when present in other stimuli. This extension has been utilized in a variety of cuteness studies, but still a theoretical connection has not been firmly established within the existing literature. Thus, in order to effectively extend the usage of cuteness and *Kindchenschema* to the likes of cartoon animals a better theoretical extension of these theories needed to be established. In exploring potential answers, the connection between Konrad Lorenz and Jakob von Uexküll once again became apparent.

This dissertation considers Jakob von Uexküll's theory of umwelt as one of the central concepts of cuteness perception. Umwelt is used to describe the meaningful world of a given species, it refers to the subjective world of an animal and accounts for the species specific perceptual activities as well as inter- and intra-species actions (Uexküll 1982). The concept of umwelt as a whole is discussed in much more detail in Paper II. The theoretical usage of umwelt is useful as it helps establish a cognitive foundation for the perceptual processes of humans and provides a methodological tool for the extension of Lorenz theory to representations of animals.

The connection between umwelt, *Kindchenschema*, and cuteness perception is employed in a variety of means throughout the dissertation. Paper II introduces and utilizes the concept of umwelt as it relates to cuteness most extensively and builds the theoretical connection of extending cuteness beyond humans. Paper I employs the concepts of umwelt as the idea of the functional circle as a means of addressing the "biophilia hypothesis". The biophilia hypothesis is an argument proposed by Edward O. Wilson (1984) which states that human interest in petkeeping, among other activities, is driven by the innate psychological appeal of nature. It is often utilized as a means of extending the *Kindchenschema* response when viewing animals or other non-human forms. The existing theories simply address anthropomorphism generally but do not offer a means of extension. In Paper I, I explore how the functional circle may trigger associated responses to certain characteristics associated with the *Kindchenschema*. In Papers V and VI the concept of umwelt is explored more specifically in the context of characters' designs in animated films and used to examine various intra- and interspecific communicative signs in characters. This allows me to directly explore how allo-animal characters are designed in such a way to be more affective as well as how cuteness is utilized within their designs. While the concept of umwelt is foundational in the thought process of Papers III and IV, it is not explored specifically. Overall the concept of umwelt and the associated theories of Uexküll are critical for the extension and on the *Kindchenschema*.

1.1.2. Multisensory Perception

One of the unexplored domains is the non-visual aspects of cuteness. Lorenz, in his establishment of the *Kindchenschema,* primarily focused on the visual aspects of cuteness, though it should be noted that he did include the clumsy movements of infants. This visual bias has continued within the existing literature as well, with a limited number of studies investigating the effects of smell and touch on the overall perception of cuteness.

This issue is tackled specifically in Paper II, where I analyze the importance of including various sensory factors into the perception of cuteness. Through the incorporation of umwelt, I establish that human perception is a multisensory experience that forms a perceptual whole. I initially explore how different qualities of the senses are related to cuteness, such as how high pitch sounds

and soft/smooth textures are associated with infants and innocence. This is then expanded on by the idea of multisensory perception, which largely refers to the combined sensory congruency of our environment. In this way our senses do not act independently, but we might imagine the texture of something we see or visualize what a stimuli could be based on a sound. This is particularly relevant for cuteness studies as it expands the initial *Kindchenschema* to be more largely inclusive of textures, smells, and sounds that were not directly proposed by Lorenz himself. Additionally, since our perception is multisensory, I am able to further discuss how experience can enhance or decrease the perception of cuteness. This is highlighted by how furry textures and sweet smells use in some cute products can lead to more positive judgements, while negative smells and textures can lead to animals or products being found as less cute.

While Paper II takes on multisensory perception as a central concept, its usage is still employed throughout the other papers. In Paper V, the idea of movement and body posture are explored more specifically as they relate to the expression of emotion in animated characters. Paper I introduces the topic of multisensory perception as a point of discussion more generally in its literature review of cuteness studies. While this dissertation still falls largely within the visual perception of cuteness, an attempt is made to extend cuteness studies outward.

1.1.3. Modeling Systems Theory and Normative Aesthetics

Approaches to the understanding of cuteness as an aesthetic have largely had their basis in the likes of biological theories which imply cuteness as an innate cross-cultural code. From the introduction of umwelt and our analysis of multisensory perception (Paper II), I establish a larger basis for the biological perception of cuteness by tying these perceptions to species-specific responses. This allowed for the research project conducted in Paper IV, which explores whether the features of the *Kindchenschema* can be utilized in the abstract context of AR vehicle operation to act as naturalistic cues in a telerobotic interface. Though the question as to what degree of perceived cuteness is culturally or individual-specific still needs to be addressed.

In exploring sub-question iii: *Is the cuteness response to Kindchenschema universal or are there cultural and personal variables that impact responses?* I explore the idea of *Kindchenschema* as a code. A code is defined as a system providing particular types of signifiers, a sign's physical form that is distinct from its meaning, can be used in various ways and for diverse representational purposes (Sebeok & Danesi 2000: 107). Codes can be naturally occurring, learned, inherited, acquired, or in combination. They can be a conscious process or occur at a subconscious level.

In investigating this idea of cuteness as a code, I needed to better explore the degree to which the various aspects of cuteness are innate vs culturally learned or personally acquired. For this purpose, I employ cuteness within Modeling

Systems Theory in Paper I. In this paper, I initially identify the perceptual errors within cuteness studies as a whole. From there I go on to identify the forms that lead to the signification of cuteness. One form of particular importance is that of metaforms, which are primary connective forms that represent abstract concepts in terms of concrete sets of characteristics (Sebeok & Danesi 2000: 38). An aesthetic as a code would then be composed of various signifiers (i.e. metaforms) including color, smell, touch, texture, etc. that allow the producer and interpreter to derive meaning from both the whole and the parts of an aesthetic artifact. These metaforms generate a series of sense inferences referred to as connotata (i.e. extensional meanings derived from sensual inference separated from the denotative form) (Sebeok 1999: 7). Continual sense-inference of metaforms leads to their crystallization and the connotata they encode for, which helps explain how cuteness establishes itself as a code at the cultural level. In other words, as groups and cultures are exposed to various cute artifacts, associated connotata may vary. This process is described in further detail in Paper I.

The further codification of cuteness is tested directly in an experimental setting to better identify the degree in which the perception of the *Kindchenschema* is culturally influenced. Paper III applies the extension of the concept of *Kindchenschema* as transformed via metrics of normative aesthetics. From the experimental results, subtle differences in the perceived connotations of various rectangles between cultural groups were discovered; participants from South Korea, who had higher Interdependent Cultural Self-construal scores, tended to rate cute rectangles (i.e. rectangles following the *Kindchenschema*) as cuter and more positively that those with higher Independent Cultural Self-construal scores (U.S.A. & Estonia). The largest take away from these analyses is the need to establish a clearer model for the perception of cuteness. While concepts of universality and cultural differences are introduced in this dissertation (Papers I; III) they were not explored further due to inclement circumstances with the global pandemic. The artifact in Paper I was going to be explored in a cross cultural research, but due to my inability to travel, was canceled. I had initially planned to explore the conception, design, and reception of three cultural symbols of Jeju island that have been transformed into cute mascot characters: the *Dol hareubangs* (the island's statues made from volcanic rock), the Jeju Mandarin, and the *Haenyeo* mermaids (the island's traditional female divers). The initially planned methodology aimed to explore the differences in perceived cuteness between locals (for whom the mascots hold a cultural significance) and tourists (who do not view the mascots with such significance). A discussion on the cultural aspects of cuteness will be continued in the following section.

1.1.4. Cultural Connotations

Moving beyond the connotata derived from the metaforms, I explore the role cultural symbolism and extensional modeling play in our perception of cuteness in cartoon characters. This is important as cuteness can also be understood as an abstract notion, such as in Paper II; it may not be tied to any referent. In these instances, cuteness may be derived from metaphoric and extensional processes. I touch on these cultural processes to some extent in Paper I and III, but still not to as deep a level as initially intended. My master's thesis (Dydynski 2017) explores the topic of cross cultural perception of cuteness to some degree with a research survey where participants were asked to rate a series of cute character mascots and explain their judgments. I note two interesting points relevant to this investigation. First, familiarity may affect cuteness judgement, i.e. people preferred animal characters they were more familiar with compared to characters and animals that they could not identify. Second, positive and negative associations towards specific animals may affect cuteness judgments. Participants noted how negative cultural symbolism, such as a black cat being seen as bad luck, led them to a negative assessment of a character. Other individuals, presumably without the cultural bias, rated the character more positively. In my master's thesis I propose the following model for explaining the perception of cuteness in animated characters (see Figure 2.)

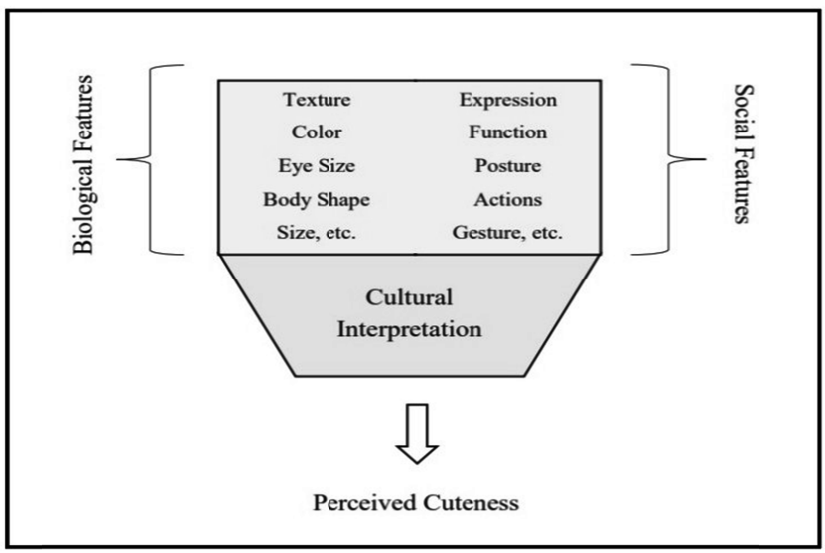

Figure 2. Perceived Cuteness Model (diagram by author, 2017).

My early model describes the interplay between the various features at the primary level, then goes on to show a general cultural interpretation process of the various schemas and features that lead to the perception of cuteness. This

early model does not specifically account for the metaforms underlying cuteness as an aesthetic and does not account for the fact that modeling systems may overlap and be difficult to distinguish in the real world (Paper I). But this model does make an initial step towards expanding the set of features that compose these various metaforms through the distinction of biological features; it also highlights the importance of cultural interpretation. Based on the theoretical discussion presented in this dissertation, I can expand this previous model (see Figure 3).

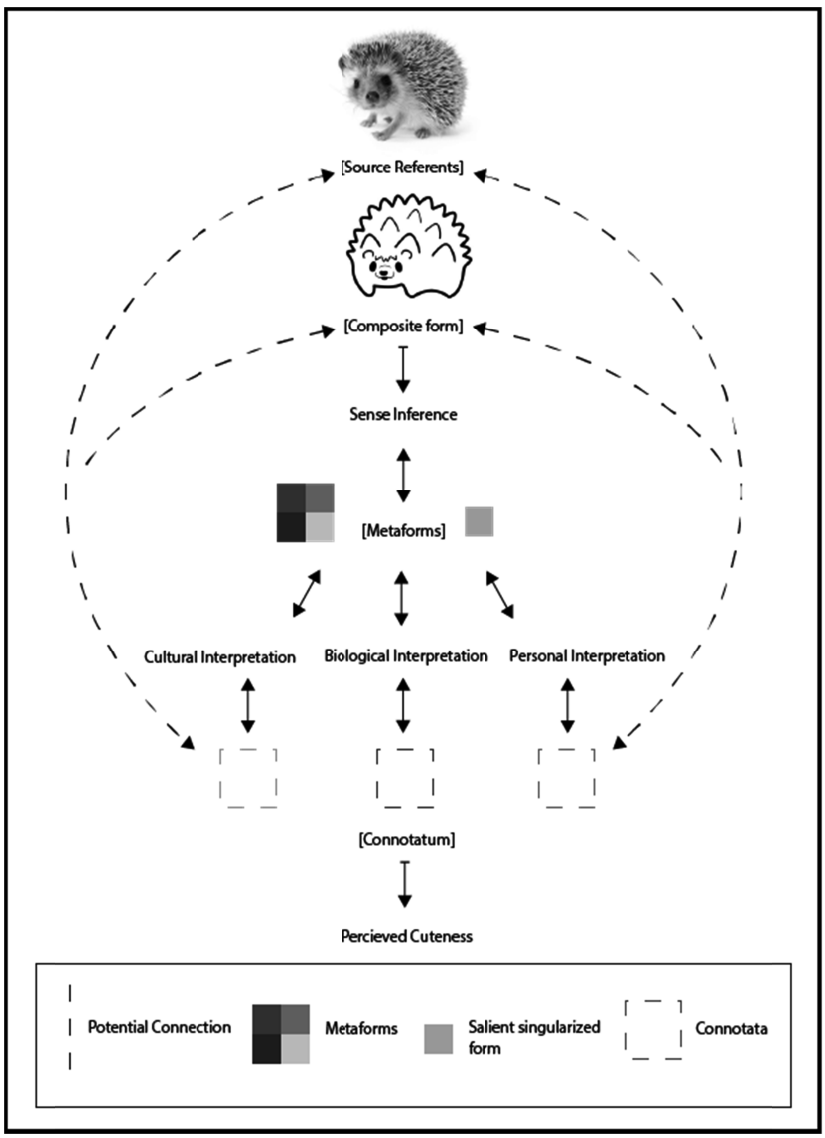

Figure 3. Extended Perceived Cuteness Model (diagram by author, 2021).

The theoretical basis for this model is largely established in Paper I, where additional descriptive information relevant to the terminology employed in this model is included. In this proposed model, I can start my analysis by viewing a given composite form (i.e. a collection of various signifiers composing a larger whole), in this case, for the purposes of explanation, the cartoon character depicted in Figure 3. Through sense inference the viewer decodes a series of metaforms as well as individualized forms. These metaforms can result from groups of features or even from singularized forms through biological, cultural, and personal interpretation resulting in a series of connotata. In the provided example, I note that the metaforms of *Kindchenschema* could be decoded based on the roundness of the character and proportions of the face, resulting in the caretaker response (a connotata underlying cuteness perception). These connotatum in connection with their respective metaforms and underlying forms if decoded by the viewer as affective and attractive, then yield a cohesive form that results in the perception of cuteness. Though certain individualized features or metaforms may be more salient for certain individuals or cultures, meaning that varied perceptions and connotata are expected between viewers. Additionally, existing knowledge or experiences with a given character may result in varied conntotatum.

This model also benefits from the inclusion of potential referents. Referential knowledge may bring in varied connotatum unaccounted for by the previous model. In this case if the viewer identifies the character as a hedgehog, they may transfer their existing connotations associated with the referent onto the character. This process may also be reflexive, i.e. resulting connotata from the character may become associated with the original referent (see Paper VI for a deeper exploration on this).

This improvement from my original model better accounts extensional modeling processes and their interplay with the crystallization of metaforms and associated connotata. Further exploration of this model in an applied setting could be achieved through more direct study and research of the various metaforms of cuteness and then by contrasting their presence in cultural perceptions between different target groups.

1.1.5. Antithesis and the Theory of Animation

In moving beyond the visual features of cartoon characters (sub question iv), I choose to explore the idea of movement in these cartoon characters as other multisensory aspects aren't directly incorporated into a 2D visual medium. An existing precedent established by Lorenz relates cuteness to movement, through his discussion of the clumsy movements of infants. This feature has been largely neglected and unexplored in cuteness studies. Though when examining the movement of cartoon characters specifically, there is a strong research theoretical basis in that of The Principles of Animation (Thomas & Johnston 1981). These theories describe a core set of foundational principles believed to

create affective movements and expressions in animated characters. These principles and their relation to perceived movement in cartoon characters are discussed in great detail in Paper V.

In exploring the origin and development of the principles of animation, a connection between theoretical biology and biosemiotics was discovered. Many of the principles are directly inspired by prevailing biologic theories and observation of the movements and expression of both humans and animals (See Paper V). In further examining the movement, I found that the concept of antithesis, which generally states that opposite emotions of valence and intensity are important in expression and understanding of emotions, as directly related to the movement and expressions of these characters (Paper V). I explored this principle through the additional analysis of an animated character from the children's cartoon *Gigglebug*, in which I assessed the valence and intensity of the various emotions of the character. Additionally, this analysis highlighted the specific usage of human movements and expressions as a basis for animation, this anthropomorphic stylization of character movements in many of the cartoon animals directly ties with our previously discussed concept of umwelt. In this case, the usage of human-like expressions and characteristics in these animal characters can have more affective and communicative impact on the viewer.

1.1.6. Bestial Ambivalence and Artificial Animals

One of the important topics that arose in the exploration of my primary research questions was the role of umwelt and anthropomorphism in the perception of cuteness; it then became a need to explore processes of anthropomorphism as relevant for cartoon characters (sub-question v.). This question is explored in my analysis of movement and expressions of emotion in animated characters, where I discuss the mixed incorporation of both human and animal movements and expressions utilized within the characters (Paper V). But this mix of human and animal qualities is not limited to just the expressions but to the designs of the characters themselves. In order to address these cartoon characters specifically, Dagmar Schmauk's typology of artificial animals is employed (Paper V). This typology poses three types of sign functions for the representation of artificial animals: "artificial animals may represent living animals, substitute them in specific contexts, or be intended as an improvement of nature" (Schmauks 2000: 309–310). Knowing the type of sign-function the different characteristics of these characters play is important in the modeling and meaning-making process of these characters, which more generally ties to our concept of Modeling Systems Theory. By knowing the typology of the given character, one can better understand its communicative intents and see whether the design features are functioning at a primary, secondary, or tertiary level and to what extent these different meanings factor into the overall perception of cuteness (Paper I).

In Paper VI this concept of artificial animals is expanded upon through Well's concept of bestial ambivalence, which is a schematic that identifies how animals are represented in various ways in animated texts (Wells 2008: 51). Well's emphasizes that these representations fluctuate within a given animated text between four contexts: the "Pure Animal"; the "Humanimal"; the "Hybrid Animal; the "Critical Human" (See Paper VI). One of the contexts in particular, "The Humanimal," also helps explain how some existing cultural notions and usage of the animal characters result from a process of repeated metaphorical usage of these characters in certain contexts. This highlights the importance of culture in the perception of cuteness that is brought up in sub-questions iii and vi. I expand on these sub-questions some with the introduced concept of expected animals, which builds on the idea of affect and how these cartoon animals can actually become referents themselves for a given animal species in the minds of the viewer. Still much is to be discussed in terms of the cultural impacts of animated films as well as in the culturally specific factors involved in the modeling of cuteness.

These theoretical points all connect in exploring the research and uncovering the niche for biosemiotics in the study of cuteness. I applied these theories in various contexts which allowed us to discover more information on the general principles of cuteness. In examining cartoon characters directly, I am able to establish greater implications for the usage of biosemiotic theories in the specific study of animated characters as well.

2. CONCLUSIONS

This research aimed to examine the theoretical underpinnings behind cuteness studies through the usage of biosemiotic theories. Now that a larger methodological framework has been established, I can return to my primary research questions. The conclusions reached for each of the primary research questions are described below as well as in which paper the answer stems from.

1) *How can biosemiotics be applied to the study of cuteness? What models and typologies can be applied and how can these analyze the perception of cuteness?*

Through exploring existing research and models of cuteness, I am able to ascertain a series of pervasive perceptual errors that have gone largely unaddressed (Paper I). Overall, *Kindchenschema* has been utilized in such a way where the features that compose the schema have been somewhat abstracted from each other. This goes against Lorenz who acknowledged the relevance of the perceptual whole. In discussing these points and perceptual errors, I do not intend to disprove existing research in the field; rather, on the contrary, this research draws attention to the complex interplay between perceptual studies on cuteness and semiotic models. In exploring cuteness as a code within Paper I, I was able to better unite biological and cultural approaches to cuteness via Modeling Systems Theory. Conceptualizing schematic sets of cute features as metaforms allow for the acknowledgement of existing models of cuteness based in *Kindchenschema* but also account for various cute schema outside the caregiver response. In this sense I address much of the discussion surrounding "categorizing cuteness" and offer a typology by which researchers can explore and identify their own metaforms, which may be biologically driven (e.g. the *Kindchenschema*) or may be culturally specific ones that are rather culturally (e.g. *kawaii* or whimsical cuteness).

In establishing a biosemiotic approach, I am also able to approach the visual bias present in cuteness studies. The understanding of what non-visual features factor into cuteness perception is understudied, and this research unfortunately only scratches the surface of the issue. Still, through the introduction of Umwelt theory (Paper II), I have highlighted the dependence we have on our perceptual and operational organs and how our sensory experience is not purely visual but rather multisensory as a whole. The introduction of umwelt theory also allows me to further establish a foundation for the perception of the metaforms of cuteness outside that of human infants, with specific focus on both real and cartoon animals (Paper II and V). This is particularly important as Lorenz himself made the extension but did not fully justify and account for the processes behind it, which led to previous studies following this extension despite an existing theoretical gap. In exploring cartoon animals specifically, I am able to more

fully understand the extent to which anthropomorphism (via the overlap between umwelten) yields the perception of cuteness in animals. But going further, I am able to explore the process by which artificial animals create affect through a combination of human and animal references and traits (Paper V and VI). This not only informs the general field of cuteness studies but also gives insight into zoosemiotic and anthropomorphic studies. More general conclusions surrounding the usage of biosemiotics as they benefit cuteness studies are elaborated on in the respective papers. The primary points mentioned here can be summarized in the following points.

1. In examining the pre-established connections between Lorenz and Uexküll, I provided addition insights into Lorenz's theoretical perspective, which uncovered the biosemiotic basis behind his thinking and its application for modern cuteness studies (Papers I and II).
2. The concept of multisensory perception expands the concept of cuteness beyond the visual aspect as well as allow us to interconnect the varied senses as they pertain to perception (Paper II).
3. Modeling Systems Theory provides a much more detailed view and analysis of cuteness and allows for understanding which aspects of cuteness stem from a biological base and which from cultural or personal instances and how they come together to form a code (Paper I).
4. The understanding of cuteness as a code also allows for the further exploration of cute features both in the form of abstract shapes as well as in that of animals (Paper I).
5. Concepts of umwelt and artificial animals play an important role in understanding the features of cuteness as they are represented in animals and animal representations, which help justify Lorenz's extension of Kindchenschema beyond human infants (Papers I, II, V & VI).

2) What does the application of cuteness in different contexts enable to reveal/ find out about the perception of cuteness as a whole ?

The direct testing and application of various theories of cuteness and biosemiotics offers an important analytical tool-kit for examining the applicability of existing theories. First in running the more critical thought experiment in the application of Modeling Systems Theory (MST) on a cute subject (*Haru* the Diver), I noted how the forms of meaning create a complex structure in our overall perception of cute phenomena (Paper I). I found that culturally ingrained metaforms may yield various connotata depending on the background of the perceiver. This further highlights the complexity of cuteness as both culturally and biologically influenced. In Paper I, I established how the varying degrees of awareness of the Hanoi mermaids in a cultural and historical sense may yield different responses to the analyzed character (i.e. knowledge of the reference may yield increased perception of cuteness). In this sense, the target domain of

a given cute object becomes critically important in cuteness studies. The impact of this cultural influence was additionally explored in Paper III, where the socio-cultural factors in the evaluation of cuteness aesthetics were established with empirical data. This experimental setting established that a rectangle can be designed to be more or less cute through the application of *Kindchenschema* converted into specific dimensions. Here it was also found that an individual's cultural self-construal can lead to differences in the perceived meaning of rectangles, which supports the presence of underlying cultural metaforms in cuteness perception.

In contrasting the perception of cuteness in the context of biological animals and artificial animals, I came to a series of general conclusions. The first of which being the importance of sensory incongruence (Paper II); this research highlights the sensory features that would not be perceived as cute and the role they play in the overall perception. I found that positive visual characteristics that would lead to a positive judgment of cuteness can be overwhelmed by negative sensory experiences such as an unpleasant sound or smell. Examples of this incongruence could be the scent of animal waste at a zoo or chemical smells on otherwise cute plush toys. Though this incongruence could also yield a positive effect if the additional sensory experiences exceed expectation (e.g. petting an animal that was softer than expected or a toy that also has a sweet scent). This emphasizes the power of immersive experiences both in the marketing of zoological gardens as well as in the creation of products and services. In further exploring the usage of cuteness in cartoon characters, I was able to see the how cute design can impact our perceptions and expectations in real world settings (Papers V and VI). I highlighted how an affective response to cuteness may prompt people to want to engage and interact with the characters present, which in term bleeds over to the real world where individuals seek to achieve these reactions. If there is incongruence between the expected experience with the animal and the actual situation, negative effects such as pet abandonment or harm to the animal or human can occur.

Moving onto the application of cuteness in the experimental context of telerobotic operations (Paper IV), I identified how the incorporation of *Kindchenschema* into visual cues resulted in increased caution. While this may seem to counteract the "caretaker response," which is usually highlighted by a desire to approach, it does support findings from Nittono and Ihara (2017) which found that the presence of *Kindchenschema* may increase focus on a variety of tasks. Further contextual explanations and conclusions about the applications of cuteness are detailed in the respective papers. The primary points mentioned here can be summarized in the following points.

1. Through analysis of a character utilizing Modeling Systems Theory, I highlighted the complex role the various forms of meaning have in our understanding of cuteness (Paper I).
2. In exploring *Kindchenschema* as a metric of normative aesthetics, I identify how socio-cultural factors affect the evaluation of cuteness.

This point towards the extensional modeling of cuteness within culturally specific domains (Papers I & III).

3. In the examination of zoo animals and cute products, I found that the congruence and incongruence of the senses can impact the overall perception of cuteness (Paper II).
4. By looking at the effects of cute cartoon characters have on real world animals, I found the traits associated with the cuteness of characters may lead to increased interest in certain animal species, but conversely may lead to abandonment and decreased interest in as the animals become adults and no longer possess such traits (Paper VI)
5. Within a telerobotic interface, cuteness, through the representation of *Kindchenschema*, can be utilized in a variety of scenarios to yield behaviors that are not directly tied to the caregiver response but can be generally tied to increased focus and attention to a given object (Paper IV)

3) *What are the implications in applying semiotic understanding/analysis of cuteness to cartoon/mascot characters?*

In exploring the perception of cartoon characters and mascots specifically, I came to a series of conclusions that provide a deeper understanding of our perceptions of cartoon characters as a whole as well as provide insights to designers and animators. Returning to my analysis of Hana the Mermaid from Paper I, I brought out the importance of the metaforms that underlie our perception of cuteness and how biosemiotic and socio-cultural factors underlie these processes (which is also discussed in the first section of conclusion). In looking at these metaforms in the context of animation specifically an interesting dynamic between author intentions and reception of these characters is brought out. In the creation of a cute character a variety of cohesive structures are employed, either consciously or subconsciously, by the designer with the intent to garner attraction and affective behaviors from a given target group. But this remains only the case if the cohesive metaforms employed by the designer result in the perception of cuteness and a positive connotation. The various metaforms and their arrangements may not be encoded correctly at the secondary level resulting in a negative connotation if the intended features could be perceived as weak or creepy (i.e. the uncanny valley, which describes a negative emotional response to an object that is perceived as too human-like in appearance (Mathur & Reichling 2015). At a tertiary level there may be cultural factors that could impact the recording of the selected metaforms and their subsequent connotations. In this way something intended to be cute could end up being culturally insensitive or offensive. It is for this reason an understanding of how various feature arrangements may be decoded as well as an awareness of potential socio-cultural factors at the tertiary level are critical for designers.

Expanding upon visual responses to certain sets of static features, this dissertation also explored the perceptions of expressions and movements as they

relate to the perception of cuteness in animation (Papers V, VI). From this I better identified the processes in which animation draws from human emotions and behaviors (via umwelt emulation) and how it leads to an affective response in the audience (Paper V). These affective powers are associated with the presence of cuteness. Similar features that improve emotional comprehension in an audience such as large eyes, increased head size, and rounded features are the same features that yield to the perception of cuteness. As mentioned previously the relationship between socialization and the presence of *Kindchenschema* in mammalian species has been noted (Theofanopoulou et al. 2018). While this dissertation does not claim that cuteness holds a causative relationship with emotional perception and sociality, their underlying metaforms seem to share some form of overlap. More general recommendations for animators and designers as well as more general conclusions can be found in their respective papers. The primary points mentioned here can be summarized in the following points.

1. In the creation and marketing of cute mascots and characters, culturally specific interpretations and meanings may result from underlying metaforms, which should be considered in the design process (Paper I).
2. The usage of human-like expressions and movements in animal characters can result in increased affective power and perceived cuteness in animal characters (Papers V, VI)
3. The primary features used in a character's design can be used to enhance overall communication; in particular the usage of cute characteristics such as large eyes can enhance the general understandability of expressed emotions (Paper V).
4. The usage of cuteness in these characters has the ability to impact our expectations and understanding of real animals, meaning that the real world impacts of character design should be carefully considered in the creation of characters (Paper VI).

3. FUTURE DIRECTIONS

This dissertation established the validity of biosemiotics as a critical methodological toolkit for filling the theoretical gaps in cuteness studies, while also managing to expand its potential horizons and applications, thus establishing an important interdisciplinary niche. The particular focus on cartoon characters and their juxtaposition with biological animals allows for the further extension of *Kindchenschema* beyond human infants and to more abstract forms. I will discuss more of the potential extensions of the findings below. First this research acts as a point for cuteness studies as a whole, viewing cuteness as a code underlined by series of metaforms (Paper I) allows for the development and exploration of different schemas of cuteness not directly tied to the *Kindchenschema*. This research then establishes a starting point for the revaluation of alternative concepts of cuteness such as whimsical cuteness and *Kawaii*. The results of this dissertation and future studies on the metaforms of cuteness offer direct applications for marketing and design as more specific feature sets can be chosen to achieve a desired perception in a target audience. Additionally, by highlighting the inclusion of various non-visual senses into our perception of cuteness (Paper II), this dissertation emphasizes how attention to sensual incongruence can benefit the creation of products. Careful attention to the interplay of the senses can help designers mediate the expectations of products and experiences, though additional research in the field of cuteness studies and design is needed to better understand this complex interplay in a variety of contexts. The results of these explorations are not limited to character and product creations but can also be utilized in the creation of zoo experiences, enhancing the perceived adoptability of animals, and in other circumstances where environmental factors may negatively impact the perception of animals.

By identifying the variance in connotata at the cultural level (Paper I) as well as analyzing the differences in cuteness evaluations based on cultural self-construal (Paper III), the universality of cuteness perception has been generally called into question. Future studies investigating the perception of *Kindchenschema,* as well as other variations of cuteness, require more diverse and inclusive participants. Seeing how perceptions of cuteness both relate and differ between varying participant groups can provide further insights into the code of cuteness as a whole, i.e. which aspects are biologically inherent and which are culturally learned.

I hope to conduct additional research of the cultural perception of cute characters and explore how varying the metaforms of cuteness employed by a designer can be interpreted as cute by different cultural groups. This research also emphasizes the delicate balance between cute, stylistic representations to create interest, awareness, and learning and the potential for negatively impacting animal welfare; the intersection between animal welfare and design/animation needs careful attention and further exploration. In our discussion of research question ii, I noted the potential effect cute, animated characters can

have on human-animal interactions, which is a point worthy of additional discussion and exploration (Paper VI). As future generations become more urbanized and globalization makes potential contacts to a variety of species more possible, expected human-animal relations need to be accounted for to mitigate potential, negative human-animal relations. It then becomes the future direction of my research to conduct a series of multidisciplinary research projects with both animators and ecologists that explores how cute and affective characters can be employed in a way that mitigates potential ecological impacts.

If I am to end on one thing it is to highlight the relevance and importance of cuteness studies. While at first glance explorations of cuteness studies may seem trivial or lacking the urgency of other disciplines, that same perception may be due to the affective powers of cuteness itself. Cuteness is one of our earliest survival tools (via *Kindchenschema*) and has clear, affective soft powers that not only have the power to impact our emotions and perceptions but even subconsciously guide and redirect our actions (Paper IV). By turning our attention to the humanities, including the semiotics of cuteness, we can better understand and address complex real-world issues and hopefully come to practical solutions for the betterment of everyone.

REFERENCES

Allison, Anne 2003. Portable monsters and commodity of cuteness: Pokémon as Japan's new global power. *Postcolonial Studies* 6(3): 381–398.

Borgi, Marta; Cirulli, Francesca 2015. Attitudes toward animals among kindergarten children: species preferences. *Anthrozoös* 28: 45–59.

Chersini, Nadine; Hall, Nathan J.; Wynne, Clive D. L. 2018. Dog pups' attractiveness to humans peaks at weaning age. *Anthrozoös* 31(3): 309–318.

Dale, Joshua P. 2016. Cuteness: An emerging field. *East Asian Journal of Popular Culture* 2(1): 5–13.

Darwin, Charles 1872. *The Expression of the Emotions in Man and Animals*. London: Murray.

Dydynski, Jason M. 2017. *Perception of Cuteness in Animal Mascots/Characters*. Dissertation: University of Tartu, Estonia

Elliot, Nils Lindahl 2006. See it, sense it, save it: economies of multisensuality in contemporary zoos. *Sense and Society* 1(2): 212–230.

Friedman, Heidi; Zebrowitz, Leslie 1992. The contribution of typical sex differences in facial maturity to sex role stereotypes. *Personality and Social Psychology Bulletin* 18(4): 430–438.

Gn, Joel 2016. A loveable metaphor: On the affect, language and design of 'cute'. *East Asian Journal of Popular Culture* 2(1): 49–61.

– 2018. The technology of the cute body. Eidos: *A Journal for Philosophy of Culture* 4(6): 14–26.

Gould, Stephen J. 1979. Mickey mouse meets Konrad Lorenz. *Natural History* 88: 30–36.

Lorenz, Konrad 1981. *The Foundations of Ethology*. New York: Springer Science.

Martinelli, Dario 2010. *A Critical Companion to Zoosemiotics: People, Paths, Ideas (Biosemiotics 5)*. Dordrecht: Springer Netherlands.

Mathur, Maya B.; Reichling, David B. 2016. Navigating a social world with robot partners: quantitative cartography of the Uncanny Valley. *Cognition* 146: 22–32.

Nenkov, Gergana; Scott, Maura 2014. So cute I could eat it up. *Journal of Consumer Research* 41(1): 325–341.

Ngai, Sianne 2005. The cuteness of the Avant-Garde. *Critical Inquiry* 31(4): 811–847.

Nittono, Hiroshi; Ihara, Namiha 2017. Psychophysiological responses to kawaii pictures with or without baby schema. *SAGE Open*. https://doi.org/10.1177/2158244017709321.

Oliver, Richard L. 1980. A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research* 17 (4): 460–469.

Schmauks, Dagmar 2000. Teddy bears, tamagotchis, transgenic mice. *Sign Systems Studie*s 28: 309–324.

Sebeok, Thomas A. 1990. 'Talking' with animals: Zoosemiotics explained. In Sebeok, T., *Essays in Zoosemiotics*. Toronto: University of Toronto Press: 105–113.

Sebeok, Thomas A. 1994. *Signs: An Introduction to Semiotics*. Toronto: University of Toronto Press.

Sebeok, Thomas A.; Danesi, Marcel 2000. *The Forms of Meaning: Modeling Systems Theory and Semiotics*. Berlin: Mouton de Gruyter.

Theofanopoulou, Constantina; Gastaldon, Simone; O'Rourke, Thomas; Samuels, Bridget D.; Martins, Pedro Tiago; Delogu, Francesco; Alamri, Saleh; Boeckx, Cedric 2018. Correction: self-domestication in Homo sapiens: insights from comparative genomics. PLOSONE. https://doi.org/10.1371/journal.pone.0196700

Thomas, Frank; Johnston, Ollie 1981. *The Illusion of Life: Disney Animation*. New York: Abbeville Press.
Uexküll, Jakob von. 1982. The theory of meaning. *Semiotica* 42(1): 25–82.
Volk, Anthony; Quinsey, Vernon L. 2002. The influence of infant facial cues on adoption preferences. *Human Nature* 13(4): 437–455.
Wells, Paul 2008. *The Animated Bestiary: Animal, Cartoons, and Culture*. New Brunswick: Rutgers University Press.
Wilson, Edward O. 1984. *Biophilia*. Cambridge: Harvard University Press.

SUMMARY IN ESTONIAN

Tegelaskujude/maskottide armsuse semiootiline modelleerimine

Nunnusus, kui akadeemiline ja teaduslik mõiste pärineb *Kindchenschema* käsitlusest. Seda mõistet on kasutatud kirjeldamaks omadusi, mis on iseloomulikud imikutele ja mis kutsuvad esile afektiivse vastuse nende hooldajatel (täpsemat arutelu *Kindchenschema* kohta loe artiklist 1). Paljud uurimused nunnususe kohta käsitlevad seda nähtust kui hulka paljudest eri tunnustest, mis moodustavad tajutava terviku. Selline lähenemine võimaldab antud teema käsitlemisel paremini mõista suhet üksikute tunnuste ja tajutud terviku vahel. Samuti on oluline mõista, kuidas ilmnevad kultuurilised ja igale inimesele omased eelistused. Eelnevalt märgitud suhte uurimine tähendab, et väitekiri on üks osa nunnususe uuringutest. Väitekiri läheneb nunnususe uurimisele biosemiootiliselt, et laiendada ja ümber hinnata olemasolevate teadustööde lähenemisviisid nunnususele. Antud tööga otsitakse vastust järgnevatele uurimisküsimusele:

1) *Kuidas saab biosemiootikat rakendada nunnususe uurimisel? Milliseid mudeleid ja tüpoloogiaid saab rakendada, ning kuidas need võimaldavad analüüsida nunnususe tajumist?*
2) *Mida võimaldab nunnususe rakendamine erinevates kontekstides leida nunnususe tajumisel tervikuna?*
3) *Millised on järeldused ja tulemused, kui rakendada semiootilist nunnususe analüüsi multifilmitegelastele ja loomamaskottidele?*

Väitekirja metodoloogiana kasutatakse sünoptilist lähenemist nunnususe uuringute alusteooriatele, et leida üles teoreetilised lüngad. Seejärel rakendatakse erinevaid semiootilisi teooriaid (omailm, paljuaistinguline tajumine, tehisloomad, modelleerimissüsteemide teooria), et luua antud tööd kasutatav teoreetiline raamistik. Selline lähenemine võimaldab luua teoreetilise baasi antud töö väidetele ja testida nende pädevust nii analüütiliselt kui ka kvantitatiivses kontekstis. Kõik väitekirja lisatud artiklid lähenevad uurimisküsimustele erinevate nurkade alt. Järgnevalt on esile toodud järeldused iga uurimisküsimuse kohta ja samuti on viidatud, millises artiklis antud järelduseni jõuti.

1) *Kuidas saab biosemiootikat rakendada nunnususe uurimisel? Milliseid mudeleid ja tüpoloogiaid saab rakendada, ning kuidas need võimaldavad analüüsida nunnususe tajumist?*
    1. Ühisosa Lorenzi ja Uexkülli tööde vahel annavad meile aluse uurida lähemalt mõningaid Lorenzi mõtteid, mis omakorda aitavad meil mõista biosemiootilist lähenemist Lorenzi mõtetes ja rakendada biosemiootikat kaasaegsetes nunnususe uuringutes. (Artiklid 1 ja 2)

2. Paljuaistingulise taju mõiste rakendamine võimaldab meil laiendada nunnususe kontseptsiooni väljapoole visuaalset kommunikatsioonikanalit ja lubab ühendada erinevad tajumeeled. (Artikkel 2)
3. Modelleerimissüsteemide teooriad võimaldavad analüüsida nunnusust detailselt ja paremini mõista, millised nunnususe aspektid pärinevad bioloogiast, kultuurist ja isiklikest eelistusest ning kuidas need üheskoos moodustavad koodi. (Artikkel 1)
4. Nunnususe mõistmine koodina lubab uurida nunnususe tunnuseid laiemalt nii abstraktsete kujundite kui ka loomade puhul. Antud mõistmine võimaldab edukalt põhjendada nunnususe teooria laiendamist. (Artikkel 1)
5. Omailma ja tehisloomade mõisted mängivad olulist rolli mõistmaks nunnususe tunnuseid nagu need esinevad loomadel ja loomade representeerimisel, mis omakorda võimaldab nunnususe teooria laiendamist viisil, mis ei olnud Lorenzi töödes täielikult välja arendatud. (Artiklid 1, 2, 5 ja 6.)

2) Mida võimaldab nunnususe rakendamine erinevates kontekstides leida nunnususe tajumisel tervikuna?

1. Analüüsides tegelasi, kasutades modelleerimissüsteemi teooriat, toodi esile tähenduste erivormide rollid nunnususe mõistmisel. (Artikkel 1)
2. *Kindchenschema*, kui normatiivse esteetika mõõdiku analüüsimine andis võimaluse tuvastada, kuidas sotsio-kultuurilised tunnused mõjutavad hinnanguid nunnususele. *Kindchenschema* analüüs võimaldab nunnususe mudeli laiendamist kultuurispetsiifilistesse valdkondadesse. (Artiklid 1 ja 3.)
3. Loomaaia loomade ja nunnude toodete uurimisel leiti, et erinevad kommunikatsioonikanalid, mida samaaegselt kasutatakse, võivad nunnuse tajumisel üksteist toetada või viia vastuoludeni, mis võivad mõjutada üleüldist nunnususe tajumist. (Artikkel 2)
4. Analüüsides nunnude multifilmitegelaste mõju päris loomadele, leiti, et nunnususega seotud tunnused tegelaskujudel võivad viia kõrgendatud huvini teatud loomaliikide vastu. Samas võib eelnev tähendada ka loomade hülgamist ja huvi vähenemist loomade täiskasvanuks saamisel ja nunnususe tunnuste kadumisel. (Artikkel 6)
5. Telerobootika kasutajaliidestes võib *Kindchenschemast* lähtuv nunnusus olla kasutatud erinevatel puhkudel, et tuua esile mitte otseselt hooldamisega seotud käitumist, vaid käitumist, mis seostub kõrgendatud keskendumisega ja tähelepanuga objektile. (Artikkel 4)

3) Millised on järeldused ja tulemused, kui rakendada semiootilist nunnususe analüüsi multifilmitegelastele ja loomamaskottidele?

1. Nunnude maskottide ja tegelaste loomisel ja turundamisel on kultuurispetsiifilised tõlgendused ja tähendused metavormide tulemus. Sellega tuleb disainiprotsessis arvestada. (Artikkel 1)

2. Inimesele sarnase miimika ja liigutuste kasutamine loomategelastel võib võimenda afektiivust ja tajutud nunnusust. (Artiklid 5 ja 6)
3. Loomategelaste disanimisel võib peamisi kasutatud tunnuseid kasutada üldise kommunikatsiooni võimendamiseks. Eriti oluline on kasutada selliseid nunnusid tunnuseid nagu suured silmad, mis võivad suurendada väljendatud emotsiooni üldist mõistmist. (Artikkel 5)
4. Nunnususe kasutamine tegelaskujude loomises mõjutab meie ootuseid ja arusaamu reaalsetest loomadest. See tähendab, et tegelaskujude disain mõjutab reaalset maailma ja seega tuleb disainimõjud täpselt läbi mõelda. (Artikkel 6)

Väitekiri saavutas biosemiootika valiidsuse kriitilise metodoloogilise tööriistana, mis võimaldas täita nunnususe uuringute teoreetilised lüngad. Samuti laiendas see töö uurimisala ja rakendusi, täites seega tähtsat interdistsiplinaarset nišši.

PUBLICATIONS

CURRICULUM VITAE

Name: Jason Mario Dydynski
Date of birth: June 20, 1994
Citizenship: United States of America
Address: University of Tartu, Department of Semiotics, Jakobi 2, 51014, Tartu, Estonia
E-mail: jason.mario.dydynski@ut.ee

Education:

2017–...	University of Tartu, doctoral studies, Semiotics and Culture Studies
2015–2017	University of Tartu, master's studies, Semiotics, MA
2014–2015	University of Tartu, student exchange
2012–2015	University of Oklahomas, bachelor's studies, Linguistics, BA

Teaching Experience:

2017–...	University of Tartu, Department of English Studies; lecturer on communicating science
2020–2021	Estonian Academy of Arts, visiting professor on public speaking and story telling
2020–2021	Baltic Defence College, visiting lecturer on media communication
2018–2019	VABA AKADEEMIA, visiting lecturer on South Korean aesthetics and culture

Professional Experience:

2015–...	Weekdone, Estonia; marketing and content manager
2018–...	Kellekord, Estonia; academic copy editor
2019–...	Freelance branding and SEO specialist
2015–2016	Spray Printer, Estonia; PR and content manager

Research Topics:

cuteness, anthropomorphism, zoosemiotics, cartoons and animation, normative aesthetics, marketing and product design, animal conservation

Selected Publications:

Dydynski, Jason; Mäekivi, Nelly 2021. Impacts of cartoon animals on human-alloanimal relations. *Anthrozoös* (forthcoming).

Sookyung, Cho; Dydynski, Jason; Kang, Christine 2021. Universality and specificity of the Kindchenschema: a cross-cultural study on cute rectangles. *Psychology of Aesthetics, Creativity, and the Arts* (forthcoming).

Valner, Robert; Dydynski, Jason Mario; Cho, Sookyung; Kruusamäe, Karl 2020. Communication of hazards in mixed-reality telerobotic systems: the

usage of naturalistic avoidance cues in driving tasks. *Human Factors*. https://doi.org/10.1177/0018720820902293.

Dydynski, Jason Mario 2020. Modeling Cuteness: Moving towards a biosemiotic model for understanding the perception of cuteness and Kindchenschema. *Biosemiotics* 13: 223–240.

Dydynski, Jason Mario; Mäekivi, Nelly 2019. Darwin's antithesis revisited – a zoosemiotic perspective on expressing emotions in animals and animal cartoon characters. *Sign Systems Studies* 47(1–2): 205−233.

Dydynski, Jason; Mäekivi, Nelly 2018. Multisensory perception of cuteness in mascot and zoo animals. *International Journal of Marketing Semiotics* 6: 2−25.

ELULOOKIRJELDUS

Nimi: Jason Mario Dydynski
Sünniaeg: 20. juuni 1994
Kodakondsus: Ameerika Ühendriigid
Kontaktaadress: Tartu Ülikooli filosoofia ja semiootika instituut, semiootika osakond, Jakobi 2, Tartu 51005
E-post: jason.mario.dydynski@ut.ee

Hariduskäik:

2017–...	Tartu Ülikool, doktoriõpe, Semiootika ja kultuuriteooria
2015–2017	Tartu Ülikool, magistriõpe, Semiootika, MA
2014–2015	Tartu Ülikool, vahetusprogramm
2012–2015	University of Oklahoma, bakalaureuseõpe, lingvistika, BA

Teaching Experience:

2017–...	Tartu Ülikool, Department of English Studies; teaduse kommunikeerimise lektor
2020–2021	Eesti Kunstiakadeemia, avaliku esinemise ja lugude jutustamise külalislektor
2020–2021	Balti Kaitsekolledž, meediakommunikatsiooni külalislektor
2018–2019	VABA AKADEEMIA, külalislektor Lõuna-Korea esteetika ja kultuuri alal

Töökogemus:

2015–...	Weekdone, Estonia; turundusjuht
2018–...	Kellekord, Estonia; akadeemiline keeletoimetaja
2019–...	Freelance branding and SEO specialist
2015–2016	Spray Printer, Estonia; PR and content manager

Peamised uurimisvaldkonnad:
Nunnusus, antropomorfism, zoosemiootika, multifilmid ja animatsioon, normatiivne esteetika, turundamine ja tootedisain, liigikaitse

Olulisemad publikatsioonid:

Dydynski, Jason; Mäekivi, Nelly 2021. Impacts of cartoon animals on human-alloanimal relations. *Anthrozoös* (forthcoming).

Sookyung, Cho; Dydynski, Jason; Kang, Christine 2021. Universality and specificity of the Kindchenschema: a cross-cultural study on cute rectangles. *Psychology of Aesthetics, Creativity, and the Arts* (forthcoming).

Valner, Robert; Dydynski, Jason Mario; Cho, Sookyung; Kruusamäe, Karl 2020. Communication of hazards in mixed-reality telerobotic systems: the

usage of naturalistic avoidance cues in driving tasks. *Human Factors*. https://doi.org/10.1177/0018720820902293.

Dydynski, Jason Mario 2020. Modeling Cuteness: Moving towards a biosemiotic model for understanding the perception of cuteness and Kindchenschema. *Biosemiotics* 13: 223–240.

Dydynski, Jason Mario; Mäekivi, Nelly (2019). Darwin's antithesis revisited – a zoosemiotic perspective on expressing emotions in animals and animal cartoon characters. *Sign Systems Studies* 47: (1–2).

Dydynski, Jason; Mäekivi, Nelly 2018. Multisensory perception of cuteness in mascot and zoo animals. *International Journal of Marketing Semiotics* 6: 2−25.

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