

# Objection!

**THE STAGED RELATIONS  
BETWEEN HUMAN BEINGS  
AND AGENTIVE OBJECTS  
AS LESS ANTHROPOCENTRIC ALTERNATIVE  
FOR THE DESIGN OF SOCIAL ROBOTS  
AND HUMAN-ROBOT INTERACTION.**

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# Abstract

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This thesis brings together two fields that at first sight seem to have little in common: theatre and social robotics. It argues in what ways dramaturgical principles used in object theatre to transform lifeless things into agentive objects offer a less anthropocentric perspective on the (way in which roboticists use theatre in their) designs of social robots. Therefore, this thesis firstly dives into the discourse in which robot developers deploy theatre as part of their research, in order to show how theatre and its theory is used in the design of social robots and human-robot interaction. It shows that roboticists only use forms of theatre in which humans and their actions are central, and therefore seem to model their non-human creatures after human actors in such a way that these creatures pass for human beings. In the second chapter, this thesis makes clear how — according to puppetry theorists — puppets can transform on stage into agentive objects, as another theatre perspective that does not reason from this passing for human beings. It is argued that the relationships between the staged puppets and humans and between the performance as a whole and the spectator are at the core of this transformation. In the third chapter, this text provides analyses of two object theatre performances, *Coco Chanel* (2017) and *I/II/III/IIII* (2007; reprised in 2017), on the basis of which the findings regarding chapter 2 are sharpened and nuanced. In this way, this thesis is able to discuss in its conclusion why an object theatre framework can be inspirational for a less anthropocentric design of social robots and human-robot interaction, for which four different perspectives are presented that social roboticists are invited to take into consideration: 1. the framework in which a social robot functions; 2. its dramaturgy; 3. its anthropomorphism; and 4. the inclusion of the uncanny.



# Samenvatting in het Nederlands

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Deze scriptie brengt twee onderwerpen samen die op het eerste gezicht weinig overeenkomsten lijken te vertonen, maar in tweede instantie toch veel gemeen blijken te hebben: theater en *social robotics*. Ze laat zien op welke manier dramaturgische principes die in het objecttheater worden gebruikt om levenloze dingen op het podium in objecten met handelingsvermogen (*agentive objects*, noem ik die) te transformeren een alternatief perspectief kunnen bieden op (de manier waarop robotbouwers theater gebruiken in hun onderzoek naar) het ontwerp van sociale robots. Ik gebruik het woord alternatief, omdat robotbouwers nu nog vaak theater waarin mensen en relaties tussen slechts mensen centraal staan als model gebruiken voor hun creaties, waarmee ze robots ontwerpen die kunnen *doorgaan voor* mensen. Om een concreet voorbeeld te geven van zo'n transformatie van ding tot agentive object: in een poppentheatervoorstelling ligt een pop die niet door zijn poppenspeler geanimeerd wordt slechts levenloos op het toneel, maar op het moment dat er, bijna letterlijk, leven in de pop wordt geblazen door een poppenspeler gaat hij door voor een karakter dat in de verbeelde wereld handelingsvermogen bezit. De spanning en ambiguïteit tussen deze twee uitersten biedt een minder binair en minder antropocentrisch perspectief op de ontwikkeling van human-robotinteractie (HRI), waarbij de logica achter de vergelijking tussen sociale robots en objecttheater hem erin zit dat sociale robots ook entiteiten zijn die tot een agentive object worden gemaakt in hun interactieproces met mensen. Deze scriptie laat zien dat het niet nodig is om objecten voor mensen door te laten gaan om er geloofwaardige interactiepartners van te maken, maar ze toont dat veeleer de complexe relaties die tussen objecten en mensen worden aangegaan aan de basis staan van de transformatie van een ding in een agentive object.

Om dat te beargumenteren, duikt deze tekst allereerst in het discours waarin ontwerpers van robots theater inzetten voor hun onderzoek. Die inzet kan worden teruggevoerd op twee verschillende redenen. Ten eerste zien robotbouwers het theater als een goede mogelijkheid om hun ontwerpen te *testen* in het bijzijn van een publiek. Het publiek dat feedback kan geven aan de robotbouwers over wat ze hebben gezien op het toneel, het beperkte, gecontroleerde raamwerk waarin een theatervoorstelling opereert, en de theaterruimte waarin

een verbeelde wereld is afgesloten van de wereld waarin het publiek zich bevindt, zien zij als de drie aspecten die ervoor zorgen dat theater zo goed werkt als testomgeving voor HRI. Ten tweede gebruiken ontwikkelaars van sociale robots theorieën die de robot als performer zien en theorieën rondom de dramaturgie van een voorstelling als *model* om hun ontwerpen te verbeteren. Deze manier van het inzetten van theater en de veronderstellingen die deze robotbouwers daarover hebben, suggereren echter dat zij hun robots modelleren naar menselijke acteurs: ze gebruiken namelijk alleen theater waarin (relaties tussen) mensen en hun handelingen centraal staan. In die zin, zo laat deze scriptie zien, ontwerpen robotbouwers hun niet-menselijke robots op zo'n manier dat ze kunnen *doorgaan voor* een mens.

In het tweede hoofdstuk wordt een ander soort theater behandeld dat inzicht kan bieden in de relaties die robotbouwers ontwerpen tussen mensen en sociale robots: het poppentheater zet namelijk objecten, poppen, samen met mensen op het podium en zorgt ervoor dat deze objecten door de toeschouwer worden waargenomen als geloofwaardige interactiepartners met handelingsvermogen, zónder dat ze per se doorgaan voor een mens. Op basis van het discours rondom poppentheater wordt beargumenteerd dat in plaats daarvan de relaties tussen de op het toneel gezette poppen en mensen, en tussen de voorstelling als geheel en de toeschouwer aan de basis liggen van de transformatie van een pop van een ding naar een agentive object. Twee perspectieven uit het poppentheaterdiscours blijken daarbij belangrijk te zijn: *(co-)presence* ((co-)aanwezigheid) en *mediation* (mediëring). Poppentheoretici, zo toont deze scriptie, schrijven dat de gecompliceerde relaties tussen pop, poppenspeler en acteur laten zien dat presence is niet iets wat een geënceneerde entiteit bezit, maar iets is wat ontstaat vanuit de geconstrueerde relaties tussen pop en mens. Co-presence is vervolgens een situatie specifiek voor poppentheater waarin zowel de poppenspeler, terwijl hij zijn pop bespeelt, voor zichzelf een dramaturgische functie creëert naast die van poppenspeler als de ontologische status van de pop en de poppenspeler dichter naar elkaar toegroeit, waardoor de pop uiteindelijk in een agent kan transformeren. Deze theoretici veronderstellen daarnaast dat de mediation tussen de voorstelling als geheel en de toeschouwer deze laatste uitnodigt om de pop als Ander te zien; als een entiteit die anders is dan hijzelf, maar waartoe hij zich door middel van zijn eigen lichaam kan verhouden. De implicatie van deze wisselwerking tussen echt en niet echt, tussen leven en dood, en tussen zelf en de Ander die poppentheoretici noemen is echter dat de pop *ontologically ambiguous* (ontologisch ambigu) wordt. Deze ambiguïteit kan op haar beurt gemakkelijk een gevoel van *uncanniness* (ongemak) oproepen bij de toeschouwer: een onzekere twijfel over precies die verschillen tussen echt en onecht, en tussen leven en levenloos. Poppentheatermakers, zo laat deze scriptie zien, maken deze ambiguïteit en uncanniness echter doelbewust onderdeel van de dra-

maturgie van hun voorstellingen, omdat twijfel over de ontologie van de pop een effect is dat ze bij de toeschouwer willen bereiken.

Vervolgens laat deze scriptie twee voorstellingen de revue passeren: *Coco Chanel* (2017) van Ulrike Quade Company en *I/II/III/IIII* (2007, reprise in 2017) van A Two Dogs Company die wordt geleid door Kris Verdonck. De ideeën over co-presence, mediation, ontological ambiguity en uncanniness uit hoofdstuk 2 worden met de analyses van deze voorstellingen uitgebreid, aangescherpt en/of genuanceerd. Aan de hand van *Coco Chanel* wordt in dit hoofdstuk beargumenteerd dat co-presence niet alleen iets is wat door het vakmanschap van de poppenspeler wordt bereikt, maar dat de *constructie van de relaties* in de voorstelling er ook voor kunnen zorgen dat de pop en de poppenspeler co-present worden. Daarnaast wordt aan de hand van *I/II/III/IIII* beargumenteerd dat co-presence niet iets is wat alleen tussen pop en poppenspeler voor kan komen: op basis van een bespreking van de *body schemas* van de dansers en machine in die voorstelling laat het hoofdstuk zien dat ook tussen die entiteiten co-presence kan voorkomen. De notie van mediation wordt ook genuanceerd, omdat dit hoofdstuk aan de hand van *Coco Chanel* aantoont dat het grotendeels de framing is die bepaalt op welke manier een object op het toneel geïnterpreteerd kan worden door de toeschouwer. Deze voorstelling biedt de toeschouwer namelijk *verschillende frames* aan om de geënceneerde poppen en de poppenspelers te begrijpen (als ding, als handelend karakter, als mens). Niet alleen de context waarin een poppentheatervoorstelling zich afspeelt of het lichaam van de pop als Ander is dus belangrijk om in gedachten te hebben bij het tot agentive object maken van een op het toneel gezet object, maar ook de dramaturgie van de voorstelling waarin deze framing besloten ligt. Tot slot wordt in dit hoofdstuk — in lijn met de beweringen uit hoofdstuk 2 — aan de hand van beide voorstellingen beargumenteerd dat uncanniness als een bewuste strategie wordt ingezet in die voorstellingen. In *Coco Chanel* gaan de poppen namelijk voor semi-menselijke karakters door, maar ondergaan dingen die echte mensen niet zouden kunnen overkomen. Tegelijkertijd worden de menselijke performers tot objecten gemaakt, wat als geheel een uncanny gevoel oproept. In *I/II/III/IIII* wordt de illusie opgewekt dat de machine waar de dansers aan vastgemaakt zitten over autonoom handelingsvermogen beschikt. Daarbij wordt de machine op geen enkel moment in de voorstelling expliciet uitgelicht, wat als geheel eveneens een ongemakkelijk gevoel oplevert.

Vervolgens vergelijkt deze tekst de bevindingen uit hoofdstuk 2 en 3 met die uit hoofdstuk 1 en laat zien dat ze op vier verschillende manieren van elkaar verschillen. Ten eerste wijzen hoofdstuk 2 en 3 op de *relaties die geënceneerde objecten met menselijke performers aangaan* als basis voor de transformatie van deze objecten in agentive objects. In hoofdstuk 1 blijkt dat robotontwerpers lijken aan te nemen dat hun robots, wanneer ze eenmaal op een

antropomorfe manier ontworpen zijn, over een natuurlijk handelingsvermogen beschikken, maar het raamwerk uit hoofdstuk 2 en 3 laat zien dat een op het toneel gezet object ook handelingsvermogen kan verkrijgen wanneer het relaties met anderen op het toneel aangaat. Ten tweede, de *constructie van de relaties* in een voorstelling, als onderdeel van de dramaturgie, zorgt niet alleen voor een bepaald effect bij de toeschouwer — zoals in hoofdstuk 1 duidelijk wordt — maar zorgt er ook voor dat de toeschouwer aan de basis kan staan van de transformatie van een ding in een agentive object. Ten derde, robotbouwers willen graag robots ontwerpen die een béétje antropomorf zijn, want dat komt de interactie ten goede. Hoofdstuk 2 en 3 laten echter zien dat objecten *niet per se antropomorf* hoeven te zijn om handelingsvermogen te verkrijgen en te kunnen interacteren met mensen, als ze maar functioneren binnen de juiste framing. Ten vierde, objecttheatermakers ontwerpen en ensceneren de objecten die ze gebruiken op zo'n manier dat ze *doelbewust* ontologisch ambigu en uncanny worden, terwijl robotbouwers die twee effecten willen vermijden omdat ze ervoor willen waken dat hun creaties niet té menselijk worden; het blijkt namelijk uit hoofdstuk 1 dat mensen minder makkelijk interacteren met een object dat heel erg op hen lijkt.

De ideeën uit hoofdstuk 2 en 3, en vooral hun verschillen met hoofdstuk 1, bieden dus, zo laat de conclusie van deze scriptie zien, inspiratie voor en een minder antropocentrisch perspectief op het ontwerp van sociale robots en human-robotinteractie. Als we met dit perspectief naar robots kijken, erkennen we de complexe aard van deze objecten en daardoor ook het feit dat een sociale robot meer is dan een entiteit die zichzelf slechts kan uitdrukken: het is ook een object dat zijn interactiepartner kan adresseren. Daarvoor moeten de relaties tussen entiteiten die in een poppentheatervoorstelling op het podium staan doorgetrokken worden naar een HRI-situatie: de sociale robot kan op die manier vergeleken worden met de pop, de robotbouwer met de poppenspeler en de interactiepartner met de menselijke acteur. Deze relaties zijn echter, net als in het poppentheater, complex: de robot zelf is ontologisch ambigu, de animator van de robot is niet aanwezig in de interactie en de mens waar de robot mee interacteert speelt tegelijkertijd de rol van interactiepartner en van toeschouwer. Om die complexiteit te onderkennen, stelt deze scriptie vier perspectieven voor die robotbouwers in overweging kunnen nemen om in hun ontwerpen op te nemen: 1. het raamwerk waarbinnen de sociale robot functioneert; 2. de dramaturgie van de sociale robot en de implicaties die die dramaturgie heeft voor de interactie; 3. het misplaatste idee dat robots altijd antropomorf moeten zijn; en 4. het opnemen van uncanniness als een bewuste strategie in het ontwerp van de sociale robot.

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# A great, short shout out!

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Without the humility that usually sticks to this section of any book, I would like to take this moment to pay back my debts to the merits of a number of people. Why? Because Sofie pointed me to the work of Aparna Rao, which in the end I did not use in this thesis at all. Because Bjorn and I agreed to not read each other's texts before the final deadline. (We stuck to it!) Because Ton sent me every little example of robotic whatevers he could find. Because the company of Ulrike Quade gave me the opportunity to visit one of the most beautiful performances I have ever seen. Because Nick enlightened me with the idea of writing acknowledgements by saying that he never ever wanted to be part of it. (Sorry, Nick.) Because my English would have been way worse if Nico didn't check it. Because Liane forced me to break up my thoughts into tiny, manageable and accessible pieces. Because I still dream about Kris Verdonck's machinery. (No, no nightmares.) And because Marlon talked nonstop about her own thesis, reminding me that I had work to do.

I wrote all other academic texts before this one without comprehensive help. However, I discovered that the longer a text is or is going to be, the more help one needs. That is why I would like to sincerely thank all these people, and Maaïke in particular. As cliché as it may be, this thesis would have been very different without your company, help and advice — worse, I must admit.

# Introduction

## FROM ROBOTS TO HUMANS TO THEATRE TO PUPPETS AND BACK.

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In this thesis, I bring together the worlds of robots and staged objects. Whether in real life or on stage, social robots and, for example, puppets in puppetry performances have one particular thing in common: they are lifeless things that can become credible agents, appearing to be able to interact with others. In this thesis I think through this similarity to provide ideas for the design and development of social robots and human-robot interaction (HRI), which is supported by the observation that several roboticists and researchers writing about the developments in social robotics propose (aspects of) theatre as inspiration for the practice of designing social robots and the HRI that follows therefrom. The aspects of theatre they use, however, seem to emphasise social robots as objects *that pass for human beings*. The alternative perspective this thesis proposes therefore departs from an approach that centralises the complex relations between human beings and social robots *as objects that can obtain agency through entering in these relations*, and eventually offers suggestions for a less anthropocentric perspective that centralises these relations in the design of social robots.

In many theatre plays human beings and the relationships between them are central: whether the Greek king Oedipus who killed his father and married his mother, the Scottish



general Macbeth who ruled his kingdom while being consumed by fear and guilt, or the Norwegian Nora who walks away from her husband in order to fulfil a duty towards herself, all these plays centralise the relationships between people and their consequences. Theatre, in that sense, can be seen as a way of modelling and imagining these relations. Social roboticists use theatre in their research for exactly that purpose: as a model and a place to represent social situations between human beings and robotic creatures in order to improve the design of human-robot interaction.

By doing so, however, these robot designers seem to assume that relationships between human beings are exemplary for the relationships between human beings and social robots. This thesis therefore argues that theatre that stages objects offers different ideas for understanding these relations. In puppetry performances, for example, puppets are staged that at first sight seem to be lifeless *things*, incapable of doing anything without the help of a human puppeteer. Once they have come to life by means of this human 'animator', however, they are perceived as *agents*: as subjects that have their own movements, emotions and actions. This ambiguous nature makes them transform into, as I will call them, *agentive objects*. Acknowledging this is relevant because it can offer a less binary and less anthropocentric perspective on the design of both social robots and human-robot interaction. This thesis therefore aims at untangling how this ambiguity is addressed and used in theatre performances that stage relationships between agentive objects and human beings, and how roboticists can use these dramaturgical principles as less anthropocentric inspiration for their designs.

## §1 | Social robots.

As a first step in this argument let me take you to an appointment I once had with Robin, a very clever, small lady. When I met her, we had a conversation about Sicily: once, Robin had to flee there from a university building. On her way out, she was unsure whether to take the ferry or a taxi to get off the island. Choosing the latter, she hailed a cab in which the driver made some small talk to her. He drove her in the direction of the airport; that was at least what she thought was going on. After a while — she did not even stutter when she told me this — she found out that the taxi driver was a psychopath and tried to kill her. Fortunately, she survived (and now dislikes Sicily). I found Robin's story quite gruesome, and weird, too. She also wanted me to speak as loudly as possible from a rather specific angle, because otherwise she could not hear me. Meanwhile, she insisted on looking me in the eyes; very intensely, if you would ask me. Her glance was unusually vivid; her eyes glowed brighter than any human pair could. When she explained the incident in the cab they literally turned into fiery red and together with a change in her tone of voice, her rosier-getting cheeks and her wild gestures, she made certainly clear to me that she was angry. And those eyes — they al-



**Figure I.1: Robin, a ZORA robot.**

most frightened me: fixed on mine, in a strange, non-human-like red. It was alienating, let me tell you.

Robin was a robot: human-made intelligence put in a physical machine. Robots abound in our world (and beyond!): they press newspapers, measure the world temperature, build cars, phones and lawn mowers, and we even make them fly around the earth and through the galaxy. What kind of robot do you imagine right now? Something like the robot in figure I.1? The things I mentioned — presses, factory components, satellites — are very different in form, but all share one aspect: they are not human-like, they are not like that robot you see above. Yet the first image people will come up with when asking them about robots could very well be this image of a little human-like creature. A long time ago, in a galaxy far, far away, this human-like creature was something that looked like an average-sized man, covered in golden plating.<sup>1</sup> C3PO was designed as a protocol droid, intended to be able to interact with other organisms and to help them with etiquette and translation issues. For that reason, the creature had to be able to understand others, show empathy and make autonomous choices — very human-like qualities.

C3PO was what we nowadays would call a *social robot*. These robots exist in different shapes and sizes, from little computer bots that filter email inboxes to natural-sized humanoids that you can see and feel. In this thesis, I focus on robots that have a physical ap-

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<sup>1</sup> For the maybe few who do not recognise this phrase: I am referring here to the Star Wars franchise (created by George Lucas; first movie released in 1977).

pearance, of which the latter ones are part. However, this physicality is not the only characteristic a social robot possesses: Terrence Fong, Illah Nourbakhsh and Kerstin Dautenhahn emphasise the societal nature of social robots, when they define them as "embodied agents that are part of a heterogeneous group, a society of robots and humans, [that] are able to recognize each other and engage in social interactions, [...] possess histories and [...] explicitly communicate with and learn from each other" (2003, 144). Christoph Bartneck and Jodi Forlizzi highlight yet another aspect, namely a social robot's behaviour that is adjusted to the behaviour of human beings: according to them, a social robot is "an autonomous or semi-autonomous robot that interacts and communicates with humans by following the behavioral norms expected by the people with whom the robot is intended to interact" (2004, 592). Furthermore, Jana Horáková and Jozef Kelemen argue that a social robot is an autonomous system that exists in the physical world, which it can sense and in which it, taking these perceptions into account, can perform actions that make sense within that world (2009b, 30), with which they emphasise the robot's agentic capacities. Based on these different aspects, I define a social robot for this thesis as an embodied, (semi-)autonomous agent that is constructed by human beings so that it can sense and respond to its environment and by communicating with these human beings can engage in social interactions with them.

Although the market for social robots is still quite small, a relatively high number of them is deployed in elderly care. *ZORA* — a robot made by SoftBank Robotics and sold in the Netherlands by the Belgian company Zorabots<sup>2</sup> — can be used for medical rehabilitation, reading the news, playing bingo, and dancing (Zorabots 2017; see figure I.1 on the previous page). Another care-related social robot available is *Kaspar*, which supports children with autism in developing their social interaction skills (University of Hertfordshire 2017; see figure I.2 on the next page). These are just two examples of social robots that are used nowadays, but that is not all. Johanna Seibt, Danish self-proclaimed robophilosopher, mentions that "on the horizon [...] are applications as 'personal assistants', 'friends', 'romantic partners', 'teachers', 'tutors', 'guides', 'receptionists', 'drivers', 'soldiers', and 'nannies'" (2016). Just let this sink in for a moment: imagine what you would do when you just could go to a store and buy a machine that gives you love or friendship; or when you would be in a classroom and would learn from a creature that is not able to think for itself. What would the world look like?

This all may sound like pie in the sky, but actually it is not. The technological knowledge necessary to build these kinds of robots progresses at a rapid pace. Professional service company KPMG forecasts worldwide growth of one and a half million social robot sales in

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<sup>2</sup> SoftBank Robotics is a Japanese company that designed the so-called NAO robot. *ZORA* is a NAO robot but tweaked by Zorabots in order to make it suitable for elderly care application.



Figure I.2: the robot Kaspar.

the period from 2015 until 2018, and an exponential growth in public venture capital investments in social robotics (Wagenmakers, Van Oers and Wesselman 2016, 7). According to their research, "[a]s with many changes driven by technology, there is no question if but when we will see the first applications [of social robots] in our daily lives" (2). It indeed sounds like our world is going to face a big universal application shift in robotics, what some have already called the *robotic turn*.<sup>3</sup>

## **§2 | Aeolipiles, automatons and animatronics.**

The word *robot* stems from the Czech word *rab* ("slave") and its cognate *robota* ("servitude", "forced labour"). Although the word obviously already existed for many years in Czech, it became widespread through the 1921 play *R.U.R.: Rossum's Universal Robots*, written by the famous Czech writer and playwright Karel Čapek. *R.U.R.* shows a dystopian world in which intelligent factory slaves are developed that take over the factory they are forced to work in and eventually kill their inventors (Čapek 1923). In the play, we find a complex connection between the human beings working in the factory and designing these 'robota', and the robotic creatures themselves: these relationships can be considered both social and hostile. Due to the fact that in this narrative human beings get connected to the robots they invent, the only

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<sup>3</sup> The robotic turn is a term coined by Sherry Turkle in her book *Alone Together*, with which she means that robots are getting more and more available and suitable for commercial use (2011, 169).

person the robots spare in their slaughter calls them 'the shadow of man', with which he means that the robots are like mirror images of their human effigies. In this way, the play connects to a topic that recurs throughout history, which is in more contemporary times called the "humanisation of machines" and the "machinization of humans", used when arguing that both human beings and robots grow towards each other by getting into relationships with each other (Dixon 2004, 16).

The fascination for artificial human-like figures goes back way beyond this Czech play from 1921. Pindaros, an ancient Greek poet, already mentions the craftwork of the people from Rhodes, which puts forward that human-like figures were already made almost five hundred years before our Common Era and that people fantasised about animating these figures:

**the grey-eyed goddess taught them [the people from Rhodes] every art,  
who beat every other human being in working with their hands;  
the streets were full of figures that were like living, moving human-likes,  
of which the fame was deep.<sup>4</sup>**

(Pindaros 464 BCE; my translation)

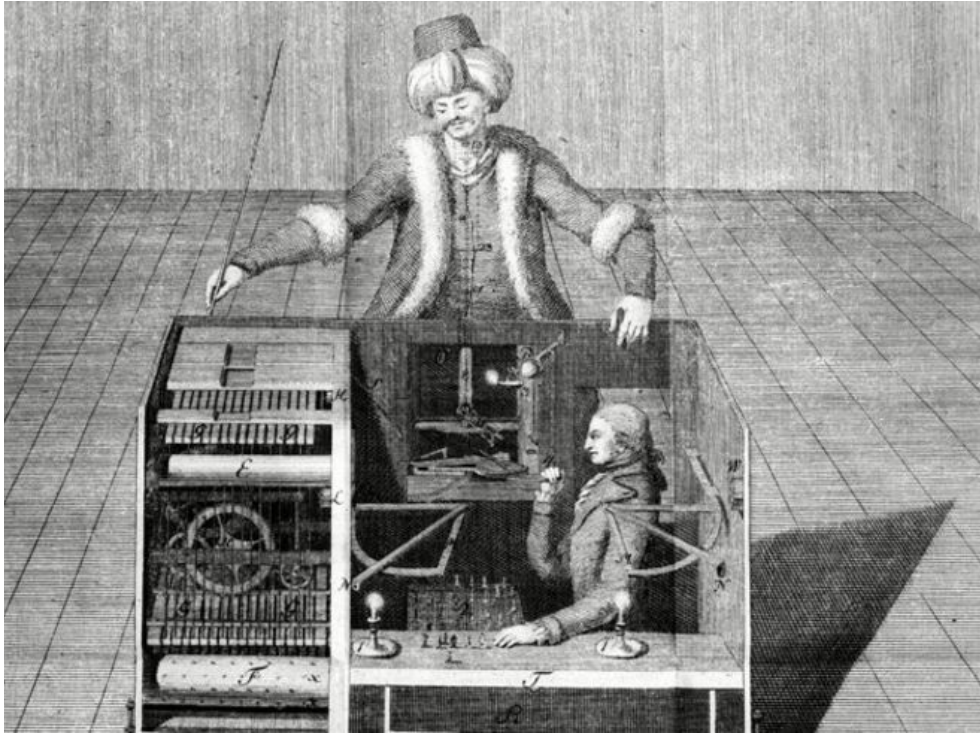
According to Pindaros, the people from Rhodes were thus already engaged with the design of moving, anthropomorphic creatures. Rodney Brooks, former Professor of Robotics at MIT, talks in the same way about Hero of Alexandria, who invented around 100 BCE a so-called aeolipile, which is a steam-driven *automaton* — a self-operating machine (2002, 13). As machines that show "(human) competence and workmanship" (Demers and Horáková 2008, 3), these automata are, just like our contemporary robots, physical appearances that are operated without human interference, i.e., machines that seemed to be able to act on their own.

Skipping almost fifteen hundred years, this fascination for self-operating machines can be observed in the fourteenth century in the development of so-called clockwork automata (of which the cuckoo clock is a still prevalent example); in the sixteenth century in Leonardo Da Vinci's famous walking lion; and in the seventeenth and eighteenth century in Japanese *karakuri*, which served tea at Japanese tea ceremonies (Dixon 2004, 19).<sup>5</sup> These automata were not what we would nowadays call intelligent since they were programmed to perform particular behaviour in order to react to a very specific, fixed, situation. This seems to be different, however, in the case of an automaton that was built at the beginning of the nineteenth century by Wolfgang von Kempelen: the *Chess Automaton* (see figure I.3). This automaton

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<sup>4</sup> The original, Ancient Greek, text is as follows: αὐτὰ δέ σφισιν ὥπασε τέχνην / πᾶσαν ἐπιχθονίων  
Γλαυκῶπις ἄριστοπόνοις χερσὶ κρατεῖν: / ἔργα δὲ ζωοῖσιν ἐρπόντεσσι θ' ὁμοῖα κέλευθοι  
φέρον: / ἧν δὲ κλέος βαθύ.

<sup>5</sup> For more information about these automata, see Max von Boehn's *Puppets and Automata* (1972).



**Figure I.3: the Chess Automaton.**

contained an automated Turkish-dressed figure that smoked a pipe while playing a game of chess, and thus seemed to include a machine that was able to play chess — seemed, because the Turk's moves were actually decided by a person sitting inside the box on which the Turkish figure sat.<sup>6</sup>

Given the anthropomorphic 'outside' of the machine, people at that time were really frightened by this "mechanical sorcery" (Sussman 1999, 87–90), probably because Von Kempelen was the first who created an automaton that pretended to possess human intelligence. In later times, this particular kind of intelligence has been termed artificial intelligence (AI). Since Von Kempelen's Chess Automaton, the development of AI and its manifestations have been increased — especially from the twentieth century onwards. In the 1950s, for example, scientists succeeded in developing digital artefacts that were able to demonstrate their possession of AI: electromechanical computers made from vacuum tubes and later transistors. Another example — celebrated by AI engineers as one of their greatest successes — is the fact that IBM engineers in 1997, almost two hundred years after the Chess Automaton, succeeded in building the *Deep Blue* supercomputer that was able to defeat the then prevailing chess grandmaster Garri Kasparov.

As the twentieth century passed, both AI and its physical manifestations came also to the interest of an increasing number of people outside academia, as Steve Dixon (2010, 22–3) points out. He argues that we can see this reflected in three particular instances. First, Walt

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<sup>6</sup> You want to know the trick? The hunchback was able to see the board through an ingenious system of mirrors.

Disney, who was fascinated by automata, built so-called *animatronics* in his globally built, and known, Disneyland theme parks. These animatronics are computer-controlled animated characters that can be used in theme park attractions in order to deliver their visitors a more immersive attraction experience.<sup>7</sup> Second, from the 1960s onwards the *cyberpunk* book genre emerged, of which Isaac Asimov and William Gibson can be considered the founders, and in which artificial intelligence and the resulting derogation of social order is discussed. Third, in that same decade of the 1960s *robotic art* developed next to the development of other interactive artworks: an art genre in which artists, through experimentation with robots and other physical machines, developed ideas about technology and ethics. In 1964, for example, Nam June Paik and Shuya Abe designed *K-456*, an anthropomorphic robot that could perform in the streets. During such a performance, Paik guided the robot while it played John F. Kennedy's inaugural address through the radio speaker in its mouth. Bojana Romic argues that this inclusion of the robotics in a broader cultural context did not stand alone, but created a "feedback loop" for actual robot designers and thereby affected the aesthetics of robots that were built in that time. According to her, that was why the idea originated in that period that "a social robot can be seen as a cultural product which fosters imagination through visual representation, interaction and kinetic behavior" (2016, 237) — an idea that remains prevalent up to the present day.

### §3 | Anthropomorphic robots.

The examples I described in the previous section illustrate a tendency to model artificial creatures after human beings. Almost all creatures discussed in the previous sections share one aspect: Von Kempelen's chess player as well as the craftwork of the people from Rhodes as well as Disney's animatronics, even including Robin, aim at representing living human beings. Furthermore, when people began designing AI, not only did the appearance of this intelligence resemble the outside of humans but the intelligence itself also often functioned according to human principles.<sup>8</sup> An early contemporary example that points at the resemblance with human intelligence stems from the period in which the first computers were made, the 1950s. Mathematician and founder of the field of computer science Alan Turing developed what became known as the *Turing test*, in order to "consider this question: 'Can machines think?'" (1950, 433). In this test (or 'Imitation Game', as Turing himself called it), an interrogator must guess the gender of two hidden others — of which one is male and one is

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<sup>7</sup> For (Dutch) people familiar with the Efteling: Hugo van den Loonsche Duyngen, used in *Villa Volta*, is an example of such an animatronic.

<sup>8</sup> Compare this idea also with Dixon's observation on the "humanisation of machines", mentioned in the previous section.

female — by asking questions such as "[w]ill [person] A please tell me the length of his or her hair?" (433). Important here to notice is that those two people can outsmart one another in order to fool the interrogator. Turing proposes to replace one of these people with a machine, and when that machine is able to fool the interrogator to the same extent as the humans are able to, Turing argues, we must acknowledge that the machine is capable of thinking — thinking, I want to add, in a human-like way. By proposing this particular experiment, Turing uses the extent to which a machine can pass for a human being as measurement for that machine's intelligence.<sup>9</sup>

With respect to this experiment, we could say that Turing considers the machine he wants to test in an *anthropomorphic* way. Originating from the Greek ἄνθρωπος ("human, man") and μορφή ("form, shape, appearance"), this concept refers to the human-like appearance of a non-lifelike artefact and the resulting human tension to attribute human characteristics to this artefact. The previously mentioned ZORA and Kaspar robots are examples of such anthropomorphic artefacts: Kaspar is more true to nature whereas ZORA looks like a stylised and simplified human, but in both robots the human-likeness is unmistakable. This anthropomorphisation of robot design can be explained by the goal these robots are built for: to interact with and assist human beings. In this respect, Dylan Glas and his colleagues found out that people are more comfortable interacting with something they are familiar with, something that acts and looks like a person. They conducted an experiment with two types of robots that assisted people in a shopping mall: two humanoid robots were available to guide visitors through the mall and entertain children, and two cart robots were there to carry items visitors had bought. Glas and his colleagues found out that the majority of visitors were more relaxed while interacting with the humanoid robots. In addition, those visitors had a significantly more positive overall impression of interacting with these robots and were more willing to use their services in the future than the visitors who interacted with the cart robots (2012, 26–7).

Not only is the anthropomorphic appearance of a robot important to consider in this respect but also the ways in which robots can behave in a human-like way. Jaap Ham, Ray-

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<sup>9</sup> Turing's mind experiment often received critique for this particular reason, of which John Searle's is the most well-known. In short, Searle argues that a computer can only compute certain outcomes which does not say that the computer is able to understand what these outcomes mean. He explains this through what he calls the *Chinese Room mind experiment*. In it, he proposes the situation of a man who is unable to understand Chinese, sitting in a locked room. He receives Chinese letters — which are slid under the door — and is forced to write responses. A book full of Chinese characters offers him help and tells the man exactly what to write down when he gets a certain letter. The man, Searle argues, is able to write coherent Chinese responses to the letters he receives but he himself does not understand a single Chinese character. Therefore, one cannot say that something that just processes a certain program or rule (which is what a machine does) is able to think and therefore possess intelligence: "[t]he computer understanding is not just [...] partial or incomplete; it is zero", he argues (1980, 419).



mond Cuijpers and John-John Cabibihan conducted an experiment regarding persuasive HRI, arguing that robots are increasingly being deployed as tools to influence human behaviour and cognitive processes — for example, robots that try to make a human quit smoking or change diet. In order to achieve these goals, they argue, a robot needs to be persuasive so Ham, Cuijpers and Cabibihan tested to see how robots were most successful in that regard. They found out that robots that looked at the person they had to persuade and robots that made a lot of gestures were perceived as more persuasive than robots that did not. The authors explain this by arguing that robots that are able to gaze and gesture imitate the behaviour of persuasive human beings (2015, 483) — after all, when a person wants to convince another person he may also start to gaze and gesture.<sup>10</sup>

Another aspect of a social robot's behaviour to consider with respect to anthropomorphism is its way of moving. Guy Hoffman and Wendy Ju have studied that particular part of robot design and concluded that a social robot should be designed in such a way that it is physically able to reach its goals but at the same time can convey a message with its movements. Hoffman and Ju argue that the way in which a robot moves "can clue users into what actions and interactions are possible" with the robot since movement can function as a kind of affordance (2014, 95) — and precisely there anthropomorphism comes in. A robot's motions, in this respect, afford understanding in the person it is interacting with: when a human being recognises certain movements of the robot because they look like movements he has already seen before in other interactions with other human beings, he will more likely grasp what the robot is trying to convey. As a result, he tends to assign internal states to the robot and thereby attributes intention and other human qualities to the creature (93).

#### **§4 | Robotics and theatre.**

In the context of these contemporary social robot experiments, Guy Hoffman points at aspects of *theatre*, such as human acting methods, as a potential experimental context for further developing social robots. He argues that the use of theatre in social robotics research "can provide for a rich environment in which a robotic agent meshes its actions with a human partner" and that "[h]uman acting method and theory holds valuable insights into some of the questions researchers in HRI are also tackling" (Hoffman 2011, 1–2). Hoffman is not the only one who proposes theatre as a source of inspiration for the development of social robots (see, for example: Bruce and colleagues 2000; Breazeal and colleagues 2003; Demers and Horáková 2008; Chatley and colleagues 2010; Duncan and colleagues 2010; Lu and

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<sup>10</sup> Of course, the fact that these robots were able to gaze and gesture is the result of and motivated by the fact that these robots had a particular anthropomorphic appearance. After all, the people these robots interacted with had to be able to recognise something as eyes for gazing, and arms or hands for gesturing.

Smart 2011; Knight 2011; Jochum and Murphey 2014; Demers 2015; and Jofre 2015) but compared with the discourse on robotics as a whole this is a specific group of people.

When we take a closer look at the aspects of theatre these researchers use in their research, we can distinguish four different ways in which they do. First, robot designers write about 'the robot as actor' (see, for example, Breazeal and colleagues 2003, Hoffman 2011, and Lu and Smart 2011) with the idea in mind that theatre stages interactions and is therefore suitable as a model for designing social robots and the HRI that follows therefrom. In addition, a theatre performance is repeatable with an audience as suitable test subjects, which makes this performance setting very appropriate for testing these designs (Knight 2011, 2). Theatre in this way functions as both a laboratory setting for experimenting with human-robot interactions and a model that is able to grasp reality and imitate sociability, which both can be applied to the design of social robots.

Second, theatre appears as a way to analyse how works of robotic art and other projects that include interaction between human beings and robots interact with their spectators (see, for example, Van Baarle 2015). Performance and theatre theory, then, is used to study the live, interactive situation these artworks evoke, whereby robots are considered as performers and visitors as spectators. Elizabeth Jochum and Damith Herath argue in this respect that theatre paradigms are useful for studying "social dynamics, interpersonal communication, conversation, and issues of timing, improvisation and control" (2016, 86), considering theatre as perspective that facilitates analysing interactive events.

Third, there are robot designers who use fictional robots, such as they appear in stories, books, and movies, as inspiration for the development of real social robots (see, for example, Demers and Horáková 2008, Demers 2015, and Jofre 2015). These designers look for the performative aspects that fictional robots have in these works of art in order to further develop their designs. The role that robots have in fictional works becomes in that way a model for developing real robots and is considered through the cultural-historical implications of thinking about robots as characters in stories (see, for example, Sussman 1999 and Dixon 2004). In contrast to the aspects of theatre discussed in the previous paragraph, theatre is in this respect not used as a model to analyse the interaction with the spectator during particular events but rather is considered a tool for the analysis of the role robots played and play in our culture, in order to improve actual robot designs.

Fourth is a way of using theatre as a model for human-computer interaction (HCI).<sup>11</sup> Theatre is used in this respect to understand the social situation that arises between human and computer but also to understand how designers of computer technology can improve those technologies by seeing what they do as an action intended to achieve a particular dramatur-

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<sup>11</sup> HCI is somewhat broader than HRI, since every robot can be considered a computer but not every computer can be considered a robot.



**Figure I.4: a still of *School of Moon*.**

gical effect that reacts to the feelings, emotions and thoughts of their user (see, for example, Laurel 2013). These scholars thus analyse interacting with a computer system — which social robots are as well — through the lens of dramaturgical effects.

In addition to academics who use (aspects of) theatre in their research, theatre makers also deploy robots in their performances. A recent example of a performance containing interactions between human performers and robots is *School of Moon* (2016) which is made by Eric Minh Cuong Castaing (see figure I.4). In this performance, two dancers, six humanoids and a group of children move, in slow motion, along the stage and take over each other's movement qualities. The three sequences this performance consists of evoke "a[n] evolution of [the] body's representation on art disturbing our perception of the human and non-human" (Relinger and Minh Cuong Castaing 2017). Through this staging of people who move like robotic creatures, particularly children, Minh Cuong Castaing explores relations between reality and fiction, and the artificial and the organic. Another example of the use of robots in theatre performances is Hiroshi Ishiguro's *Robot Actors Project*. Ishiguro is a Japanese roboticist who works together with theatre director Hirata Oriza and together they put very realistic human-like robots on stage as actors. By doing so, they want to take the characteristics of both robotic and human actors as starting point to explore the differences between them.<sup>12</sup>

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<sup>12</sup> In the next chapter I further elaborate on this particular project.

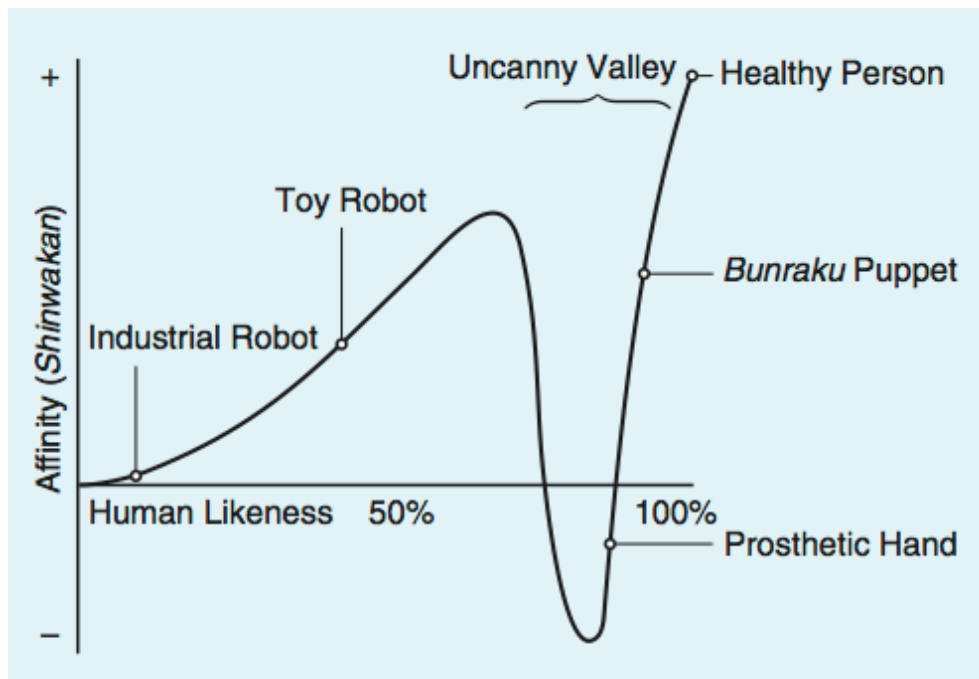


Figure I.5: a graphical explanation of the uncanny valley.

## §5 | From the uncanny valley to theatrical puppets.

As we saw in the third section of this chapter, roboticists tend to design anthropomorphic robots — robots that look recognisable and nearby — from the idea that this eases the interaction between the robot and its human interaction partner. However, this manner of designing also has its disadvantages, which Masahiro Mori indicates in an article he wrote in 1970 in the metaphor of the *uncanny valley*. Mori argues that the more a robot looks and communicates like a human being, the more its human interaction partner is likely to accept this robot and the more affection the robot can evoke in that particular person — *up to a certain point*. In the process of designing robots that look more and more like real human beings, he argues, there comes a certain moment when the distinction between human and non-human gets blurred, and when the robots becomes an ambiguous creature. At this moment, the robot looks so unfamiliar in its familiarity that the user or spectator of the robot feels unsettled: the feeling of uncanniness (2012 [1970], 98).

As we see in figure I.5, Mori visualises this valley in a graph in which the affinity with a robot is compared with human-likeness. The graph shows that an industrial robot is not human-like at all and therefore has a neutral affinity level, but that when the human-likeness of a robot compared to that industrial robot increases our affinity for that particular robot increases as well. The uncanny valley, in this respect, describes the moment when this affinity level suddenly drops, which is the case when a robot becomes too human-like and too familiar. Mori uses the prosthetic hand as an example thereof because, he argues, when we see such a hand laying on the floor we start wondering about whether it would be a real hand or

not, with that uncomfortable and unsettling feeling as result. However, in accordance with the metaphor of the valley, the affinity level rises again when the robot is made even more anthropomorphic and starts to peer with a real human being.<sup>13</sup>

This valley is a challenge for social robot developers, who therefore look for tools to avoid it (MacDorman and Ishiguro 2006). In this respect, Mori himself suggests avoiding building robots in an anthropomorphic way at all, with which he opens up the discussion for robots that have a non-human-like design (2012 [1970], 100). He mentions in this respect the *bunraku* puppet (also visible in figure I.5). *Bunraku* is an old form of Japanese puppet theatre in which puppets are manipulated by three puppeteers at the same time — puppeteers who remain visible to the audience. *Bunraku* puppets often have very well-designed heads but their other body parts are stylistically shaped, and the puppeteers can often only control the puppet's head, arms and hands. The appearance of these puppets is very close to that of a human being, Mori argues, because of the great distance people have when watching these puppets on stage: that distance prevents the spectator from looking at little details which can lead to the 'unraveling' of the *bunraku* puppet as a puppet (98).

Mori thus describes this difference in distance to the stage as the difference between the perception of a *bunraku* puppet as a human being at a distance and as a thing up close. From my perspective, this is a rather odd argument to make. With this example, he still seems to be in favour of puppets that look like human beings: although they do not look really anthropomorphic, Mori seems to argue that it is a good thing that these *bunraku* puppets can still be considered as human beings. I would like to argue that the peculiar thing about *bunraku* theatre is that the audience experiences a very particular suspension of disbelief: a spectator of *bunraku* theatre sees a puppet with agentive qualities — a character in the performance — but is at the same time aware of its qualities as just a thing because he witnesses the constant manipulation by its puppeteers.

This is an ambiguity we can explain in terms of the puppet being *object* and *agent* at the same time. Elizabeth Jochum and Todd Murphey argue that puppet theatre, which *bunraku* theatre is part of, "allows theatre audiences to grant fictive life to characters or objects based on their behaviors and the performance setting, encouraging spectators to project psychology and emotions onto [...] inanimate objects" (2014, 308–9). Jochum and Murphey discuss in this respect the work of Bert States who argues that in theatre the spectator can "hold in mind two categories — that of the real and that of the imaginary — that are fused into a single phenomenon" (1985, 169), which he calls "binocular vision" (8). In short, the pup-

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<sup>13</sup> This would suggest that a realistic artificial double of a human being does not cause an uncanny feeling, since the 'amount' of human-likeness this double has is on the right side of the uncanny valley. In my opinion that is an observation you can argue with, since precisely these artificial doubles may be alienating; they are so familiar and look so much like a living human being, yet they are artificial and not alive.

pet in a puppetry performance thus seems at the same time to act as a human being, a subject with agency, when animated on stage but is in that process actually nothing more than a lifeless thing which clearly remains a puppet.

## §6 | Social robots as agentive objects.

I would argue that social robots are, in the same way as theatrical puppets, entities that evoke binocular vision. Social robots are also things, machines made by human beings, yet they are agents to which people can project psychology and emotions: they are real and imaginary at the same time. Jochum and Murphey take up this perspective of comparing robots to theatrical puppets as well, by doing voicing an exceptional opinion within the robotics discourse. However, there are some more authors who link puppets and their binocular vision to robots. Jana Horáková and Jozef Kelemen observe a link between puppets, theatre and robotic representation of human beings when they argue that

**[i]n the theory of theatre of the past century, [Edward Gordon] Craig's *Supper-Puppet* (in German: *Übermarionette*), and [Oskar] Schlemmer's dream about an ideal stage representation of man as a puppet, as well as the futurists' dreams about a man-machine, or [Vsevolod] Mejerchold's concept of biomechanics, resonate with the developed vision of modern theater.**  
(2009a, 558)

This "vision of modern theater" is connected to what David Tomas calls an *anti-mimetic shift* that appeared at the beginning of the twentieth century: he argues that in Craig's, Schlemmer's and Meyerhold's projects the "mirroring of the human body was not established on the basis of conventional mimicry [but] on a common understanding of the similarities that existed between the control mechanisms and communicational organizations of machine systems and living organisms" (1995, 27). Theatre makers who made performances that were in line with this idea of anti-mimesis thus tried to lift the limits between representations and reality and between mimesis and life itself.<sup>14</sup>

These theatre forms are relevant as an alternative, non-anthropocentric perspective on the design of social robots, because they offer insights in matters that do not have to do with

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<sup>14</sup> This anti-mimetic shift is a transformation we not only see in early twentieth-century theatre projects but also in the postdramatic theatre that developed from the 1960s onwards. In his well-known book *Postdramatic Theatre*, Hans-Thies Lehmann characterises this form of theatre that started to gain ground from the end of the previous century onwards. He argues that, in opposition to dramatic theatre, the text is no longer key in postdramatic performances, becoming a peripheral element that exists next to other theatrical elements such as the performer's body, images and/or sound. The fragmentary montage of all these elements yields a sensory experience for the spectator which is more important than understanding or assigning meaning to the performance. Postdramatic performances are therefore often non-linear and do not rely on causality, contain a multitude of different actions, and do not work towards a particular goal. These performances also try to investigate the relationship(s) between what is put on stage: human actors, objects, images and so on (2006, 93).

mimesis, representation and therefore anthropomorphism. In the discourse on HRI, however, it is still quite prevalent to consider social robots as anthropomorphic creatures that should be adapted in such a way that they serve the purposes of human beings — as we also saw in the third section of this chapter. Kerstin Dautenhahn argues in an overview article about the challenges in HRI research in this respect in favour of two remarkable points: she states that "[r]obots are not people" and that HRI "benefits from the availability of increasingly sophisticated humanoids" (2007, 104). With the former point, she means that robots differ from human beings because human beings are social and robots are not. When human beings talk to a broken coffee machine or praise a car for starting on a cold morning, according to Dautenhahn, they anthropomorphise those objects in order to enter into a social relationship with them. Therefore, and now we come to her latter point, social robots should be designed in an anthropomorphic way, for it would be easier in that situation for a human to enter into a relationship with those robots (104).

In this thesis, I argue against this anthropocentric perspective. Theatre in which binocular vision is evoked through staged objects — so-called object theatre, of which puppet theatre is part — helps with bringing up that argument, as it eminently provides insights into the complex relational dimensions of *an object that obtains agency through entering into relationships with human beings and therefore becomes social by itself*. By assigning in this way agency to non-human things, I follow Jane Bennett who develops in her *Vibrant Matter* "a vocabulary and syntax for, and thus a better discernment of, the active powers issuing from nonsubjects", with which she wants to highlight "what is typically cast in the shadow: the material agency or effectivity of nonhuman or not-quitehuman things" (2010, ix). She reasons from thinking in terms of "thing-power", although she admits that this wording emphasises a thing's "latent individualism" (20). A thing is not individual, she argues, since a thing as actant — something that has agency, whether object, human or neither —

**never really acts alone. Its efficacy or agency always depends on the *collaboration, cooperation, or interactive interference* of many bodies and forces. A lot happens to the concept of agency once nonhuman things are figured less as social constructions and more as actors, and once humans themselves are assessed not as autonyms but as vital materialities.**

(20–21; my emphasis)

I thus do not take agency as a characteristic belonging to an autonomous entity but as something that is implied in the social, mutual networks in which that entity exists. This makes theatre a good point to start from, as in theatre these networks are staged as a set of relations between different performative (in the literal sense: belonging to the performance) elements. In puppet theatre, I would argue, the puppet's agency results from these relations

it has with other staged entities (for example, the manipulation by its puppeteer) but also the agency of the puppeteer follows from the fact that a puppet is present to manipulate.

One could argue that assigning agentive qualities to objects can be considered as assigning human-like characteristics to things that are not able to possess such characteristics — and thus as anthropomorphic — but according to Peter Eckersall this is precisely not "a matter of anthropomorphism or projecting human emotional responses onto objects; it is the beginning of an understanding of new modes of subjectivity" (2015, 124). Thinking in terms of staged objects that seem to possess agency thus does not centralise the importance of human beings in our world but rather paves the way for the beginning of an understanding of the complex relationships between human beings and these, what I will call in the course of this thesis, *agentive objects*: objects that through entering into relationships with human beings have obtained agency.

## §7 | The course of this thesis, or a note on methodology.

What I want to advocate in this thesis is considering the complex relationships between human beings and staged objects such as they appear in object theatre as an alternative, less anthropocentric perspective on social robot and HRI design, reasoning from the relations these objects enter into rather than their anthropomorphic appearance. In this way, I attain to a more nuanced alternative for the relations between human beings and social robots, which does justice to the ambiguous nature of the social robot. In order to do so, the first chapter of this thesis lays out the starting point that this less anthropocentric perspective will be an alternative for: I show how theatre and its theory is used in the development of social robots, and what particular kind of theatre these roboticists use in their research. I do so on the basis of a literature review of a large amount of texts written by roboticists. We will see that roboticists' use of theatre happens for two particular reasons: first, robot developers consider theatre a good option for *testing* their designs in front of an audience. Second, we will see that roboticists use expertise from the theatre discourse — in particular: theories that consider the robot as performer and theories that consider the dramaturgy of a performance — as *model* in order to improve their designs. Subsequently, I argue that these roboticists use forms of theatre in which only human beings and their actions are central, causing them modelling their non-human creatures after human actors and relationships between humans in such a way that these creatures *pass for* human beings.

In chapter 2, I deploy my object theatre perspective: through a study of scholarly texts that belong to the discourse on puppet theatre, I discuss how puppetry theorists argue that staged puppets can transform into agentive objects, without them passing for human beings. I show what perspectives puppetry scholars offer on this transformation and on the



staged relationships between this class of objects and human beings. We will see that puppetry theorists consider two particular perspectives key: *(co-)presence* and *mediation*. Furthermore, these theorists argue that a puppet's transformation into agentive object has two implications: the puppet becomes *ontologically ambiguous* and can be perceived as *uncanny*. However, in contrast to what we have seen in the fifth section of this introduction, we will see that puppet theatre makers include the ontological ambiguous and the uncanny as deliberate strategies in their performances because uncanniness and doubt about the ontology of the puppet are effects they want to achieve in the spectator's mind.

In the third chapter, I analyse two performances in which staged objects transform into agentive objects: semi-anthropomorphic puppets in *Coco Chanel* (2017) made by Ulrike Quade Company and a non-anthropomorphic machine in *I/II/III/IIII* (2007; reprised in 2017) made by A Two Dogs Company which is directed by the Flemish theatre maker Kris Verdonck. I show how these objects enter into relationships with the human beings present in these performances and become agentive objects, in order to sharpen and add to my findings of chapter 2. In this chapter, I nuance the notions we will encounter in chapter 2 of co-presence as formulated by Paul Piris and mediation as formulated by Meike Wagner. Furthermore, I make clear that the makers of these performances indeed deliberately stage the agentive objects at stake in these performances as ambiguous and therefore uncanny creatures, in accordance with what we will encounter in the second chapter.

As conclusion I argue why the ideas and perspectives that I discuss in chapters 2 and 3 can be inspirational for the design of social robots and human-robot interaction, and how this offers a less anthropocentric perspective on this design. First, I show why it makes sense to utilise this object theatre framework and why social roboticists should acknowledge the complex relationships at stake between the robots they design and their human interaction partners. Second, I present four different perspectives that social roboticists, according to me, could take into consideration for endorsing these complex relationships: 1. the framework in which a social robot functions; 2. the dramaturgy of a social robot and the implications this dramaturgy has for the HRI; 3. the misguided focus on developing anthropomorphic robots; and 4. the inclusion of the uncanny in social robot design. More simply said, I make clear in this conclusion how what I discussed about object theatre can be a less-anthropocentric elaboration on what roboticists already do with theatre.

# 1

# Inspiration

## WHAT THEATRE ALREADY OFFERS TO SOCIAL ROBOT DEVELOPMENT.

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Imagine a theatre space: a stage, some light and an auditorium filled with about ten people. Performance of the night: *Fetch and Carry*. Before the show starts, someone who calls himself a facilitator enters the stage and explains what is going to happen. "After the performance, I am available to answer all your questions about what you have seen," he says. Applause. An actor enters the stage, carrying a robot which he places on a little mark that has been taped on the floor. He commands the robot: "Get the food, Charlie." But what food? Yet, the robot starts to move and crawls to a corner of the stage where, as it turns out, some fruit is hidden. It unfolds its little robotic arms in order to get what it wants but by doing so it seems as if it almost squeezes the fruit in its attempt to lift it. Crawling back to the human actor, the robot has some trouble moving in a straight line, but in the end it reaches the human. He takes the fruit, strokes the robot and gives it a compliment: "Good boy, Charlie, good boy." Blackout.

This is not some absurdist performance but one of the experimental theatre plays that Amiy Chatley and colleagues have set up in order to improve the robots they design. They chose to



Figure 1.1: Guy Hoffman's marimba-playing robot.



Figure 1.2: a prototype of Breazeal and colleagues's *Public Anemone*.

do this in this particular way because it offered them the advantage of immediate audience feedback on this staged interaction (2010, 76). And this is not an unusual course of events. Guy Hoffman (2011) created a marimba-playing robot that is able to perform in front of an audience, improvising along the way (see figure 1.1). Cynthia Breazeal and colleagues designed what they call a 'Public Anemone' whose main task has been to "entertain and engage an audience" (2003, 76; see figure 1.2). Meanwhile, Allison Bruce and colleagues (2000) have put robots themselves in the role of actors, using comedy improvisation to demonstrate their believability.

In this chapter, I discuss the work of eleven different authors in which they demonstrate and reflect on the *inspiration* that theatre offers in the context of their research on social robots and human-robot interaction. I show what role roboticists envision for theatre in the

design and development of social robots and I provide an overview of what aspects of theatre they precisely use in their research. In the end, I present conclusions about what aspects of theatre and what kind of theatre these roboticists exactly utilise and what the implications are thereof.

In the first section, I discuss how HRI researchers use theatre as a *testbed*, as a place where they can show and experiment with their HRI designs. We will see that they consider theatre useful for three particular reasons: first, they argue, because theatre can provide a *controlled environment* in which researchers can frame their social robots; second, because the theatre as venue is able to distinguish an *imaginary world* from the auditorium; and third, because the audience as necessary member of a theatre performance can be part of the research's *feedback loop*. In the second section, I unwrap the ideas that roboticists have about the robots they design in *dramaturgical* terms and how these robots can be understood as *performative agents*. As we will see, these designers consider a robot's social behaviour a distinctive part of being such a performative agent and in order to adjust this behaviour to interaction with humans they use *models* that theatre has already developed for analysing behaviour between people. Finally, with respect to the particular aspects of theatre that these roboticists use in their research, I evaluate what assumptions are implied in these texts about using theatre in HRI research. My argument in the last section of this chapter is that many of the aspects roboticists find useful for developing social robots and human-robot interaction (the robot as actor; fixed narratives; an imaginary world; dramaturgy; an audience; intentional actions) belong to a form of theatre in which human beings, the representation of actions and the relationships between human beings are central, which make the robots that these roboticists design *pass for* human beings.

## §1 | Theatre as testbed for HRI designs.

"Robotics has had a long history with theater", Heather Knight<sup>1</sup> argues (2011, 42). In addition, she observes a great advantage of *testing* social robot designs by putting these robots on stage. In that way, she argues, they can be studied in a "human way" in order to understand how they can become more like their living effigies. She argues that theatre is suitable in this respect as a place to test, since it "is inherently social, repeatable, and there are various test subjects sitting in the audience" (43). The act of putting a social robot on stage in front of an audience could thus be, according to this roboticist, a meaningful way of doing research on the design of social robots and human-robot interaction. In this section, I first discuss some examples of research situations in which HRI is tested in a theatre setting, and subsequently

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<sup>1</sup> Heather Knight works as an Assistant Professor of Robotics at Oregon State University.

the three aspects of theatre that, according to social roboticists, facilitate this way of working: its use of fixed narrative frameworks in a controlled environment; the theatre as venue that is able to evoke an imaginary world that is distinct from the auditorium; and the audience that can provide feedback on what it has seen.

### §1.1 | Examples of theatre as testbed.

Knight's use of the term 'test subjects' suggests a place to experiment, a laboratory. When we extend this metaphor to the theatre venue, as a physical place to test social robot designs, theatre functions as *testbed*. Robot developers, as we have seen with the example of *Fetch and Carry* at the beginning of this chapter, can use a theatrical setting in order to test their presumptions about the interactions they design.

When researchers embed this way of working in their experiment designs, according to Guy Hoffman<sup>2</sup>, they can test the designs of only two particular classes of social robots: "fully scripted" robots that show "extremely simple behaviour", and "fully tele-operated robots" that are remote-controlled by a human operator (Hoffman 2011, 1–2).<sup>3</sup> An example of a scripted robot with very simple behaviour can be found in the first robot ever to be put on stage, by Cynthia Breazeal and colleagues<sup>4</sup> (2003); they used a performance setting as a testbed for researching their *Public Anemone* (see figure 1.2 again). During the day, the robot seemed 'awake' and interacted with its surroundings (an artificial waterfall, a pond etc.) as well as with the audience. As part of the 'test experience', audience members were invited to evaluate their interaction with the Public Anemone (80). An example of a performance with fully tele-operated robots is the *Fetch and Carry* performance I described in the beginning of this chapter, which was part of an experiment designed by Amiy Chatley and colleagues<sup>5</sup> who call their way of working *Theatre-based Human-Robot Interaction* (THRI). They conducted an experiment that involved this THRI which was essentially the performance of several HRI scenarios in front of an audience, and concluded with a group discussion between audience members afterwards. Three scenarios were used for this experiment (the already mentioned *Fetch and Carry*; *Interactions*, about verbal and non-verbal interaction between a robot and a human actor; and *Migration*, about a robot's movement), which all together lasted for fifteen minutes and which were first introduced by a so-called facilitator while the

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<sup>2</sup> Guy Hoffman works at the Sibley School of Mechanical and Aerospace Engineering at Cornell University.

<sup>3</sup> See the second section of this chapter for more information on the tele-operation of robots.

<sup>4</sup> Cynthia Breazeal is Associate Professor of Media Arts and Sciences at the Massachusetts Institute of Technology, where the other authors of this article have worked as well.

<sup>5</sup> Amiy Chatley and the other authors of this article, in 2010, were part of the School of Computer Research at the University of Hertfordshire.



Figure 1.3: the very realistic robot Ishiguro uses in *Sayonora*, Geminoid F, next to her human effigy.

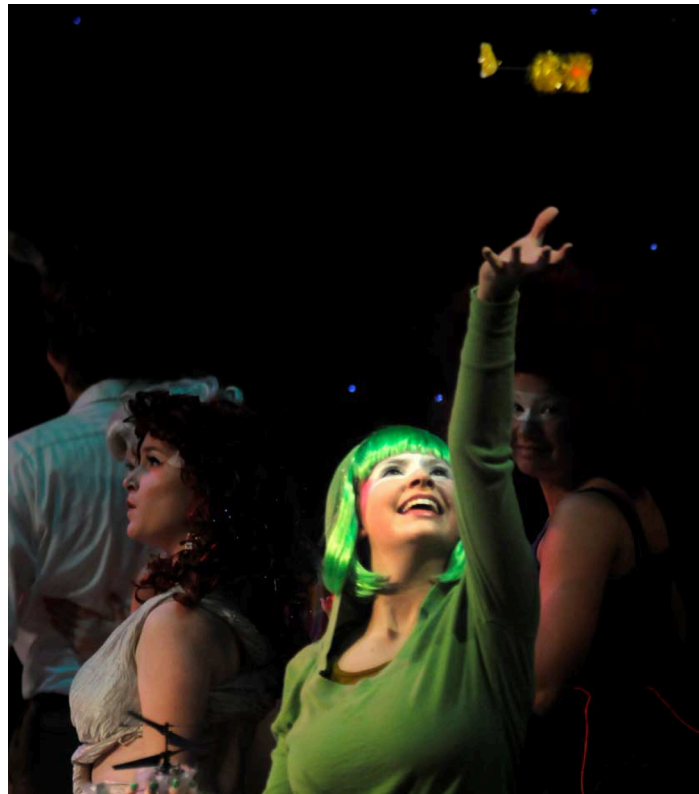
robots were set up on stage (75). In addition to the positive effects of using theatre as testbed — which I elaborate on in the next subsection — Chatley and colleagues found out that such use also has its limitations, namely that "theatre is not a perfect medium for dispersing information to a wider audience", because "theatre shows the larger picture, but at the cost of finer details" (77).<sup>6</sup> Although the authors I discuss in this chapter advocate the use of theatre in HRI research, they also see some disadvantages concerning this specific research method.

Another project in which theatre as testbed comes to the fore is Hiroshi Ishiguro's *Robot Actors Project*. Ishiguro, who works together with director Oriza Hirata, is a Japanese roboticist interested in robot presence and control which he tests in theatre situations. The play *Sayonora*, in which a robot reads poems to a human actress (see figure 1.3), is an example of this collaboration. Zaven Paré<sup>7</sup> argues that Ishiguro, by putting very realistic human-like robots on stage as actors in a theatre play, uses theatre as a "platform to test the limits

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<sup>6</sup> This disadvantage is in a remarkable opposition with Masahiro Mori's observations on the uncanny valley, which I discussed in the introduction. Mori mentioned that the greater the distance to the stage, the more lifelike a staged object (he talks in this specific passage about puppets) can be.

<sup>7</sup> Zaven Paré is a French new media artist who is one of the researchers in the *Robot Actors Project*.



**Figure 1.4: a robotic drone fairy in Duncan and colleagues's *A Midsummer Night's Dream*.**

of our [human] behaviors" (2012, 313). The challenge for Ishiguro's robots is to be in direct contact with the audience but experimenting with this challenge "has enriched [Ishiguro's] understanding of communication between humans and robots and between humans via robots" (308). Izabella Pluta<sup>8</sup> observes in this respect that for Ishiguro "the stage becomes a new laboratory for robot study", functioning as "a place for experimentation" (2016, 70). For Ishiguro, theatre becomes in this way a research platform that is useful for achieving the following two goals: first, exploring possibilities for designing better robots for the entertainment industry; and second, familiarising audiences with the current state of robotics and the experiments that surround robotics, by showing his audience how to develop a relationship with a robot (Paré 2012, 311). So, Ishiguro does not only use theatre as a venue to test his designs but also tries to think through theatre in order to improve his robotic creatures — something to which I return in the second section of this chapter.

A third example of theatre as testbed is an experiment that Brittany Duncan<sup>9</sup> and colleagues conducted: they staged Shakespeare's *A Midsummer Night's Dream* using little robotic drones as fairies (see figure 1.4). Their main goals for choosing to work this way were

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<sup>8</sup> Izabella Pluta works on intermediality and technology in theatre at the University of Lausanne and the University of Lyon 2.

<sup>9</sup> Brittany Duncan is Assistant Professor of Artificial Intelligence and Human-Robot Interaction at the University of Nebraska-Lincoln.

having "roboticists work with theater professionals to learn how to create believable agents" and to find out how "untrained humans" — humans who are not used to working with robots, i.e., the audience — would react to these drone-like fairies. With respect to this latter goal, these fairies sometimes crashed into the audience, deliberately, and needed to be put on stage again (2010, 91–2). Duncan and colleagues argue that these audience members relied on social behaviour they had seen on stage when interacting with these robots: they treated the drones in the same way as the actors did in the play (92). Theatre here then functions as a test environment in which the researchers can find out not only what the spectators' feedback is on the on-stage interaction they have seen but also how people react when confronted with a social robot in a spontaneous interaction situation.

## §1.2 | Theatre's suitability as testbed.

So what are the aspects of theatre that make a performance environment so suitable for testing HRI designs? According to David Lu and William Smart<sup>10</sup>, using theatre as testbed works well for three reasons. First, they argue that

**there is an established way in which theatre is judged and evaluated. Most people have some intuition of whether they believe what is going on on stage. Showing an audience a piece of theatre with a robot and asking their opinions in a theatrical context is more natural than similar evaluations in a constructed observation in a lab.**

(477)

Although in the beginning of this section I compared the theatre venue with a laboratory setting, Lu and Smart argue that a theatre environment actually works better to test HRI than a laboratory setting does, as it offers a more natural, less artificial context to show human-robot interactions. Second, they argue that "[b]y making robots participate in theatre, we have the opportunity to experiment with algorithms for normal human robot interaction in a controlled environment", as it removes the unpredictability of human actions (477). With this, they mean that the constraints of the highly controlled environment that theatre provides offer the necessarily restricted environment for researching HRI. Third, the theatre as venue offers the opportunity to place on stage hidden sensors and other equipment necessary for controlling the robots (477). By hiding these, the test subjects — the audience — are not distracted by props and other things that do not belong to the imagined world and can focus solely on the staged HRI. In sum, Lu and Smart thus mention these three aspects: the possibility for spectators to *provide feedback* on what they have seen; the constraints that theatre

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<sup>10</sup> David Lu works at the Department of Computer Science at Washington University; William Smart works as a robot programmer at Oregon State University.



offers as a *controlled environment* for the emergence of a fixed framework; and the quality of the theatre venue to successfully hide equipment necessary for the staged HRI outside the *imaginary world* in which that HRI takes place.

Elaborating on this first aspect, the spectator as test subject, Lu and Smart argue that during a robot theatre performance the audience is there for two particular reasons (2011, 473). First, its members can provide feedback on the interaction they witness. In that feedback, which is collected after the performance, the audience members can address, for example, in what ways the staged interaction could look more natural or how they would envision themselves interacting with the social robot shown. Chatley and colleagues also mention this advantage when explaining their motivation for using their THRI research method: "[i]n order to combine live HRI experiences within a more efficient experimental group setting, we take inspiration from the field of Human-Computer Interaction (HCI) where theatre has been used to gain feedback from potential user audiences" (2010, 73). Second, theatre is also a good place to show interactions to an audience that is not yet familiar with robotic interactions. Roboticists (see, for example Chatley and colleagues 2010, Duncan et al. 2010, and Paré 2012) see themselves responsible for 'educating' the public and familiarising them with the current state of social robot development. As we have seen in Hiroshi Ishiguro's *Robot Actors Project*, he argues that in a while people are going to buy social robots for domestic use, so — according to him — showing the audience how they can get into a relationship with these robots is of great importance. For educational purposes, Ishiguro often frames this educative ideal within an entertaining context, one which a theatre performance can eminently offer (Paré 2012, 311).

The second aspect that Lu and Smart point out is theatre's controlled environment. In this respect, Guy Hoffman, Rony Kubat<sup>11</sup> and Cynthia Breazeal argue that stage performances can be a promising implementation platform for many important ideas in HRI research. Theatre, they argue, is namely a "relatively constrained yet rich environment" in which a robotic agent mingles its actions with a human partner (2008, 359). Allison Bruce and colleagues<sup>12</sup> mention two advantages of using a constrained *script* in order to comply a staged HRI scenario with the constrained environment that theatre provides. First, they argue, that "[t]he context in which [robots] exist [...] provides a framework that defines how their behavior should be. [...] Rather than merely behaving emotionally, agents should be able to behave in ways that make sense within a narrative" (2000, 4002). A robot is no human and therefore not (yet?) capable of doing anything without human interference, so according to these au-

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<sup>11</sup> Rony Kubat works in the Media Lab of the Massachusetts Institute of Technology.

<sup>12</sup> Allison Bruce — now known under the name of Frank Broz — and colleagues work at the Robotics Institute of Carnegie Mellon University.

thors, robot developers must use the as-if that theatre can offer — by adjusting the narrative to what a robot is *able* to do — in order to convince the audience of the robot's capacities. More simply said, theatre can evoke the illusion of a fully-working, autonomous robot. The other advantage of using a fixed script Bruce and colleagues observe is that "a story is designed to be entertaining and interesting", with which they mean that a narrative framework can serve entertainment purposes (2000, 4002). Defining the story as "a domain in which the primary agent is successful (or unsuccessful) in achieving its objective" (4008), they argue that the clearer a narrative framework for the audience is in showing this (un)succession, the more entertaining a performance can be. Bruce and colleagues thus not only see scientific potential in putting robots on stage but also entertainment value.

Second, this way of working also affords repeatability, which is useful for robot developers who carry out robot theatre experiments. The experiments that Chatley and colleagues conducted with their THRI research method consisted of three different scenarios. Using a limited amount of scenarios was useful for them since once an actor knew an action sequence by heart, they could repeat the experiment time and time again (2010, 74). When repeating these scenarios multiple times, there was no need to reprogram the robots that were used. In this way, these robot developers were able to gather more audience feedback and process it *ceteris paribus*, whereas letting the robot and actor improvise would have had the opposite outcome (74).<sup>13</sup>

The final aspect Lu and Smart point out is the ability of the theatre as venue to evoke an imaginary world in which the HRI takes place that is distinct from the non-fictional world in which equipment can be hidden that is necessary in order to make the HRI work. A classical theatre venue facilitates this emergence of another world by separating the lifted stage from the audience, and by separating the actual performance space with curtains from the backstage. Lu and Smart mention in this respect the "fourth wall that separates the actors from the audience" (2011, 473). In addition to hiding equipment, for example, this distinctive performance space can also "make using sensors easier, since elements such as visual landmarks can be added to the surroundings" (477). These visual landmarks, placed in the on-stage world, can, for example, facilitate the robot in navigating but can also measure how a robot moves and give direct feedback on the robot's (literal) performance (477). We have seen this in the example of *Fetch and Carry*, in which the interaction between the human actor and the robot consists of a relatively simple yet lifelike scenario. In this scenario, an everyday situation is shown to the audience. However, this scenario would not have been credible as

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<sup>13</sup> *Ceteris paribus* means "other things equal" in Latin. The phrase is used when the effect of changing one variable is examined on another, with the underlying preserve that all other variables remain equal, i.e., are not deliberately effected by the experimenters.

everyday situation when the tele-operator of the robot at stake was also present on stage. The construction of the theatre as venue thus offers the illusion of a, for the audience, credible HRI and is therefore, according to Lu and Smart, as a third aspect important to consider.

## §2 | Theatre as model for developing HRI.

In this second section, I discuss how roboticists see the usefulness of theatre with respect to it functioning as a *model* to design interactions between a robot and a human being. We will first see that roboticists consider a social robot as performer, as an agent that performs a role in front of a human being.<sup>14</sup> Theories about human acting, according to them, prove useful in this respect for designing particular robotic behaviour. Second, we will see that theories that have been developed about the setup of plays are useful for social robot development because they facilitate the analysis and design of the setting in which a social robot functions (also in real life). In this context, the notion of dramaturgy is mentioned; not only as a concept to describe the contents and effects of robot theatre, but also to describe the effects that a social robot in a real-life setting has.

When Heather Knight, whom I cited in the previous section, talks about theatre being "inherently social", she uses that phrase as a reason why HRI developers should consider theatre as an opportunity "to bootstrap the development of deeper and more effective human robot interactions, particularly in the domain of non-verbal interaction" (2011, 43). In theatre, she argues, the audience has already learnt to understand this human non-verbal communication, and therefore, "[u]sing the theater context and body of knowledge to bootstrap the development of effective social robotics is important" (43). In that respect, Knight uses this "body of knowledge" that theatre already has developed as a model for the development of the interactions social robots effectuate.

Also David Lu and William Smart observe the advantage of using theories and knowledge regarding theatre in order to model interactions. They observe that with regard to the social capacities of robots HRI developers face a threefold problem (2011, 473). First, there is the articulation problem, which means that "robots are mechanically limited in their expressive range, due to fewer degrees of freedom than humans". Second, they mention the intentionality problem with which they refer to the fact that because "simple motions are often ambiguous, and complex movements do not always give enough consideration to the information the movement transmits to the observers", the robot's intentions "are not always clear". And finally, there is the interpretation problem, which points at the problem of "not only recogniz-

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<sup>14</sup> Johanna Seibt, whom I cited in the introduction, mentions examples of these roles: nannies, teachers, friends, soldiers, etc.

ing a human making a particular gesture [...] but then also contextualizing it to the current situation".

In order to get around these problems, Lu and Smart propose theatre as "the mode for modelling interactions", despite the fact that theatre, according to them, seems to be unable to function as "a fitting model for social interaction because it [seems to] lack, for lack of a better term, interaction" (473).<sup>15</sup> However, they argue, there is a so-called "higher-order" interaction at stake in theatre, which occurs when the actor fails to comply with the performance's narrative framework (or script). Actors on stage have to deal with subtle differences that occur while acting out that script, and "must be constantly making adjustments to their actions based on the other's actions" (474). This is a striking similarity with HRI research, they argue, and a reason why theatre can come in to offer a model since in HRI "is little or no low-level adaptation, just script following" (474). In HRI research little attention is paid to *how* robots do things, rather than to *what* they do — and this, they argue, also happens in theatre, where a director decides what happens on stage, and actors are only responsible for how to act that out (474). This places a robotic acting partner on the same level as a theatre actor, they argue: "[s]ince actors are more successful in convincing others that they are something that they are not, using the same techniques to convince people that robots are social seems a clear choice" (475). Thinking in terms of what actors do can therefore be used as a model for the development of social robots and human-robot interaction.

## §2.1 | Robots as performers.

Lu and Smart already hint at the idea that a robot can be seen as an actor, as a particular kind of *performer* that interacts with a partner. The noun *interaction* originates from the Latin word *inter* ("between") and *agere* ("to do"): interaction consists of an event in which two actors reciprocally do things. In human-robot interaction, these two actors are a robot and a human being. Lu and Smart put it like this: "HRI involves an exchange of ideas from the robot to the human and vice versa, with the objective being either a tangible goal being accomplished, such as getting the human to do something, [...] the human being entertained, or socially engaged" (2011, 476).<sup>16</sup> In this respect, a robot has to be able to act credibly in front

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<sup>15</sup> This statement seems weird, as Lu and Smart try to argue why theatre can serve as a suitable model for designing human-robot interactions. In the context of this statement, they do not define what they mean with 'interaction'. I interpret their understanding of interaction as a spontaneous, non-predefined form of interaction: in theatre plays, indeed, interaction is often based on a predefined script (as we have also seen in the previous section), and therefore difficult to consider spontaneous.

<sup>16</sup> This idea is, amongst others, developed by Erving Goffman who wrote his notorious book *The Presentation of Self in Everyday Life* (1956) with the idea in mind that social interactions can be considered performances of one's own self.

of the person it is interacting with (and when put on stage, it should act credibly in front of the audience together with its human interaction partner).

Guy Hoffman remarks in this respect that in order to be able to play this role, robots are — just like theatre actors — required to display "artificially constructed social signals and accommodating human expectations" (2011, 2). He therefore argues that roboticists cannot only learn from comparing robotic to human actors but also from how these human actors prepare for their role: "[a]n actor's preparation of a role includes a systematic investigation of what gesture, body pose or physical action best describes the internal drive and objective of their character in different contexts." Therefore, he argues, "a reading of several canonical texts on modern theater acting holds valuable insights for designers of fluently meshed human-robot coordination systems" (2). He discusses two of these "canonical texts": one about continuity and one about responsiveness. With the former he refers to the Stanislavski Method or Method Acting in which "surface actions are [...] representations of continuously evolving sub-surface developments in the arc of a performer" (2).<sup>17</sup> This means that actors should not focus on memorising their lines but rather on the power relation between characters, obstacles and intentions which together lead to certain actions. This "inner monologue" should, according to Hoffman, also be implemented in robot design, which could make sure that HRI transforms into "a more natural and continuous interaction" rather than "the command-and-response behavior robots usually display" (3). Furthermore, with the notion of responsiveness, Hoffman refers to ideas of Sanford Meisner, Ruth Maleczech and Viola Spolin, who argue that for an actor it is very important to learn to respond "quick and intuitively" (3). When transposing this to HRI, this would lead on the one hand to an "immediate, quick response, potentially based on incomplete information" and on the other hand to "a more calculated, processed response following later in the interaction" (3). A social robot should then, according to Hoffman, be able to react faster and better on the basis of partially known information.

But despite all given examples of and ideas about autonomous robot designs we must, according to Guy Hoffman, Rony Kubat and Cynthia Breazeal, acknowledge that the robot as performer is almost never able to act on its own, which is meant literally: in many cases — in, for example, staged interactions, laboratory tests or interactions on a film set — the robot is remote-controlled by a human operator (2008, 354). We have already seen in the previous section that these authors argue that there are two extremes between which the agency of a robot can be categorised: on the one hand we have robots that are completely tele-operated

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<sup>17</sup> Method Acting is devised by Konstantin Stanislavski and further developed by, amongst others, Sonia Moore, Michael Tsjechov and Augusto Boal.

by a human and therefore can feign to act independently<sup>18</sup>, and on the other there are completely pre-scripted robots (such as animatronics in theme parks) that cannot respond spontaneously to input from outside (354). These authors argue that, since it is still rather difficult if not impossible to program all necessary human characteristics into a single robot, social robots are still very often controlled by a human tele-operator, someone whom they call a puppeteer (359).<sup>19</sup>

Elizabeth Jochum and Todd Murphey<sup>20</sup> elaborate on this notion of the puppeteer when describing a project in which they tried to develop automated puppets (indeed, robots) that are capable of dynamic movements (2014, 308–9). They emphasise movement as part of the strategies social robot developers can deploy in order to create credibly acting robots, and they even argue that we can "extend the metaphor of movement as a *lingua franca* for communication and interaction between humans and robots, and in particular for robots tasked with imitating human motions" (311; original emphasis), because "in terms of movement, both automated and tele-operated robots are similar to [...] puppets, where movement is defined in kinematic, geometric terms" (315). One way to achieve this is through the design of motion that does not try to precisely mimic human motions — because those movements looks rigid and perfunctory — but through motion that tries to look as natural as possible (313). Jochum and Murphey therefore argue that the animation qualities of the tele-operator as puppeteer, particularly the ways in which he moves his robot, are important to consider when designing social robots, apart from the movement qualities of the robot as performer.

## §2.2 | The dramaturgy of a social robot.

The robot as performer is only one of two angles social roboticists use when talking about theatre as a model for developing social robots and HRI. Allison Bruce and colleagues mention the second angle when they talk about the setup of a dramatic play. They argue that drama contains of "plots driven by characters who make purposeful actions towards their goals. What a hero wants — not what he or she feels — is what makes a story come to life" (2000, 4002). Bruce and colleagues thus argue that the emotional outcome of actions

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<sup>18</sup> This way of working is called the Wizard of Oz (WoZ) method. Amiy Chatley and colleagues discuss the use of this method, arguing that "[d]irect robot control (WOZ) allows the robots to act as (semi-)actors in scenes and also allows actions to be simulated that are currently not available for the robots to do themselves (e.g. robust navigation in everyday environments, smooth natural language interaction, sophisticated reasoning and sophisticated 'social intelligence' in interaction and dialogue with the user)" (2010, 74).

<sup>19</sup> We can wonder, however, what or who in this sense can be considered the actor: the robot itself or its operator? If all action can be led back to this operator who decides every single move of the robot and arouses all the robot's emotions — albeit predefined in a script — we could ask ourselves whether that would be the latter.

<sup>20</sup> Elizabeth Jochum works as an Assistant Professor at the Department of Communication and Psychology of the Danish Aalborg University; Todd Murphey is Professor of Mechanical Engineering at the Neuroscience and Robotics Lab of Northwestern University.

performed on stage are of less importance than the intentionality of the actions themselves as functioning within the setup of the play. They subsequently distinguish five different aspects of drama in order "to create a guideline for a dramatic agent architecture": the hero, the villain, outer obstacles (external factors that prevent the hero from reaching a goal), inner obstacles (internal factors), and given circumstances (4003). They use these characteristics in order to more easily design situations and spaces in which robots can act *as if* they are trying to achieve a particular goal.

Heather Knight emphasises this setup of a play when she talks about the *dramaturgy* of the robot (2011, 46). Knight quotes in this respect the Dutch actress Elsie de Brauw, who explained that the "[o]bservation of what the spectator sees and what I experience as an actress is completely different" (De Brauw quoted in Knight 2011, 46). Knight then argues that "most robots are intended to enhance, enable or empower a human or a set of humans" and that its inner feelings (if a robot has inner feelings at all) are of less importance than the outcome of its actions (46). Jaana Parviainen and colleagues<sup>21</sup>, in addition, mention that "the communicative potential of social robots [...] strongly depends on how their physical features and movements appeal to users emotionally" (2016, 211) — and thus not particularly on the emotions that the robot feels itself. With these remarks these authors mean that it is important that the logic and structure of a play, its dramaturgy, make sense to the spectators in order to touch or move. This emphasis on intentionality functioning in the context of the composition and logic of a play rather than on an actor's inner feelings is therefore the second aspect roboticists consider important when using theatre as a model for the development of social robots and HRI.

### §3 | Human-human interaction as template for robot theatre.

We have seen that roboticists use theatre as testbed and model on the basis of certain grounds and assumptions. Theatre as testbed works well for three reasons, roboticists argue: first, the presence of the *audience* ensures that roboticists can get immediate feedback on the HRI their test subjects witnessed; second, and this makes theatre so suitable as testbed, compared to any other situation in which an audience is involved, roboticists argue that the theatre environment offers a *controlled environment* that roboticists can use in order to frame the HRI shown; and third roboticists argue that the division in a theatre venue between stage, backstage and auditorium facilitates the emergence of an *imaginary world* in the sense that this world can only appear because of the fact that equipment necessary for the operation of the robot can be hidden backstage. Apart from using the theatre venue as a

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<sup>21</sup> Jaana Parviainen and her colleagues work at the Research Center for Knowledge, Science, Technology and Innovation Studies at the Finnish University of Tampere.

place to test HRI designs, we have also seen that robots need to convince their interaction partner of their behaviour in order to make themselves look like credible interaction partners, just as theatre actors need to convince the audience of their credibility. In that way, roboticists consider social robots as *performers*. In that respect, the *dramaturgy* of the robot is important to consider: with respect to HRI situations, we have seen that roboticists find it useful to think in terms of the logic and structure of a play in which given circumstances offer a challenge to a character that has to overcome particular obstacles in order to achieve a goal. Dramaturgy can, as some roboticists show us, function as an architecture for designing real-life HRI situations. In this last section, I would like to argue that these assumptions are typical of a particular kind of theatre: theatre that is based on actions, human beings and the relationships between them. I therefore argue that these roboticists, who get inspiration for their designs from looking at actors and characters, consider their creations in human terms rather than in terms of objects and reason from an underlying assumption — a template, so to say — of human-human interaction instead of from the interaction between a human being and an object.

Let me therefore first take the *Fetch and Carry* performance I described in the introduction to this chapter as an example to illustrate how the five elements I mentioned above — audience, controlled environment, imaginary world, robot as performer, and dramaturgy — come together in a robot theatre experiment. As mentioned at the beginning of this chapter, this performance consists of two performers: a human being who gives directions to an anthropomorphic social robot (see figure 1.5 on the next page)<sup>22</sup>, which robot is tele-operated by an operator hidden backstage. The robot gets the command to look for food, which it finds, and then returns to the human performer. This narrative is simple and fixed: it is clear what happens and it is set up in such a way that there can be no deviations from this procedure. By putting this narrative on stage, a recognisable world emerges which the audience members can relate to. The social robot, unable to act autonomously, is operated by a tele-operator who is located in an invisible place outside this imaginary world, which maintains the illusion that the robot is autonomous. Through the staging of this imaginary world that in no way seems connected to the 'real' world of the theatre venue and the audience, the spectators are invited to take up the perspective of the human being in this staged situation and to consider how they would act in the situation shown.

In *Fetch and Carry*, the robot thus functions as a deliberate performer — although we can argue whether the tele-operator or the robot itself is considered as performer. Although unable to express itself in words or language, the robot is able to convey intentionality, since

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<sup>22</sup> The figure is a bit blurry but the only image I could find — and I have to admit that I find it difficult to imagine that this creature is able to pick up something from the floor. I therefore can only rely on the description of this performance as provided by Chatley and colleagues.





Figure 1.5: the robot, called Peoplebot,  
used in *Fetch and Carry*.

the narrative that *Fetch and Carry* consists of is a representation of an intentional act which the robot performs according to the commands it gets from the human performer. He, on his turn, makes clear what his intention is by the use of language: with words, he commands the robot to get the food. This particular way of staging an intentional interaction is part of the performance's dramaturgy: the logic of showing the robot crawling to a corner of the stage in order to pick up food makes clear that the robot is able to understand the human being and his command, and therefore establishes the robot as an equal and credible interaction partner.

When we look at this example we see different aspects returning from earlier in this chapter: fixed narratives; performing; an audience; dramaturgy; the robot as actor; a script; the dramatic build-up of a play concerning a space, props, characters, circumstances and obstacles; intentional actions; acting methods; an imaginary world; frontstage; and backstage. In this sense, *Fetch and Carry* is a representation of set of logically related actions. From a theatre studies perspective, these aspects are exemplary of what Christopher Balme describes as dramatic theatre.<sup>23</sup> Christopher Balme, in his *The Cambridge Introduction to Theatre*

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<sup>23</sup> In the introduction I already touched upon the counterpart of dramatic theatre: the notion of *postdramatic* theatre. For more information about postdramatic theatre, see footnote 14 in my introduction or Lehmann 2006.

*Studies*, uses dramatic theatre "to encompass those forms of theatre that employ exclusively or predominantly the spoken word" (2008, 4), for example the classical Shakespearean play. The essence of dramatic theatre, he argues, lies in the drama — as in the ancient Greek noun δράμα, which means 'action' (4). The core elements Balme distinguishes when talking about dramatic theatre are the human actor who plays a character (17), the audience (34), the theatre space which is located in a theatre building and consists of a stage and an auditorium (47), and, as said, the text that prescribes what the play should consist of (119).<sup>24</sup> We can therefore say that in dramatic theatre a play unfolds around the representation of particular actions that are acted out by the play's characters, which are performed by human actors, in front of an audience, on a stage, on the basis of a text. Returning to the *Fetch and Carry* scenario, we see that Chatley and colleagues also embedded exactly these elements in their experiment: they have put two characters *on stage* as *actors* in order to let them *do* certain things in front of an *audience* full of test subjects, all based on a specific *narrative* that is *vocally* acted out.

#### §4 | The limitations of this particular use of theatre.

This example of *Fetch and Carry*, however, also prompts me to point out some restrictions that using this human-centred kind of theatre as template for HRI has. First, I would like to stress the ambiguity between the staged robot performer and the role the robot plays in this staged setting. Clearly, a human actor on stage can choose to not play himself but rather a character. When put on stage one can pretend that they are someone other than they actually are. For a robot, this dualism is impossible to pursue: it cannot consciously decide to pretend to be something or someone else. This is even further problematised when we consider the use of tele-operators in robot theatre, just as in this *Fetch and Carry* scenario. As we have seen, Hoffman, Kubat and Breazeal (2008) argue that contemporary robots are puppets, unable to convincingly move by themselves without the help of a human animator. Since what the robot does in *Fetch and Carry* is decided by a human being and not by the robot itself, I would argue that in these cases the puppeteers and human operators are the actors rather than the robots, which makes the robot nothing more than a mere marionette.

Second, I want to address the assumptions that the researchers whom I discussed in this chapter have about interaction and about what interaction consists of. These roboticists

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<sup>24</sup> In addition to this 'list' of elements that dramatic theatre consists of, Balme furthermore observes that up to recent years even theatre scholars have known an "almost exclusive focus on 'highbrow' canonized works" as opposed to new dramas or marginalised forms and genres, such as theatre that is not solely focused on the spoken word (5). This may explain why roboticists — assumably less familiar with the field of theatre studies than theatre scholars themselves — do not tend to think beyond dramatic theatre as the theatre form to use for their experiments.

seem to mix up different kinds of interaction that take place on two different levels. On the one hand, by staging a human being and a robot a particular interaction constellation emerges: both the human and the robot have to convince the audience of their mutual interaction. So when a staged HRI and an audience are involved, interaction takes place between these two interaction partners on the one hand and the audience on the other. In this constellation, both the human and the robot must convince the audience of their status as credible interaction partner, and it is therefore not important at all whether the human actor believes what the robot is doing: it only matters whether this collaboration is credible to the audience. The authors of the articles I discussed, however, wish to extend this way of thinking to HRI in real life in which a social robot has to act credibly in front of a human being, but at this moment this human being becomes interaction partner and spectator at the same time: two roles that in a theatre setting are strictly separated. Therefore I would argue that we cannot equate the two different circumstances of being a spectator of HRI in a theatre setting and being simultaneously spectator and interaction partner in real life.

This literature review shows that roboticists envision a role for theatre in their HRI research that is twofold: theatre offers a good environment to test preliminary HRI designs and thinking through theatre as a model offers new insights for the development of social robots. Furthermore, I have shown with this review that these elements point to a specific form of theatre: theatre in which the relations between humans and the representation of actions are shown and in which the role of human beings is key. By doing so, these roboticists seem to design social robots that *pass for* human beings. However, apart from the anthropocentrism connected to this way of considering social robot designs, I mentioned some limitations connected to using this particular kind of theatre as template for HRI design. Therefore, as a starting point for the formulation of a perspective on social robot and HRI design to which these limitations are not connected, I want to shift my focus in the next chapter to puppet theatre, in line with Elizabeth Jochum and Todd Murphey's proposal — which I discussed in section 2.1 — of combining insights on puppet theatre with social robotics.

# 2

## Relations

### THE TRANSFORMATION OF A PUPPET INTO AN AGENTIVE OBJECT.

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The hornbill Zazu flies, cycling back and forth over the stage. When his master Mufasa, with his imposing head and lion manes, calls him to order, he flutters back to where his master stands and bows. "Protect Simba on his way," Mufasa commands. This throws a spanner in the works of Simba, Mufasa's son, who wants to go together with his friend Nala on a secret quest to a mysterious elephant graveyard. On their trip, Zazu, Simba and Nala walk through the jungle, where they see the most extravagant animals. Simba does not want to obey to Zazu's orders and sings out loud that he cannot wait until the moment that he will be king of all animals. Meanwhile, Simba and Nala try to get rid of Zazu, who gets more and more distracted by the breathtaking colours he sees around him. Eventually, Simba and Nala succeed: Zazu loses his way in the dense bushes. In order to reinforce this event, Zazu's puppeteer — who was until this moment practically invisible — literally disconnects the puppet from his hands, throws it in the coulisses and wanders around the stage. Not only Zazu's way, but also the magical connection between puppet and puppeteer is lost in this way, and attention is drawn to the poor actor who seems to be incomplete without his puppet. In complete confusion, he leaves the stage.

Puppet theatre is a theatre genre in which *relations* are staged between human performers and lifeless things that transform into characters with agency. In 2011, Dassia Posner, Claudia Orenstein and John Bell organised a conference to theorise on puppetry and performing objects "in a performance form that is as ancient as the stones and is becoming increasingly visible in contemporary theatre" (Posner, Orenstein and Bell 2014, 1). In the edited volume that resulted from this conference, they argue that in Broadway performances like *The Lion King* the presence of puppets is obvious, but that puppets are also more and more used in cabaret performances, clubs and during so-called *puppet slams*. Posner, Orenstein and Bell observe that this "proliferation of expressive objects" highlights the relationship between actor and object, where "human flesh and material constructs [...] intermingle in an endless array of configurations" (2). Therefore, they argue, puppetry asks us questions about the tension between animate and inanimate, as it depicts a world in which the inanimate sustains life: "to manipulate the puppet is to explore [the] blurred line between life and death, between the self as a discrete being and one intertwined with inanimate matter" (3).<sup>1</sup>

With regard to this "blurred line", a text often cited is Jiří Veltruský's "Man and Object in the Theater" (1964 [1940]). In this article, he argues that

**[i]t follows from the teleological character of action that it is the result of the intent of a subject. It is, however, necessary to differentiate the concept of the subject: first of all there is here the basic subject who is the originator of the intent; then there is the subject overtly performing the action, who may be identical with the basic subject, but may also be his mere tool and thus only a partial subject.**

(83)

With his text, Veltruský shows that a subject in theatre is not dependent on the intention with which it performs a certain action, but that its *participation* in the action is of greater importance (84). To explain this, he uses the example of the prop: Veltruský observes that props, usually fabricated to support an actor's action, possess a so-called "action force" that attracts action to it. He argues that when only a prop is shown on stage with no actor present to use it, the action does not stop: "the action force of the object comes to the fore in all its power" (88).<sup>2</sup> This, puppet theatre scholars using his text argue, is also at stake in puppetry: also puppets possess such an "action force" since they are eminent examples of objects that perform certain actions but are no originators of the intents for these actions — they (only) participate.

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<sup>1</sup> In my opinion, the similarity with HRI is striking: a human interacting with a social robot also puts himself in a configuration with a material construct through which he becomes intertwined with inanimate matter.

<sup>2</sup> Compare this "action force" to Jane Bennett's notion of "thing-power", which I discussed in the introduction to this thesis.

Although the word puppet can refer to a lot of different things (a glove, a bundle of grass sprouts, a dress on a hanger, a doll, a robot), Posner, Orenstein and Bell argue that the most important elements of the puppet, however, do not only include the puppet's appearance but its *liveness* and *agency*. They disclose a difference between the puppet as a thing and the puppet as something that is *able to do*, in opposition to a view in which puppets have often been considered as things that are unable to change matters: in that view, puppets are tied to humans by either their manipulation or representationally by their form, and therefore are only able to "mimic human ideas and content" (6). In that train of thought, puppets do not have the agency to "*shape or alter*" these human ideas (6; original emphasis).<sup>3</sup> Posner, Orenstein and Bell advocate, however, another perspective on this matter and consider the puppet as do-er, which assumes that the puppet can at least seem to possess agency. Therefore, these authors define contemporary puppetry as "the human infusion of independent life into lifeless, but not agentless, objects in performance" (5).

Through this definition, they consider the puppet as an object able to transform into an agentive object.<sup>4</sup> In the previous chapter, we saw that social robots are designed with the aid of a theatre perspective that makes them pass for human beings. By modelling their social robots after humans, roboticists suppose that the human interaction partner can localise agency in these human-like creatures, which transforms the robot as object into an agentive object. In this chapter, however, I discuss how the body of knowledge concerning puppet theatre — in which, as we have seen, the differences between object and subject, and living and non-living are key — offers a different perspective on this *transformation of an object into an agent*: we will see that puppet theatre shows us that objects do not need to be modelled after human beings in order to undergo this transformation, but that agency can emerge from the relationships they enter into with human beings. Furthermore, I discuss how two implications of this transformation that puppetry scholars shed light on — the puppet that becomes ontologically ambiguous and uncanny — are deliberately deployed in puppetry performances and how that differs from the assumptions roboticists seem to have about ambiguity and uncanniness.

In order to argue so, I distinguish two different aspects that are useful for analysing this transformation. In the first section I discuss the notion of *presence*, as discussed by both Erika Fischer-Lichte and Cormac Power. We will see that Fischer-Lichte interprets this concept

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<sup>3</sup> Jennifer Parker-Starbuck (2013, 385) further elaborates on this difference between mimicking and altering.

<sup>4</sup> I defined agentive objects in my introduction as "objects that through entering into these relationships with human beings have obtained agency". This definition results from a way of thinking in which agency is not a characteristic that a (human) entity can possess, but that results from the relationships that an entity enters into within the network in which it exists. Puppets, like social robots, are always put into such relationships with human beings: puppets in relation to their puppeteer(s), robots in relation to their human interaction partner(s).

as something a staged entity can *possess*, whereas Power argues that the presence of the puppet as agentive object is the result of the staging of *relations* between the puppet and other (human) performative entities. Considering a puppetry performance in terms of presence thus emphasises the relationality that is necessary in order to make a puppet transform into an agentive object. Building on this idea of presence as a relational concept, I discuss Paul Piris's concept of *co-presence* which, he argues, results from the relation between puppet and human being when a puppeteer creates an additional dramaturgical function for himself during the animation of the puppet, through which the ontology of puppet and puppeteer is brought closer together. Piris, we will see, argues that co-presence is necessary in order to make the puppet transform into an agentive object.

In addition to staged relations relations between the performance as a whole and the spectator are at stake too. In the second section I discuss how the mediation between the performance and the spectator — again: as relational concept — can help us understand how a puppet can transform into an agentive object. We will see that what Margaret Williams calls the "potentiality of the puppet" — in my terms: its potentiality to transform into an agent — can only exist in particular performative contexts. This means that this potentiality is a mediated effect in which the spectator and the affordances of a particular venue are involved. We will furthermore see that a staged puppet, according to Meike Wagner, is Othered relative to the spectator: a reciprocity is created between the puppet's live, present body on stage and the mediated act of staging that body. The result of this Othering is that the spectator relates his own, real body to the artificiality of the Other body of the puppet, which decentres his bodily perception and in turn makes it possible for the puppet to obtain agency.

Subsequently, I discuss two implications that puppetry scholars mention with respect to this transformation of the puppet into an agentive object. In the third section we will see how puppetry theorists observe that spectators of puppetry performances see two different categories fused into the single entity of the puppet, that of the thing/object and the character/agent, and how the puppet therefore appears as an *ontologically ambiguous* creature. Then, I discuss in the fourth section how puppetry scholars argue that this transformation into agentive object can evoke a feeling of *uncanniness* in the spectator. In the introduction we already encountered the uncanny in the context of Masahiro Mori's uncanny valley, who argued that a very human-like non-human entity can evoke this unsettling and uncertain doubt about the life(less)ness of itself — which should, according to Mori and other roboticians, be avoided. We will see in this section, however, that puppet theatre makers deploy the ontologically ambiguous and the uncanny as a deliberate performance strategy.

## §1 | Presence.

### §1.1 | Having presence and becoming present.

In her master's thesis (2013), Margot van Dijk compares presence theories in order to describe the presence concerning human and non-human performers. In this subsection I discuss two of these presence theories, articulated by Erika Fischer-Lichte and Cormac Power. I show how Fischer-Lichte explains presence in terms of and as grounded in entities on stage: according to her, staged entities can *have* presence. In contrast to Fischer-Lichte's understanding of presence, I subsequently show how Cormac Power understands the presence of the puppet as agent as emerging from and located in relations between the puppet and the puppeteer, through which the puppet can *become* present as agent.

Erika Fischer-Lichte distinguishes in her *Ästhetik des Performativen* (2004) three concepts of presence that a performative entity can have: a weak, strong and radical concept. She bases this distinction on the ontological difference between the different entities that can be present on stage. Fischer-Lichte defines the first concept, the weak one, as the performer's act of being physically and perceptibly present in front of someone else (106) — paraphrasable as just observably being there. Fischer-Lichte's strong concept, to continue with, results from the training and craftsmanship of the performer and comes to the fore when that performer stages his own body. By doing so, he ensures that the spectator perceives him as present (165). Radical presence, lastly, is used by Fischer-Lichte to describe a particular process of awareness, in which an assumed dichotomy between body and mind is eliminated: "when the actor brings his phenomenal *Leib* as an energetic one to the fore and by so produces presence, then through that he appears as an embodied mind, that is, as a being" (171; original emphasis).<sup>5</sup> Important to notice is that these three concepts of presence are all non-relational, as no other staged entity is necessary in order to ground weak, strong or radical presence in the staged performer: this performer either just is there, uses his craftsmanship or brings his *Leib* to the fore and then is present for the spectator.

However, the concepts of presence that Fischer-Lichte distinguishes do not seem that suitable for describing presence in puppetry performance, because these concepts are forms of presence that only human performers can possess: objects, such as puppets, do not have craftsmanship (and therefore no strong presence) and also no body/mind dichotomy (and therefore no radical presence). Furthermore, the puppet-as-agent — as, for example, a character — is always made present by another staged entity, its puppeteer, and cannot have

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<sup>5</sup> The original, German text by Fischer-Lichte is as follows: "wenn der Schauspieler seinen phänomenalen Leib als einen energetischen hervorbringt und so Präsenz erzeugt, dann tritt er dadurch als *embodied mind* in Erscheinung, das heißt als ein Wesen" (original emphasis). Fischer-Lichte's notion of "der phänomenaler Leib" refers to the material notion of the body, the *Leib-Sein* instead of the *Körper-Haben* — being a body instead of having a body (Fischer-Lichte 2004, 139).



presence by itself. Cormac Power therefore takes up a different perspective, arguing that in a puppetry performance a spectator sees what is actually present in front of him but also sees what is evoked in his own imagination (Power 2008, 175). To describe this complexity, Power distinguishes three different *modes* of presence: a literal, fictional and auratic mode, of which the first two are relevant in this context. The literal mode is quite similar to Fischer-Lichte's weak concept of presence as Power lets it refer to a performer's act of being present; however, he mentions that this act of being present always depends on a spectator who perceives the performer as actually present (87).<sup>6</sup> In this respect, the puppet as thing can always be literally present because it can always appear as unanimated object in front of the spectator. Power's fictional mode of presence, however, refers to the act of making present a fictional world, which is the result of a relationship between (the actions of) the performer and (the imagination of) the spectator (44). There is a difference, he argues, between what is actually present on stage and what the performance makes present in its staging. The animation of a puppet as thing into a puppet as agent, he argues, is an example of this fictional mode of presence, because this animation as part of what the performances stages makes the puppet present as agentive object.

Fischer-Lichte thus approaches presence as a characteristic that a staged entity can possess, whereas Power sees presence in puppet theatre as a relational concept. Building on the relationships that a puppet can enter into, I would argue that we can distinguish three entities that can become present in a puppetry performance: puppet, puppeteer, and actor. In this respect, a human performer can take up two different roles: the role of puppeteer who animates a puppet and the role of actor as a character in the fictional world that exists next to any puppet character. This means that the puppet can enter into two different relationships with human performers, apart from not entering into a relationship at all: on the one hand, there is a relationship with the puppeteer who manipulates his puppet; on the other, a puppet — while being manipulated — can also enter into a relationship with another human actor. To make this even more complicated, this human actor can be the same person as the puppeteer in case a puppet interacts with its own manipulator. Power's modes of presence can be used in this respect to point out the different relationships that can occur between puppet and human performer, which are clarified in table 2.1 on the next page.

We see in this table that in a puppetry performance puppets and human performers can have different functions. When the puppet is not played by someone and functions not as agentive object but just as object — when laying, for example, inanimately on the stage floor — the puppet is not in a relationship with another entity and becomes only literally present.

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<sup>6</sup> This thus does not mean that the literal mode of presence is unmediated: Power argues that something or someone on stage immediately transforms into a theatrical sign and is therefore automatically mediated (109). I provide a closer discussion of this process of mediation in the second section of this chapter.

|               |  |
|---------------|--|
| <b>Puppet</b> |  |
| Literal       |  |
| <hr/>         |  |
| <b>Puppet</b> | and <b>puppeteer</b>                             |
| Fictional     | Literal  |
| <hr/>         |  |
| <b>Puppet</b> | and <b>actor</b>                                 |
| Fictional     | Fictional  |
| <hr/>         |  |
| <b>Puppet</b> | and <b>puppeteer with also the role of actor</b> |
| Fictional     | Both literal and fictional                       |

**Table 2.1: the different relationships between performance entities in a puppetry performance in terms of Power's modes of presence.**

This changes when the puppet is played by a human performer and enters into a relationship with this puppeteer. The puppeteer then becomes literally present, whereas the puppet enters the fictional world and becomes fictionally present: its body is manipulated by its puppeteer in such a way that it evokes the idea in the spectator of the presence of its character. When this puppet, while being manipulated by its literally present puppeteer, interacts with a human actor this actor becomes fictionally present as well. When the puppeteer simultaneously fulfils the role of actor, the modes of presence belonging to the puppeteer and the actor are merged into the single staged entity of the puppeteer as actor, who then becomes literally and fictionally present at the same time.

This process of categorising and labeling the different forms of presence that can emerge because of the different relationships that emerge between puppet and human performer makes us aware of the fact that a puppet needs a human being — a manipulator, a puppeteer — in order to become present as an agentive object. In puppetry performances, in which objects are staged, these objects *are* not present as agents but *are made* present in that capacity. Considering puppet theatre performances in terms of presence makes us thus aware of the fact that relationships emerge between puppets and human beings, which are necessary for the former to transform into an agentive object.

## §1.2 | Co-presence.

Not only Cormac Power considers presence in puppetry performances in a relational way; Paul Piris (2014) looks at staged relationships between puppets and human beings in terms of what he calls *co-presence*. He argues that in a puppetry performance a "live confronta-

tion" between puppets and human beings takes place, and that this leads to co-presence. This co-presence

is particular because it establishes a relation of self to Other between two beings that are ontologically different: one is a subject (in other words, a being endowed with consciousness) and the other one an object (in other words, a thing). Yet, the particularity of the puppet is to present an ontological ambiguity because it is an object that appears in performance as a subject. Co-presence stresses this [...] ambiguity by confronting the puppet with a human protagonist.

(Piris 2014, 30)

Co-presence thus stresses the potentiality of the puppet as agent and is therefore a strategy puppet theatre makers can deploy to make the puppets they stage transform into agentive objects. To explain what this co-presence exactly is, Piris refers to Jean-Paul Sartre who argued in his *Being and Nothingness* (1943) that a relation of self to Other can arise between two different consciousnesses (what Piris calls, as we can see in the quote above, "beings endowed with consciousness") that are physically distinguishable present in the world (Sartre 1943, 30–1). Precisely this is at stake here, according to Piris: when both a puppet and a human being, either as puppeteer or as character, are confronted and enter into a relationship with each other, co-presence emerges which makes the puppet transform into an agentive object.

However, co-presence does not simply emerge when these two entities are confronted with each other. This is only the case, Piris argues, when performers use skills they draw from puppetry on the one hand and from acting on the other. Both areas share the quality of being able to create characters on stage but puppetry and acting are dissimilar in the sense that they encompass two different forms of *body schema* to achieve that creation (31). Whereas actors trust on their own body in relation to the bodies of other performers, in puppetry we find a division between the body of the performer and the character; between what Steve Tillis (1996) calls the performer as *producer* of theatrical signs — signs that "communicate a dramatic character" — and the puppet as the *site* on which these signs are placed (109). When a puppeteer places theatrical signs on the puppet, this puppet as agent becomes part of the fictional world; but therefor, according to Piris, a relationship with the body of the puppeteer is necessary.

The body schema form of a puppetry performance thus entails two different bodies: "the actual body of the puppeteer and the apparent body of the puppet" (31). It is easy to say that co-presence is the simultaneous staged visibility of a puppeteer's body next to a puppet's one, but according to Piris it is not that simple: the body of the puppeteer has to bear a dramaturgical function in the context of the play in order to become co-present with the body of

the puppet (31). This leads to a specific kind of puppetry dramaturgy in which the puppeteer with his own body creates a character for himself which has a dramaturgical meaning next to the character of the puppet.<sup>7</sup> So, whereas actors focus on their own body as the site on which theatrical signs are placed and whereas puppeteers focus on the body of the puppet, the co-presence of puppet and puppeteer requires a double focus on both (32). Piris furthermore argues that co-presence can only be achieved when the ontological status of both puppeteer and puppet is brought closer together, by which he means that either the puppet needs to be humanised or the puppeteer needs to be 'puppetised' (36).<sup>8</sup>

Although it seems obvious to fuse the bodies of both puppeteer and puppet in order to achieve this effect of humanisation and 'puppetisation' — by, for example, physically connecting the puppet to the puppeteer — according to Piris it is necessary for achieving co-presence that these two bodies remain distinct. When, he argues, "the distinction from the puppeteer is not clearly established, the puppet appears as an extension of the performer and, thus, is mostly present on stage as an object and not as a protagonist" (36). By arguing that the puppet can appear as a protagonist, Piris acknowledges that co-presence is necessary for the puppet's transformation into an agentive object. When the two conditions that Piris mentions (the puppeteer creates a character for himself and the ontological status of both puppet and puppeteer is brought closer together) are met, the puppet and puppeteer can become co-present which ensures that the puppet appears as an agent.

### §1.3 | Comparison.

Considering puppetry performances on the basis of the concept of presence have made us aware of the fact that in such performances rather complex relationships emerge between puppets and human beings. These relationships are necessary in order to make the puppet transform into an agentive object: the literally present puppeteer is responsible for a puppet's animation and thus for its transformation into a fictionally present agent, but we have also seen that the interaction between this fictionally present puppet and a fictionally present human actor can emphasise the puppet's status as protagonist. When this human actor is also the puppet's puppeteer co-presence can emerge, which is according to Paul Piris essential for stressing the ambiguity of the puppet and therefore also for emphasising its agency.

In the previous chapter, we saw that roboticists design their social robots in such a way — which particular aspects of dramatic theatre aid in — that they pass for human beings. The similarity between a social robot designer and a puppet theatre maker is that both want to

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<sup>7</sup> In table 2.1 I explained this as the relationship between the puppet and the puppeteer with also the role of actor.

<sup>8</sup> Henryk Jurkowski also recognises that puppets among humans become more puppet-like, whereas puppets among humans become more human-like (Jurkowski 2013, 28).

design objects that can become agential. Both are inspired by theatre, but roboticists take human beings and theatre that is based on human-human relationships as model for their creatures: they use, for example, human acting methods as model for how to convincingly design the robot as agent. By doing so, however, they assume that agency is something that can be localised in a social robot's design. We can conclude that thinking in terms of presence in puppet theatre offers another perspective, in the sense that it exposes the complexity of staged relationships between puppets and human beings and, more important, that a puppet's agency emerges from these relationships. This provides us with a perspective in which a puppet can be put into a relationship with another human being, through which it transforms into an agential object — which makes it obtain agency in a different way than roboticists assume.

## §2 | Mediation.

### §2.1 | Mediated contexts.

The discourse on puppet theatre not only focuses on relationships between staged entities, but also on the *mediated* relation between the performance as a whole and the interpreting subject. One author who discusses this relationship between puppetry performance and spectator in terms of mediation is Margaret Williams: she argues that puppetry is a mode of *spectatorship* rather than a performance genre (2014, 23). In that respect, Williams discusses the idea of a puppet's death, which is a recurring theme in Western puppet theatre and a metaphor for exposing the paradox of the puppet as a living thing (18). To explain this paradox, Williams recalls Philippe Genty's famous untitled performance in which "a Pierrot marionette becomes aware of the strings connecting it to its manipulator and asserts its independent life by breaking them one by one until it falls 'dead' when finally detached from the puppeteer" (18). However, Williams argues paraphrasing Victor Molina, a "puppet cannot be called dead until its body has completely disappeared", because as long as (a part of) the puppet remains visible on stage, there is always a "potential puppet" (19).

With this, Williams seems to argue that a puppet's literal presence ensures its potentiality as a living character. However, she argues that this potentiality only emerges in the mind of the spectator because of the mediated relation between him and performance. The mediation between a particular performative context and spectator is determining for our ability to assign human-like, agential qualities to objects, Williams observes: in some contexts (a theatre venue) puppets can become agential objects, whereas in others (a gallery) they cannot (24). That is why she calls puppetry a mode of mediated spectatorship, which is formed by the affordances of the performative context. This could imply, however, that puppetry can only exist in, and not outside, the realm of theatre. That is not the case, Williams argues:

puppetry should rather be seen as a point of intersection between physical, visual and psychological manipulation — where not only the puppet on stage is manipulated, but also the perception of the spectator. A performative context in which this can happen is a context in which a puppet can transform into an agentive object (24–25). The puppet that transforms into an agentive object then is a mediated result of the puppeteer's manipulation in a specific performative context, which is part of, according to Williams, puppetry's dramaturgy (25). Williams thus sees the *framing* of a puppetry performance, as the context in which this performance is mediated, as determining for if and how a puppet can become an agent.

## §2.2 | Mediated bodies.

Meike Wagner is another author who approaches the mediation between a puppetry performance and the spectator, but she distinguishes between different types of *bodies* in puppet theatre instead of the mode of spectatorship it evokes. She argues that puppetry emphasises the "constructedness of the body" (126). To unravel this constructedness, Wagner distinguishes between *live* and *mediatised* bodies: she considers live bodies bodies that have a corporeal presence<sup>9</sup> and mediatised bodies representations of bodies. But what is a puppet then, Wagner wonders: a live, performing body, or a representative image of the human body? This question is even further problematised by contemporary puppet theatre performances that "mingle bodies with human actors and mediatized bodies and so draw the human figure into an ambiguous position between an animated agent and an existential symbol of mediatization", she argues (127).

This blurring of the border between human and puppet, as the ambiguity between living and dead and between live and mediatised, contributes to the transformation of the puppet into an agentive object. According to Wagner, this works as follows:

**[t]he artificial object body, the puppet body on stage, decentres my own bodily perception [...]. I recognize obviously a human-like body, animated and moving like people are animated and move. However, the puppet body carries at its core the *artificiality of the [O]ther* that is its first principle of existence.**

(131; original emphasis)

What Wagner means here is that when looking at a puppet body, a spectator can relate to what it does, how it moves and how it is animated from his own human perspective. Because he can relate himself to it, he understands what it does in his own human terms and thereby assigns agency to the puppet. However, at the same time the puppet also carries what Wagner calls "the artificiality of the [O]ther", to which the spectator also relates through his own

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<sup>9</sup> With this, Wagner refers to Power's literal mode of presence.

body but which is perceived as a challenge towards his own body image.<sup>10</sup> This, however, can only happen in a mediated environment in which the puppet can both present itself as this artificial Other and represent a human-like body which is animated in a human-like way. It is thus, according to Wagner, the *medial structure* of puppetry that allows for this ambiguity (131).

Wagner thus observes that the ambiguity between the puppet as a thing and the puppet as something that can possess agency is an ambiguity between the live, present body of the puppet and the medial operation of staging the puppet as Other, respectively. This process of 'Othering' is important to Wagner:

**[t]he puppet is very close to human beings; its features are familiar to ours. However, this familiarity is fragile and endangered — after all the puppet does bear the potential of radical alienation and [O]thering: it still symbolises death. In particular, the incorporation of this opposition — to be the carrier of the familiar [O]ther, of another human feature *and* the radical [O]ther, the dead object — inscribes the puppet into an undecidable [...] status and creates an irritating image of the puppet as *the [O]ther body*.**

(132; original emphasis)

The staged puppet thus does not only remind the spectator of an ontological difference between thing and living being, but it also connects to the difference between the *own* ('my self, being alive') and the *Other* ('the alien, the artificial, the dead'). Mediation, in this respect, makes clear that a puppet can consist of both a live and a mediated body, simultaneously presenting an object and representing a character/Other: without the mediated layer in which the puppet is able to represent, the puppet cannot transform into an agentive object and the spectator cannot perceive the ambiguity of the puppet as both lifeless thing and agentive object. The mediation — staging — of a puppetry performance thus lets the puppet obtain agency not (only) because it enters into relationships with staged human beings but also because it enters into relationships with spectators who perceive the puppet in terms of their own bodies.

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<sup>10</sup> A body image is the body that can be looked at: we all have an image in mind of our own body. This is in contrast with the body schema that I mentioned in the section in this chapter on co-presence: a body schema entails the non-visual sense of one's body — a body schema emphasises how we assign meaning to the world from our bodily perspective. A puppeteer, for example, includes his puppet in his body schema which leads to a single body schema but two body images (remember that Paul Piris argued that the puppet and puppeteer should remain distinct entities while being co-present). See, for more information, Shaun Gallagher's "Body image/body schema" in the *Oxford Companion to Consciousness* (2009).

## §2.3 | Comparison.

Through this discussion on the basis of the perspective of mediation we have seen that Margaret Williams argues that the dramaturgy of a specific performative context determines in what ways a puppet can be mediated and therefore also whether a puppet can transform into an agentive object. It thus depends on the context's framing of the puppet whether it can become agentive or not.<sup>11</sup> Meike Wagner, in addition, argues that the mediation of the staged puppet results in an ambiguity in the body image of the puppet which relates itself to the body schema of the spectator. Therefore, the spectator is invited to interpret the mediated body of the puppet in terms of his own body, thereby assigning agency to the puppet.

In chapter 1, we saw that roboticists emphasise the consideration of a social robot's dramaturgy in HRI design, just like Williams emphasises the dramaturgy of a puppetry performance. When roboticists use this term, they mean that the effects that a particular social robot design can have on its interaction partner are important to consider. This, however, assumes that this partner plays no role in the effects that emerge from his relationship with the robot. It is as if the dramaturgy of the agentive object paves the way for a one-way relationship: the agentive object actively (inter)acts with the human involved but this human being passively undergoes this (inter)action. Thinking in terms of mediation provides us with a perspective in which this is not at stake: although the affordances of, for example, the performance's venue determine to what extent a puppet can transform into an agentive object, we have seen that the spectator of a puppetry performance is actively engaged in assigning agency to the puppet's body and thus in its transformation into agentive object.

## §3 | Ontological ambiguity.

### §3.1 | The ambiguous status of the puppet.

I have now discussed two different perspectives, one offered by the notion of presence and one by the notion of mediation, that allow for an understanding of how a staged puppet can appear in a puppetry performance as an ambiguous entity that is both thing and agentive object. Puppetry theorists have, in addition, tried to describe not only how this ambiguity is achieved but also what this ambiguity actually consists of. Henryk Jurkowski talks in this respect about the "oxymoron" of the ascription of life to a lifeless object (Jurkowski 2013, 55). Steve Tillis coined the term "double-vision" for talking about spectators who allow themselves to perceive the puppet as a living being (Tillis 1992, 65). Moreover, in the introduction I already mentioned Bert States who uses for this phenomenon the term "binocular vision". In this section, I shortly unwrap these terms by referring once again to Paul Piris, in order to

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<sup>11</sup> I discuss this idea of framing more elaborately in the next chapter.



discuss what the ontology is of the ambiguous state that a puppet ends in after its transformation into an agentic object.

Piris uses the term "ontological ambiguity" for this particular ambiguous state, by which he means that a puppet is "an object that appears in performance as a subject". This is also the puppet's "particularity", a goal that the puppet needs to fulfil, and thus a strategy puppeteers deliberately deploy (2014, 30). To explain what this ontological ambiguity actually consists of, as I explained before, Piris refers to Jean-Paul Sartre who argued in his *Being and Nothingness* (1943) that a relation of self to Other can arise between two different consciousnesses that are physically distinguishable present in the world (Sartre 1943, 30–1). This relation of self to Other can be considered in the light of the previous two sections as both the relation between the puppet and its puppeteer or another human actor, and as the relation between the puppet and the spectator. In both cases the puppet obtains agency through entering into such relations.

With respect to puppetry performances, Piris argues that the ontological ambiguity of the puppet brings the ontological status of both puppeteer and puppet closer together, with which he means that in a puppetry performance either the puppet is humanised or the puppeteer is 'puppetised'. In addition, Piris observes that the subjectness of the puppet is not something that is "out there", perceivable on stage; rather, only a puppet's objectness can be perceived whereas its subjectness is imagined in the spectator's mind (39). Here we also see the two different relationships I exposed before, between the puppet and the human puppeteer/actor and between the puppet and the spectator, at work.

Further elaborating on the subjectness imagined in the spectator's mind, Piris refers to Sartre again who argues in another work, *The Imaginary* (1940 [2004]), that there are two ways of relating to an object: we can perceive an object by "encountering it by our consciousness" (7) — which means: perceiving it — or we can imagine an object by providing ourselves with an "analogical representative" of it (20). With this, he means that we imagine a relation between the object and an image in our minds. Sartre calls an object that can facilitate this an *analogon*. An analogon allows, according to Piris, "the absent subject to acquire a kind of presence in our consciousness" (Piris 2014, 39), which means that we assign to an object subjectivity that is actually not there. A puppet is such an analogon, Piris argues, since it allows the audience to assign subjectiveness and agency, which is absent, to itself as a present object. Because imagination (assigning absent subjectivity to a present object) cannot fully take over perception (beholding the object that is actually there), Piris argues that a "dual mode of existence" originates which establishes a reality in which the puppet is real in its objectness but unreal in its subjectness (40). However, I would argue, a puppet that allows the audience members to assign agency to itself already possesses agency. In that

train of thought, the agency that an agentive object can obtain is not unreal: although one can argue that the puppet as subject/character only exists in the imagination of the spectator its ability to act relative to and enter into relationships with the other human performers on stage and the spectator is real, cf. Jane Bennett's ideas about the agency of things that I discussed in the introduction to this thesis.

### §3.2 | Comparison.

In the previous chapter, we saw that roboticists consider their creatures single entities that should be as unequivocal as possible, because in that way a smooth HRI can emerge. However, puppet theatre offers a perspective in which agentive objects are by definition ontologically ambiguous: spectators of puppetry performances always see two different categories fused into the single entity of the agentive object: that of the thing/object and that of the character/agent. This is not something that should be avoided: this ambiguity is deployed in puppetry as a deliberate performance strategy.

## §4 | Uncanniness.

### §4.1 | The deployment of the uncanny.

In the introduction to this thesis, I discussed the feeling of uncanniness in the context of Masahiro Mori's uncanny valley.<sup>12</sup> The ontological ambiguity that I discussed in the previous section, we will see, can result in an unsettling feeling in the spectator, in doubt about whether the object at stake is alive or not: the uncanny. In this section, I explain that puppet theatre makers consider the uncanny not something that needs to be avoided but rather a strategy they actively use in their performances to make the spectator think about the differences between humans and objects.

In his "Playing with the Eternal Uncanny", John Bell argues that "the dark feeling of uncertainty" about whether an object is living or dead is involved with the essential nature of puppetry: the bringing-to-life of lifeless objects, of "the dead world", by living human performers (2014, 43). In this respect, he discusses a 1906 essay by psychiatrist Ernst Jentsch and a 1919 essay by neurologist Sigmund Freud, because — although they speak negatively about the feeling of uncanniness — "reading Freud's and Jentsch's essays is a remarkable experience" for puppeteers, since "both are filled with references to the essential nature of puppetry" (43). In fact, Bell argues as elaboration on the ideas of Jena Osman who argues that every puppetry performance is an instance of Brecht's *Verfremdungseffekt* (Osman 2008, 19)

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<sup>12</sup> Epitomising, Mori argues that the more a robot looks and communicates like a human being, the more its interaction partner is likely to accept this robot — *up to a certain point*. In the process of designing robots that look more and more like real human beings, he argues, there comes a certain moment when the distinction between human and non-human gets blurred, and when the robot becomes an ambiguous creature.

that all puppetry performances can be considered as instances of the uncanny. In other words, we could say that the uncanny is an element that is deliberately deployed in every puppetry performance.

Bell firstly discusses Jentsch's essay, "On the Psychology of the Uncanny", which deals with doubt as central concept. Jentsch argues that

**among all the psychical uncertainties that can become a cause for the uncanny feeling to arise, there is one in particular that is able to develop a fairly regular, powerful and very general effect: namely, *doubt* as to whether an apparently living being really is animate and, conversely, doubt as to whether a lifeless object may not in fact be animate — and more precisely, when this doubt only makes itself felt obscurely in one's consciousness.**

(Jentsch 2008 [1906], 221; my emphasis)

This notion of doubt is central in puppetry and certainly with respect to the ontological ambiguity of the puppet: spectators may wonder what the puppet they see (re)presents and to what extent it lives. John Bell argues that Jentsch, with this statement I quoted, problematises the uncanny, "by associating [this feeling] with doubt, uncertainty, abnormality, disturbance, and other undesirable effects" (Bell 2014, 46). This problematisation includes the idea that the uncanny is reserved for only, what Jentsch calls, "primitive life" in "primitive cultures"; the idea that belief in the uncanny is connected to the "infancy" of these primitive cultures. In this respect, Jentsch gives the example of the Greek who, according to him, in Jentsch's contemporary times still believed that "a dryad [lives] in every tree" (Jentsch 2008 [1906], 225). Of course we have to view these assumptions in the light of 1906, but they certainly show that Jentsch considered the uncanny a negative feeling: civilised cultures, he argues, should not have doubt about anything they consider non-human. In this way, according to Bell, puppetry does not fit our modern, humanist interests in "civilization [...], realism, rationality, text, and bourgeois art", as it focuses on "primitive roots, animism, irrationality and [...] basic contradictions with realism" (Bell 2014, 44). The doubt surrounding puppetry is thus often considered as an uncertain, uneasy and uncomfortable feeling because the animism that is attached to performing objects and puppets is a problem for modernism.

Thirteen years after Jentsch, Sigmund Freud adopted this anxious and negative perspective on the uncanny, as he observes that the uncanny "belongs to the realm of the frightening, of what evokes fear and dread" (Freud 2003 [1919], 123). Freud was interested in what happens in the minds of people when they experience the uncanny. These effects were, he argues, "associated with the omnipotence of thoughts, instantaneous wish fulfilment, secret harmful forces and the return of the dead" (154). For Freud, this negative set of emotions and behaviour is undeniably connected to the uncanny: people who have a healthy relationship with their unconsciousness should never be accrued to uncanny feelings (154). Similarly to

Jentsch's essay, John Bell argues that this way of seeing the uncanny fits a greater world-view in which the extent to which someone believes in the living power of objects marks a relatively low cultural sophistication: he paraphrases Freud's argument as "only primitives believe in the agency of things" (Bell 2014, 49).

Bell, however, tries to advocate for the uncanny and considers the conceptions of modern culture in opposition to puppetry. Puppets are signs of old beliefs and practices, of indeed primitive cultures with low cultural sophistication, he argues, and that is precisely why they are uncanny: "[m]odern puppet performances can be threatening, doubt-inducing, and anxiety-provoking events because they remind us that we are not necessarily in control of as much as we thought we were" (50). However, according to Bell, this is not something puppet theatre makers should put aside: it is the essence of their work. Putting agentive objects in a performative space may thus lead to anxiety and doubt, but can be used to ask important questions about our contemporary times and about how human beings relate to objects.

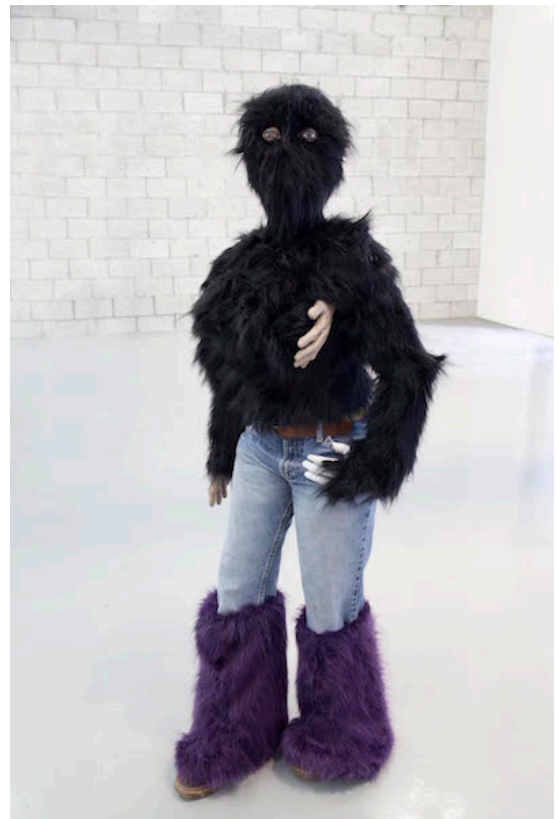
How the uncanniness of the puppet as agentive object is used as a deliberate strategy within puppetry can be seen in the work of Ana Jofre who designs life-sized, anthropomorphic puppets. With these puppets, she tries to evoke the uncanny in the spectator in order to reflect on how people are able to emotionally connect to objects (2015, 1). Three aspects are, according to her, important to include in these designs: an uncanny feeling can be evoked "by objects of human scale with anatomically correct proportions, by objects with autonomous motion, and by objects that mechanically respond to the viewer" (1). Jofre's artworks are also inscribed with, what she calls, personality and character, which is conveyed through "materiality, costumes, and (minimally simple repetitive) behaviors" (1). Two examples of these designs are *Joana Jofre* (see figure 2.1 on the next page), which is a five foot tall, realistic robotic puppet meant to interact with visitors of galleries and public interventions, and *Monster Jofre* (see figure 2.2 on the next page), which is an anthropomorphic puppet that is covered in fur. Because Jofre argues that "the unexpected is also an important element of the uncanny", *Monster Jofre* also possesses a third hand (2). Jofre thus designs anthropomorphic objects: objects that very well look like but are in such a way different that they cannot possibly be a real human being. She then uses the uncanniness that these bodies — human but not yet human — evoke as a strategy to make the spectators of her puppets think about their relationship with the objects at stake (1).

#### §4.2 | Comparison.

The feeling of uncanniness, we have seen, is deployed in puppetry as a deliberate strategy. The puppet as agentive object, being ontologically ambiguous, raises questions about the difference between living and lifeless and between humanness and objectness. In our modern



**Figure 2.1: Joana Jofre**



**Figure 2.2: Monster Jofre, covered in fur and with a third hand.**

culture, these are made into opposites: the animism, irrationality and unrealism of agentive objects become problematic for we live in a culture that values realism, rationality and civilisation. Therein, these objects have no place and become unfamiliar and therefore uncanny. Precisely this unsettlement is used in puppetry, which asks its spectators (irritating) questions about the difference between human beings and things and about how they relate to agentive objects. In the previous chapter, we saw that the uncanny yields a dilemma for roboticists: they design social robots that look and behave as anthropomorphically as possible because this eases the interaction between human and robot, but they also have to avoid falling into the uncanny valley. Puppet theatre thus offers another perspective on the uncanny as prevalent in the discourse on robotics because puppet theatre makers do not consider the uncanny by definition something that should be avoided.

## **§5 | The puppet's transformation into agentive object.**

This chapter dealt with an exceptional quality that theatrical puppets bear: being able to transform on stage from lifeless things into agentive objects. Puppets, we have seen, are considered as do-ers, they can obtain *agency*. I have shown how the notion of (co-)presence is used in the puppetry discourse to explain how a puppet can transform into such an agentive object, as it points at the complex relationships between puppet, puppeteer and human ac-

tor. Using the notion of presence, I exposed these relations and how the puppet's agency result therefrom. Furthermore, I have shown how the concept of *mediation* can work similarly to point at how a staged puppet can obtain agency from its relationship with the spectator. We have seen that puppetry theorists argue that because of a puppetry performance's mediation the spectator can consider the puppet as Other, for he is invited to interpret the mediated body of the puppet in the terms of his own body. Through this, the spectator assigns agency to the body of the puppet which in turn transforms into an agentive object. Although the body of the puppet as Other is a representation of a human body, and therefore something the spectator imagines in his mind, the agency that the puppet as *ontologically ambiguous* agentive object obtains is real, I argued: it is able to enter into relationships with both human performer and spectator, through which it obtains agency to actively shape these relationships. We have also seen that in the spectator this ambiguity can evoke an *uncanny* feeling: a feeling of doubt about the ambiguous status of the puppet. In puppetry, I argued, the ontologically ambiguous and the uncanny are often deployed as a strategy to pose questions to the spectator about his relation to objects and about the differences between human beings and things.

Compared to the previous chapter, we can conclude that the expertise present in the puppetry discourse provides a perspective on the transformation of things into agentive object which is for three reasons different from the framework we encountered in chapter 1. First, it exposes the relationships that staged objects enter into with human performers. Both roboticists and puppet theatre makers design and use objects that can become agentive, but roboticists use human beings as model for the design of their creatures, assuming that designing social robots that pass for human beings provides them with innate agency. In puppetry, however, staged objects do not have to pass for human beings in order to obtain agency because entering into a relation with a human performer is necessary for the agentive object to do so. Second, the relationship between the staged set of relations between human performers and agentive objects on the one hand and the spectator on the other is treated by puppet theatre makers and puppetry theorists as reciprocal. The dramaturgy of this staged set of relations is not only responsible for positing a particular effect on the spectator — something we did see in the previous chapter — but rather facilitates the spectator's active engagement in the puppet's transformation into agentive object. Third, we have seen that in puppetry performances agentive objects are deliberately staged in an ontologically ambiguous and uncanny way. It is the essence of puppet theatre maker's work to include the uncanny in their performances, and therefore they embrace and appreciate it. However, this is something that roboticists try to avoid: we saw in chapter 1 that they design social robots as unambiguously as possible with which they try to avoid falling into Mori's uncanny valley.

# 3

## Construction

### HUMAN-OBJECT RELATIONS IN TWO DIFFERENT PERFORMANCES.

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A cable keeps a woman hanging in the air. She seeks balance in her movements, and her shadow plays as an artificial double on the wall behind. The woman looks like a puppet, part of a puppet-show with living marionettes. Her movements look exhausted, as if she must surrender to the will of that whatever thing she is connected to but at the same time tries to look for little hinges in order to exercise her control over the arbitrariness to which she is handed over. However, it seems to be all for nothing: at the end of her choreography, the invisible machine drags the woman backstage. Blackout. Some metal jingles are to be heard, and when the light turns on again an additional dancer is chained to the darkness aloft. Together, the dancers try to do their pirouettes, be en pointe, gain more balance and find space to get into control. Sometimes they make it, resembling graceful swans; most of the time they look like dead carcasses. A third dancer accompanies after a second, and even a fourth after a third blackout. It seems as if they get used to their imprisonment — as if they know when to move, as if they know what movements provide enough kinetic energy to the others to let them make theirs. Or is that a mere illusion, as compensation for the powerlessness this performance bears?

In this third chapter, I analyse aspects of two theatre performances in which both human beings and objects are staged, in order to describe how these objects transform into agentive objects and how and in what ways they are able to enter into relationships with human beings. Through these performances, I elaborate on my findings from the previous chapter: I show how these findings are complemented by the outcomes of my analyses and I point out what the similarities and differences are between these findings and the aspects of theatre that we encountered in chapter 1. We will see that these two performances allow for a discussion of not the staged object in itself, but of how the situation in which that object operates — the dramaturgy; the *construction* of the set of relations between human and non-human performers in which the object functions — is staged. In the previous chapter, the relations between humans and agentive objects were central; in this chapter I show how the credibility of the object as agent is associated with the construction of these relations.

Firstly, I discuss a performance that Ulrike Quade Company performed in 2017: *Coco Chanel*. This is a performance about the famous French businesswoman who "controlled the way the world looked at her", which sought "to investigate the influence fashion has on our society, [...] how a costume becomes a body and how a body becomes a puppet" (Ulrike Quade Company 2017b). In this *bunraku*-like<sup>1</sup> performance, semi-anthropomorphic puppets are staged and played by three puppeteers (Ulrike Quade Company 2017b). The other performance I discuss is *I/II/III/IIII*, created by A Two Dogs Company / Kris Verdonck in 2007 and reprised in 2017. The opening of this chapter describes this performance in which Kris Verdonck asks himself whether "a growing number of 'marionettes' [leads] to more chaos or to more order" (A Two Dogs Company / Kris Verdonck 2017b). In *I/II/III/IIII*, an important role is reserved for an invisible, non-anthropomorphic object: a machine that literally leads the dancers in their choreography.

In the first section of this chapter, we will see that in *Coco Chanel* the puppets and the human performers become co-present in a way that elaborates on Paul Piris's theory. Second, I argue that in this performance both puppets and puppeteers appear as uncanny Others: the human-like puppets are often in a non-human way decomposed into different body mosaics, and the human performers playing a role in the fictional world often behave like objects. Third, we will see that the multiple ways in which this performance frames what it stages aids in the transformation of the objects at stake into agentive objects.

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<sup>1</sup> As I explained in the introduction, *bunraku* is an old form of Japanese puppet theatre. In these performances, puppets are manipulated by three puppeteers at the same time who are all clearly visible on stage — although they wear black clothing. This allows these players to also play a part in the performance themselves. Bunraku puppets do often have very well-designed heads but the other parts of their bodies are often stylistically shaped. Moreover, puppeteers can often only play a puppet's head, arms and hands — *bunraku* puppets often do not have legs.



In regard to *I/II/III/IIII*, I make clear how the object at stake in this performance evokes the illusion of possessing autonomous agency. This illusion of autonomy, we will see, shapes the conditions for the uncanny, which is deliberately used in this performance as a strategy to ask questions about agency and will. In contrast to *Coco Chanel*, we will see furthermore with respect to the machine's transformation into agentive object that this performance, in contrast to *Coco Chanel*, does not frame what it stages in multiple ways. Rather, I show how in *I/II/III/IIII* the dancers incorporate the actions of the remote-controlled machine into their body schema. The relationship between human being and non-human object in terms of body schema then becomes reciprocal, which makes the machine into a credible agent.

The third section of this chapter, lastly, presents a conclusion about how the puppets in *Coco Chanel* and the machine in *I/II/III/IIII* — that all work in a set of relations between themselves and human beings — are able to transform into agentive objects, what that adds to my observations presented in the previous chapter, and how that differs from the theatre perspective provided in chapter 1.

## **§1 | Ulrike Quade Company's *Coco Chanel*.**

Ulrike Quade Company, founded in 1999 and artistically directed by Ulrike Quade, creates visual theatre. In their works, Ulrike Quade and her team combine puppetry with dance, mime, sculpture, scenography, language and music in order to create expressive visual images (Ulrike Quade Company 2017c). The staging of *Coco Chanel* (2017) is not different: simple yet refined. The middle of the stage is covered with a great patchwork blanket which consist of thousands of little pieces of cloth (see figure 3.3 on page 64). One side of the blanket is clear white, the other burgundy, and the blanket as a whole can be lifted up; when hanging in the air it separates the back of the stage from its front, functioning as the kind of puppet showcase known from the classic Punch and Judy shows. The upstage (see figure 3.2 on page 60) — separated from the rest of the stage by a thin curtain of white, hanging threads — looks like a museum, filled with naked and clothed mannequins, a wardrobe and furniture. The puppets that are used look delicate but fragile (see figure 3.1 on the next page). *Coco Chanel* herself is imagined through multiple semi-anthropomorphic puppets, all representing a different period of her eventful and troubled life. Wrapped in the patchwork blanket we see Chanel as toddler and orphan; we see her as young lady, depicted by only a torso and a hat; during her high days, pattering on nothing more than two white mannequin legs; as widow with a lived countenance that constantly smokes cigarettes; and as corpse, the remainder of an agitated life. Most of the puppets used in this performance are composed of different parts — such as the already mentioned mannequin legs, dresses, hats and so on — and are, in line with the performance's pace, composed and decomposed in just a few seconds.



**Figure 3.1: the three puppeteers playing the puppet of widow Coco Chanel.**

During the seventy minutes that this performance lasts, it is these puppets that let us hop, step and jump through different parts of Chanel's life: played by three human stage performers, they tell (parts of) her life story, supported by a recording of the voice of Flemish actress Frieda Pittoors. Scenes sometimes consist of conversations between characters; between, for example, Chanel and her lover Jean Cocteau. In these scenes, Pittoors's sound recording functions as Chanel's voice, while one of the puppeteers takes the dialogue partner's voice for his or her account. In such scenes the puppetry is ingenious: by putting one arm in a puppet's sleeve and the other in another puppet's head, the puppeteers seem to conjure and juggle. In other scenes, the puppeteers drag themselves inwards the performance's imagined world: while stepping out of their role as puppeteers and thereby taking up new roles, detached from their duty to animate the lifeless creatures (and not even always detached from that duty!) they perform choreographies and act like, for example, fashion models who walk up and down the runway (see figure 3.4 on page 62). However, their movements are rusty and *staccato* — very robot-like, so to say — as if they want to emphasise the thingness of their being.

### **§1.1 | Co-presence through constructed interaction.**

In the first section of the previous chapter I explained that the puppeteer as human being and the puppet as object are ontologically different. When these two entities are simultaneously present on stage they can become co-present when they enter into a relationship with each other. Paul Piris argued that co-presence can be achieved when two conditions are met, reasoning from a puppeteer's craftsmanship: first, the puppeteer must succeed in creating a



**Figure 3.2: the upstage of *Coco Chanel*.**

dramaturgical function for himself in the performance (playing a character that exists next to the character of the puppet in the fictional world); and second, this puppeteer must ensure that he himself becomes 'puppetised' and that the puppet he plays becomes humanised. *Coco Chanel* shows us, however, that it is not only the craftsmanship of the puppeteer that makes both him and puppet become co-present but that the dramaturgical construction of the interactive relations between the two also ensure for this co-presence.

In *Coco Chanel* three human performers are constantly on stage, playing maximally two puppets at the same time. There are more than six different puppets that they play and, as said, sometimes props such as mannequin legs are used to depict a living creature. Important to notice is that not all puppets and performers are at the same time part of the fictional world that this performance constructs.<sup>2</sup> In one scene, for example, the puppet of the young Coco Chanel, played by two puppeteers, has a conversation with the puppet representing Jean Cocteau, played by the remaining puppeteer. In this particular scene, the two puppets become fictionally present whereas the puppeteers do not. In another scene, one human performer acts as if walking up and down the runway, whereas the puppet of the widow Coco Chanel, which is played by the other two puppeteers, looks at and interacts with her (see figure 3.4). In this situation, the first performer becomes an actor on her own and, together with the puppet of widow Coco Chanel, becomes present in the fictional world whereas the remaining two puppeteers do not. In yet another scene, a puppeteer plays the puppet of corpse Coco Chanel, which tries to loosen the corset its puppeteer wears (see figure 3.3).

<sup>2</sup> This is presence in the sense of Cormac Power's fictional mode of presence. See again subsection 1.1 in chapter 2.





**Figure 3.3: the puppet of corpse Coco Chanel, loosening its puppeteer's corset, in front of the patchwork blanket.**

When the corset is completely untightened, the puppeteer, together with her puppet, falls to the ground, unable to move at all. Through her own actions, the puppeteer in this scene makes herself part of the world in which the puppet is present. When we in this respect take a look at presence in terms of dramaturgical functions, we see that in *Coco Chanel* the human performers sometimes become present in Power's literal mode, but sometimes (also) obtain fictional presence when stepping into the fictional world the performance constructs. In that case, these human performers assign an additional dramaturgical function to themselves: apart from being puppeteer, they also become a character in that fictional world — one of Piris's two conditions for becoming co-present.<sup>3</sup>

When we thus take a look at the examples of *Coco Chanel* I discussed above, we clearly see the puppeteers' craftsmanship at work: they play their puppets and sometimes play a character in the fictional world — even simultaneously in the case of the corpse and the corset. Paul Piris would argue that this is enough for becoming co-present. However, I would argue that it is not (only) the puppeteer's craftsmanship that facilitates this process of becoming co-present: the construction of the interactivity between the puppet and the puppeteer, as part of the performance's dramaturgy, puts the puppet in a position that offers the opportunity to become a character at all, and *therefore* co-present. Becoming a character then is the result of the interaction between the puppet and other human performers (whether puppeteer or actor), and is not (only) a matter of the craftsmanship of the puppeteer. I would

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<sup>3</sup> We will see in the next section that Piris's other condition — puppet becomes humanised and puppeteers becomes 'puppetised' — is also met in this performance, but not as part of the puppeteers' craftsmanship.



**Figure 3.4: the performer who walks the runway is being dressed.**

thus argue that for becoming co-present not only the puppeteer's craftsmanship is important but also the performance's dramaturgy, as the constructed set of interactive relations between staged entities: for because of that dramaturgy the puppets in *Coco Chanel* are able to transform into agentive objects.

### **§1.2 | The uncanniness of both puppet and human performer.**

In the second section of chapter 2, I discussed Meike Wagner's argument that a puppet can become an agentive object as an effect of the mediation of the puppet's body. This leads to an ambiguity in the staged body of the puppet: it can be simultaneously considered a live, present body and a non-living representation of a human being. Through the medial operation of staging, this dead but live object body of the puppet is juxtaposed with the representation of a living but absent body representation. By incorporating this ambiguity, the puppet gets inscribed with an irritating image of the *Other*. This irritation can be described in terms of the uncanny: the uneasy feeling someone can get because he doubts whether something is alive or not and how this something relates to being human.

The puppets in *Coco Chanel* have semi-anthropomorphic (thus human- but not yet life-like) qualities, as we can see in figures 3.1, 3.3 and 3.4. Their faces are stylised and whiter than average, but are made complete with a mouth, nose and eyebrows. The puppets' torsos are as their human counterparts would be, although they are empty and need to be filled with the puppeteers' limbs in order to come alive. As a result, the figures of Coco Chanel and Jean Cocteau are clearly depicted in this performance, although legs are missing. But this is not how all characters in *Coco Chanel* are animated: as said, the puppeteers sometimes use only





**Figure 3.5: the skull placed on widow Coco Chanel's torso.**

mannequin legs to represent a character, or they put a hat on top of their upraised arm. However, mannequin legs are human-like after all and a hat is also a very human accessory, so I would argue that the parts of this composed puppet mosaic bear something human as well; through a minimal representation of their bodies, these characters depict human beings.

These body parts, however, are constantly decomposed and mixed in order to form a new composed body. In one scene (see figure 3.5), the puppeteers separate the widow Chanel's chattering head from her torso, putting it in a designer purse and replacing it with a (human) skull that tries to speak; but its voice is drowned out. The spectator is invited to understand the theme of decay but before he can become aware of that, the skull is replaced again with Chanel's 'old' head. This process of composing body parts into one animated whole, and subsequently decomposing and mixing them in order to be able to create another body mosaic can evoke uncanniness: when I visited this play on a rainy evening in Deventer, several people walked out on the performance at precisely these moments. This is not that strange: the performance produces a world that invites the spectator to accept objects as human-like

creatures, but when these creatures are in a very non-humanly way decomposed into different body mosaics a dismal sight is produced.

Moreover, not only the human-likeness of the puppets facilitates this feeling of uncanniness; also the object-likeness of the human performers. When the three human performers step out of their role as puppeteers and become characters themselves, they do not act as human characters would. I already mentioned the performer who walks up and down an imaginary runway but instead of imitating a model's usual gestures and way of walking, she acts rigid and tight — robot-like. Suddenly (see figure 3.4), she stands still and like a lifeless mannequin she gets dressed by both another human performer and the puppet of widow Coco Chanel which is played by the last remaining human performer. The sight of her face is blocked by the brim of an enormous hat, making it seem as if she does not have a face at all. Her human qualities torn down; she has become an object.

This growth towards each other of both human and object, ending somewhere in between where human characters behave like objects and objects behave like humans, I would argue, fuels the feeling of uncanniness.<sup>4</sup> *Coco Chanel* seems to constantly toy with this feeling by playing with the live and mediatised quality of the bodies of both puppets and human performers: in fact, not only the decomposition of the human-like puppets can be considered uncanny but by stepping out of their role as puppeteer and into the fictional world as object-character, stepping out, and stepping in again, the human performers become uncanny as well. This uncanniness, however, is evoked in this performance as a deliberate strategy. In this way, Chanel's fascination for creating fashion — working with objects, mannequins, fabrics — finds its way in the characters that are used in this performance. Ulrike Quade Company even mentions this in the performance's promotion: "[t]he performance *Coco Chanel* seeks to investigate the influence fashion has on our society; how a costume becomes a body and how a body becomes a puppet" (Ulrike Quade Company 2017c.)

### §1.3 | Multiplication of frames.

*Coco Chanel* is extremely fragmentary but the sketched on-stage world is unified by the usage of a narrative. With respect to this fragmentation in theatre, Maaïke Bleeker refers to Hans-Thies Lehmann who in his *Postdramatic Theatre* defines a performance's unity in terms of *framing*.<sup>5</sup> She paraphrases Lehmann by arguing that theatre performances can be unified by a *dramatic* frame, which provides "coherence in view of purpose and reason and shows the world according to invisible beliefs about world order, history and reality" (2011,

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<sup>4</sup> This is one of Piris's conditions for achieving co-presence, and therefore an argument in favour of the idea that puppetry is always uncanny — after all, in puppetry co-presence is always at stake.

<sup>5</sup> Lehmann talks, in his German text, in this respect of *Rahmung*.

41). This logic offers a "totality" to the spectator, a unified world that he can easily enter. Lehmann argues in this respect the following: first, the logic of a dramatic frame frames what is offered to the spectator to be seen; second, that logic makes the spectator interpret the world presented — however abstract or fragmentary — in terms of a unity; and third, that logic persists as a symbol of a total and unified world (Lehmann 1999, 288).<sup>6</sup> In this sense, the imagined world that can be evoked by a performance can be classified as a representation of a world; the "symbol" Lehmann mentions.

A dramatic frame therefore ensures that everything in it appears as non-ambiguous. However, in *Coco Chanel* this is not the case: every staged element can be interpreted in many ways. With regard to performances that provide multiple possibilities for interpretation, Bleeker refers to Lehmann again who classifies this characteristic as part of *postdramatic* performances, as opposed to dramatic ones.<sup>7</sup> In postdramatic performances, Bleeker argues, "the unifying perspective provided by dramatic [...] theatre is deconstructed and replaced by other frames, or rejected all together [...]. The result can be ambiguous and often confusing experiences" (Bleeker 2011, 43). These performances thus do not offer their spectators a dramatic frame but rather a "multiplication of frames" (44): they invite the spectator to interpret every staged element in a multitude of ways.

In the context of *Coco Chanel*, one frame that is part of this multiplication is the performance's narrative. As I mentioned in the beginning of this section, a narrative (slightly) unites the different fragments of *Coco Chanel* and evokes an imagined world in which Chanel's life story is depicted. In Lehmann's terms, this world is unified in the sense that it provides fragments that function according to a logic of purpose and reason: the characters in this narrative seem to act according to a logic that their human counterparts would follow if they existed in the world outside the theatre. Although fragmentarily skipping back and forth through different parts of her life and even after her death, this logic seems to function as a guidebook that unifies what is staged, which offers the spectator an entrance to crawl into this history of Coco Chanel.

However, we have to acknowledge, this is not entirely the case. For example, outside the theatre bodies cannot be composed and decomposed then happily start moving again —

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<sup>6</sup> The original, German text by Lehmann is as follows: "Ob das Drama an verschiedenen Plätzen einer *Simultanbühne* spielt wie im Mittelalter, in der Mehrfachdekoration, dem 'decor-multiple' der Renaissance, oder im typisierten Einheitsraum-Palast (palais à volonté) des Klassizismus, ob es vor dem Hintergrund des barocken 'Schau-Platzes' für das Weltgeschehen oder im Kraftfeld eines naturalistischen Milieus stattfindet, das die Handlungen der Menschen vorab zu determinieren scheint, ist demgegenüber von untergeordneter Bedeutung: stets bleibt der dramatische Raum separiertes Symbol einer Welt als Totalität, sei diese auch noch so bruchstückhaft dargeboten" (original emphasis).

<sup>7</sup> In the introduction I already touched upon postdramatic theatre. For more information, see footnote 14 in my introduction or Lehmann 2006.



which shows that *Coco Chanel* also presents other frames to the spectator apart from a narrative. Both staged objects (puppets, but also mannequin legs et cetera) and human beings can be interpreted in different ways: as things, as human-like creatures, as humans, as part of the spectator's here-and-now, as part of the imaginary world — and that is why the objects and humans in this performance can become co-present and uncanny, as we have seen in the previous subsections. Therefore, we can conclude that a multiplication of frames is at stake in *Coco Chanel*. Moreover, this multiplication ensures that the staged objects used can transform into agentic objects and become ontologically ambiguous, because of the simple fact that it provides the spectator with a framework in which these objects can indeed be both thing and agent at the same time. The narrative, as one of the multiple frames presented, reinforces this transformation and ambiguity because it offers an environment in which the objects can act as characters and therefore make sense as agents. A multiplication of frames which offers the spectator multiple points of view from which to interpret what he sees can thus aid in an object's transformation from a lifeless thing into an agentic object.

## §2 | A Two Dogs Company / Kris Verdonck's *I/II/III/IIII*.

The second performance I discuss in this chapter is *I/II/III/IIII*, directed and created in 2007 by the Flemish artist Kris Verdonck and reprised in 2017 under the flag of A Two Dogs Company. Verdonck's works are generally positioned between theatre, visual arts, installations and architecture, and they often show projections or constructions (A Two Dogs Company 2017c). The staging of *I/II/III/IIII* is likewise: the performance starts with a woman hanging in the air, connected to a large cable that leads upwards, facing her back towards the audience. Under accompaniment of slow piano music, she is lowered and turned around. She lets her weight rest on her feet and by doing so she slowly falls to the ground (see figure 3.6 on the next page).<sup>8</sup> Then, the entity above the stage drags her sideways, over the floor, and suddenly pulls her into the air. Because of the speed of the upward force, the woman turns an enormous amount of pirouettes before coming to a complete standstill. In the air and on the ground, hanging upside-down or sideways, the woman tries to fulfil her choreography but the invisible machine in the fly tower constantly draws on her, pulls her, drags her and pushes her into other directions. The movements she makes recall animal carcasses in abattoirs, angels reaching for the skies, collapsing dishcloths — by all means, they are nauseating and one thought persists: the woman has no control over the machine and has surrendered to its will. At one moment in midair, she folds up herself as if she wants to protect herself from

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<sup>8</sup> Pictures of *I/II/III/IIII* do not totally grasp what goes on in the performance, as movement is an explicit and important part of it. Unfortunately, I cannot attach a video to this written thesis. For those who want to know how this performance really comes about: a reprise of Verdonck's *I/II/III/IIII* will be in Dutch theatres until December 2017.



Figure 3.6: the first dancer in *I/II/III/IIII*, lowered by the machine.

what happens to her (see figure 3.10 on page 71). But there is no escape: all she can do is perform her dance, biding her time while awaiting what the machine will do with and to her.

Then, her choreography and the machine's movements end. The woman is dragged backstage, the lights turn off and sounds of metal on metal are heard. When the lights turn on again, two women are chained to the machine, wearing exactly the same dress. The accompanying music is slow again but different than before. The women perform the same choreography as in the first act of the performance, similar to each other, but now they must not only take the machine into account but also the proximity of each other. When the machine suddenly moves, the forces then released sometimes make the two women bump into each other or disturb each other's choreography in another way.

As the name of *I/II/III/IIII* already suggests, after this second act two other acts are performed with three and four female dancers, respectively. The more dancers chained to the machine, the more difficult it becomes for them to stay in sync (see figure 3.7 on the next page). However, them succeeding in doing so yields beautiful images, as we can see in figure 3.8 on page 69. At the end of the performance, the curtain call surprisingly includes not only the dancers but also two previously unseen technicians. It turns out that these two technicians were responsible for remote-controlling the machine the women were chained to.

## **§2.1 | The uncanny illusion of autonomous agency.**

In puppet theatre, the puppet's body can be perceived as Other because of the ontologically ambiguity of it being simultaneously a present and presented object-body and an absent and represented subject-body. In *I/II/III/IIII*, the machine does not refer to anything it could represent but yet acts as an entity the dancers have to cope with: they have to collaborate and



**Figure 3.7: all four dancers, unable to stay in sync.**

interact with it in order to perform their choreography, because the machine determines to a great extent how they are able to move. In that way, the women are to a great extent bound to the machine's will: when it moves, the women cannot do anything but await what that movement means for their own choreography. The machine obstructs in that way; for example, it forces the women to sit down or hang upside-down in midair, and it does not let them fall down full-speed but rather lowers them at a very slow pace. On the other hand, the dancers need the machine in order to make their movements, which means that they cannot just wait and see what happens, but must anticipate in order to be ready when the machine makes a move they can benefit from. In this way, the collaboration between the dancers and the machine is a very peculiar one: a collaboration that can only exist when both parties try to find the right balance.

This all emphasises the seemingly autonomous actions of the invisible entity in the fly tower, and therefore the agency it seems to have: the performance provides the image of women chained to a machine, surrendering themselves to its will and actions. This constellation gives rise to an irritating, uncanny image of an Other: it is dismal to look at dancers who want to perform choreography, but who are unable to do so because they cannot control their own movements. The machine drags, pulls, drops and pushes, while the women involved have to work very hard in order to handle the machine's strength. The spectators witness this physically exhaustive activity as the women start to breath more heavily and sweat more excessively. In addition, as we can see in figures 3.6, 3.7 and 3.8, the machine is kept out of the spectator's sight: light is only shone on the women who perform. Sometimes, inevitably, the spectators can see a cable going into the darkness aloft or the rig in which the dancers are locked, but the actual machine is never, explicitly, highlighted. The spectator can, however, clearly notice that there is something which the dancers are chained to: the machine 'expresses' itself when the moving construction of metal and steel creaks, squeaks



**Figure 3.8: all four dancers, able to stay in sync.**

and screeches. Moreover, when I visited *I/II/III/IIII* in Amsterdam the light during the third act was accidentally much brighter than in the first, second and fourth, which made me see the machine working above the dancers.<sup>9</sup>

This staging of a mysterious, invisible but perceivable, agentive entity results in images in which the women look like will-less creatures, unable to act, seemingly protecting themselves from the harm that is done to them by the overpowering machine (see figures 3.9 on the next page and 3.10). Because the women look will-less, the agency and will of the machine is emphasised: because the women seem to be surrendered to it, the machine looks like it can do whatever it wants. This facilitates the doubt that underlies the spectator's feeling of uncanniness, which I discussed in the previous chapter: if the machine in question has more to say and more to bring in regarding agency in this choreographic pas de cinq than the human dancers, it could be considered alive and having its own will. However, machines usually do not have a will nor are they alive, which facilitates precisely the uncanny.

The uncanny is thus at stake in this performance. Just as in *Coco Chanel*, this is deployed in *I/II/III/IIII* as a deliberate strategy: as mentioned in the introduction to this section, Verdonck wants to investigate whether more chaos or more order is accomplished when the number of "marionettes" connected to the machine grows (A Two Dogs Company / Kris Verdonck 2017b). Marionettes are entities that are controlled by a greater power, so considering

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<sup>9</sup> For writing this thesis, I had access to a video registration of the original 2007 performance of *I/II/III/IIII* in which no extra light was visible during the third act of the performance. There is a possibility that Verdonck deliberately changed his light plan for the 2017 reprise of *I/II/III/IIII*, and that the change of light was therefore not accidental.



Figure 3.9: one of the dancers, hanging in midair.

his dancers in these terms points at the fact that Kris Verdonck wants to highlight their willlessness. Furthermore, the 'trick' of this seemingly autonomous machine is deliberately kept secret until the end of the performance, because only then the two tele-operators appear on stage to receive their applause. In this way, an uncanny feeling can be evoked in the spectator's mind, bolstered by a doubt originating from this performance's construction to convey the illusion of the machine possessing autonomous agency.

## **§2.2 | Expansion of body schemas.**

We have seen in the previous subsection that *I/II/III/IIII* does not lean upon a dramatic framework through which the spectator can interpret the performance in order to trans-





Figure 3.10: two dancers folded in a protective pose.

form the machine into an agent. All the performance does is present a machine and four dancers on stage who perform choreography together. There is no narrative and no historic or fictional context given nor is it necessary to interpret what is shown in terms of this context: this performance presents what happens when different numbers of dancers are connected to a machine they are not in control of and perform choreography.

So when it's not dramatic framing, what then makes the machine transform into an agentic object and become uncanny? In order to give an answer to this question, we need to take a closer look at the specific set of relations constructed in this performance. We now know that the machine in *I/II/III/IIII* is actually remote-controlled by two invisible tele-operators, so we also have to revise the relations between the entities at stake in this performance: until now, I talked about the relations between the machine and the dancers, but with these tele-operators entering the picture we must now consider the relations between them and the machine as well. We could argue that the tele-operators are puppeteers<sup>10</sup> of a gigantic puppet — the machine they control — which in turn interacts with the dancers, because the operators 'play' their machine in the same way as puppeteers play their puppets. Without tele-operators, the machine would not have been animated and would not have done anything in the performance.

An important difference between the puppeteers we encountered in *Coco Chanel* and the tele-operators of this machine, however, is that the puppeteers in Ulrike Quade Company's performance are constantly present on stage. The tele-operators in *I/II/III/IIII*, hidden some-

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<sup>10</sup> Recall that I, in chapter 1, quoted Hoffman, Kubat and Breazeal (2010, 359) who argued that a tele-operator of a robot can be considered a puppeteer.

where backstage, are not. It makes therefore sense to ask the question what consequence this complication has in terms of co-presence. In the previous chapter we saw that Paul Piris argues that in order to become co-present a puppeteer expands his body schema to also include the body schema of the puppet. In that way, the puppet and puppeteer appear as one body schema, which facilitates these entities becoming co-present.

In *I/II/III/IIII*, however, the operator-puppeteers do not expand their body schema to include the body schema of the machine — at least not in terms of co-presence because the tele-operators are not staged. I would argue that another relation is at the root of co-presence in this performance: the relation between the machine and the dancers. The women are chained to the machine and therefore part of it, which ensures that their movements — as theatrical signs — are also part of, decided by, and a result of the actions of the machine. This expands their body schema, because they also include the machine in it. As the result of the mutual relation between these physically connected staged entities in which the machine determines how the women must react while the women's reactions confirm the machine's agency, I would argue, the machine and dancers become co-present. In that way, and as an elaboration on Piris's theory, it does not matter that the machine's puppeteers remain invisible and do not become co-present with the machine; because the machine becomes co-present with the dancers who are chained to it, it still can obtain agency. *I/II/III/IIII* therefore shows that co-presence can also work in a different way than Piris indicates, a way that involves the body schema of staged human beings who do not take up the role of puppeteer. Apart from the fact that the machine conveys the illusion of having autonomous agency as it seems to be able to influence the dancers' choreography on its own, we can thus also argue that both the seemingly autonomous agency of the machine and the construction of the women's reactions to the actions of this machine make these entities part of each other's body schema. Therefore, they can become co-present, which makes the machine transform into an agentive object.

### §3 | Staging two sets of relations.

With this discussion of *Coco Chanel* and *I/II/III/IIII*, I have brought to the fore two practical instances of the staging of a set of relations between human and non-human agents. In particular, I have shown how these relationships are constructed by the dramaturgy of both performances, and how they facilitate the transformation of the objects that they stage into agentive objects.

We have seen that puppeteers and puppets in *Coco Chanel* become co-present together because of the interactive relationships that are *constructed* between them. This nuances not only Erika Fischer-Lichte's idea of having-presence as a characteristic that a staged enti-

ty can possess which we encountered in the previous chapter, but also Paul Piris's ideas about co-presence itself. We have seen that it is not only a puppeteer's craftsmanship that facilitates the emergence of co-presence, but that the staging of relations between puppeteer and puppet facilitate becoming co-present as well. Because of this co-presence, the puppet can transform into an agentive object, something to which the dramaturgy of a performance thus also contributes. Furthermore, my discussion of *I/II/III/IIII* yielded another nuance on Piris's theory about co-presence, as we have seen that the extension of the *body schema* — which Piris attributes to the puppeteer — can also be attributed to other staged entities: the dancers and machine in this performance form one body schema, which makes both co-present and in turn emphasises the machine's agency. In this respect, it is not only important to consider what the machine exactly does, but also how the machine's actions are emphasised by the reactions that the other entities included in its body schema — the dancers, in this case — give.

In terms of the uncanny, we have seen that these two performances nuance the in robotics prevalent view of Masahiro Mori on the uncanny valley, as they indeed show — in accordance with my findings in chapter 2 — that the uncanny does not have to be avoided and can be deployed as a *deliberate performance strategy*. *Coco Chanel* is constructed in such a way that the object-likeness of the human performers and the human-likeness of the objects used is emphasised. At the same time, these human-like objects are decomposed, mixed, and composed again into different body mosaics over and over again — something that cannot happen to 'real' human beings. This produces an uncanny image that is used as part of the performance's search for how fashion can become a body and how a body can become fashion. In *I/II/III/IIII*, the uncanny is achieved by providing the spectator with the illusion that the machine possesses autonomous agency. The intentional choice to hide the machine's teleoperators backstage makes the machine appear as a self-deciding creature, which is used as a strategy to ask questions about agency and will.

In *Coco Chanel*, lastly, we have encountered a *multiplication of framing*: the performance offers its spectators multiple frames that invite them to interpret what is there to be seen in multiple ways. The performance's staged entities — human and object — can all be interpreted as both human and object, for which multiple frames are necessary. In addition, as part of that multiplicity of frames, a narrative is provided that invites the spectator to interpret the objects as characters that act within that narrative, and that therefore makes them appear as agentive objects. Framing as encountered in *Coco Chanel* therefore nuances the notion of mediation as discussed in chapter 2, because it shows that apart from the performative context or the bodies of staged entities, the performance's dramaturgy — of which the multiplication of framing is part — should be considered with regard to mediation.



Apart from the additions and elaborations on my findings in chapter 2, we can conclude with respect to the aspects of theatre that I discussed in chapter 1 that the construction and staging of a particular set of human-object relations are highly important to consider when talking about agentive objects. In chapter 1 we already encountered the notion of dramaturgy, but only in the specific understanding of designing a robot in such a way that its effects on the interaction between a human interaction partner and itself are taken into account. The discussion of these two performances however shows that dramaturgy must also be considered because it — as the construction of a staged set of relations — is at the core of an object's transformation into an agent. Furthermore, we have seen that object theatre stages sets of relations in which objects obtain agency. In contrast to my findings in chapter 1, we can conclude that these objects do not have to be anthropomorphic or lifelike *per se* in order to be able to do so, because we have seen that partly human-like puppets and a non-anthropomorphic machine are perfectly able to transform into agentive objects.

# Conclusion

## OBJECT THEATRE AS PERSPECTIVE FOR HRI DESIGNERS.

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A roboticist we meet is working on the design of a particular social robot: X. X is a rather strange-looking creature; it looks like an outsized red marble. A complex system of weights inside the orb enables X to move. The roboticist is trying to find ways that enable its creature to not only move but also interact with others — human beings, other spheres, other robots, other objects — through those movements. As a matter of fact, he deliberately designed X in an ambiguous way: when it is not moving, it just looks like a red marble and does not display its agential qualities at all. It may be uncanny when this object suddenly starts to move and tries to enter into a relationship with a human being present, yet that is precisely what this roboticist wants to overcome. Humans, he proposes through this design, must become aware of the fact that they are able to relate to both human and non-human entities and that these entities can also start searching for this rapprochement. Meanwhile, he is aware that in order to achieve this ideal he must not only take X's design as a red, moving marble into account but also the interaction that he designs through X. For him, it is more important to construct a specific relationship between this red orb and its human interaction partner than is the design of X itself.

This is how I envision a social robot design that incorporates aspects of object theatre, which I have discussed throughout this thesis. In the previous chapters, I have elaborated on the worlds of robots and staged objects in quite separate terms. Now it is time to draw up the balance sheet: what does combining these three chapters imply for the design of social robots? In this conclusion, I argue for what reasons object theatre — theatre in which relations between objects and human beings are staged — can be in a less anthropocentric way inspirational for the design of social robots and human-robot interaction. It is not that I provide a completely different conception about how social robots and HRI could or should be designed but I show how object theatre can offer a different perspective on these designs, compared to the theatre perspective presented in chapter 1.

In order to argue how I think constructed, staged relations between humans and objects are inspirational for social robot design, in the first section of this conclusion I briefly summarise what was argued in the previous three chapters. In this section, I already connect my observations to the field of social robotics. Following this, I can more easily explain in the second section how I see object theatre as inspirational for social robot and HRI design. In the third section of this conclusion, lastly, I point out what kind of further research this thesis can lead to.

## **§1 | From robots to puppets to objects.**

In the first chapter of this thesis, we saw that roboticists use theatre in their research for two particular reasons. First, these roboticists argue that a theatre setting can help them to improve the social robots they design. They argue that in such a *testbed* setting an audience can provide feedback on the HRI it has been shown. As additional benefit, people who are involved in such a 'testcase audience' can be familiarised with the sometimes still unfamiliar characteristics of HRI.

Second, they argue that theatre can help when thinking about a social robot as a performer that needs to credibly convince its interaction partner to reach a particular goal. In theatre plays, the same is at stake: directors try to design their performance in such a way that the agency of the (human) characters drives them towards something: saving a princess, taking revenge on an opponent or finding love. Theatre, we have seen, functions as a *model* here, one for shaping human-robot interaction.

However, by pointing out these aspects of theatre, these roboticists only use a specific form of theatre, I argued: theatre in which human beings are key and in which the relationships between human beings are staged. Roboticists, in this way, seem to design social robots that are able to *pass for* human beings. Furthermore, they make a theatre setting in which the spectator is spectator only and must be convinced of the mutual interaction between the

staged HRI partners equal to an HRI situation in which the spectator is interaction partner as well and must be convinced by the autonomous robot alone.

To argue that objects can also become credible interaction partners without them passing for human beings, I shifted focus in the second chapter to a class of theatre in which relations between human beings and objects that can transform into *agentive objects* are staged. We encountered in the body of knowledge regarding puppet theatre two different perspectives to look at the transformation of a puppet into an agentive object and two implications of that transformation.

We can describe the first perspective in terms of *presence*. The complex constellation of relationships between puppets, puppeteers and human actors shows, puppetry theorists argue, that presence is not something that a staged entity possesses but rather emerges from these relations. According to Paul Piris, one of those puppetry scholars, puppetry performances stage *co-presence*: a particular form of presence through which a puppet can obtain agency. Moreover, we have seen that puppetry theorists observe that not only relations between staged entities are constructed in puppetry performances but also relations between the staged world and the spectator. This process of *mediation* invites the spectator to consider the puppet as Other, as an entity he can relate to in terms of his own body. By doing so, they argue, he attributes agency to the puppet, which enables the puppet to appear as agentive object.

An implication of this transformation into agentive object we encountered, is that the puppet becomes *ontologically ambiguous*: it becomes thing and agent at the same time. This, as a second implication, can evoke an *uncanny* feeling in the spectator since he may start doubting whether the object at stake is alive or not. We have seen that puppet theatre makers include both the ontologically ambiguous and the uncanny as deliberate strategies in their performances.

The discussion of *Coco Chanel* and *I/II/III/IIII* — as two practical constructions of a set of relations — allowed me to sharpen and nuance these notions of (co-)presence, mediation, ontological ambiguity and the uncanny. Both *Coco Chanel* and *I/II/III/IIII* showed us that co-presence indeed is something that emerges from the staged relationships between objects and human beings. *Coco Chanel* showed us that co-presence is not something that is evoked by the craftsmanship of the puppeteer alone; I argued that also the performance's construction of the relations between puppet and puppeteer enable these entities to become co-present. Furthermore, *I/II/III/IIII* showed that co-presence is not necessarily something that needs to

emerge between object and animator: I have showed that in this performance the object and human dancers become co-present by including each other in their *body schema*.

In terms of mediation, I talked with respect to *Coco Chanel* about a *multiplication of framing*: this performance, I argued, offers multiple frames that invite the spectator to interpret what he sees from different points of view. In that way, the puppets used can simultaneously be a thing and a character that functions within the narrative that this performance stages. This multiplication is a construct that belongs to *Coco Chanel's* dramaturgy so, with respect to mediation, I argued that instead of only looking at the performative context or the puppet's body as Other — as Meike Wagner proposes — the construction of the performance, its dramaturgy, should also be considered.

With respect to the uncanny, we have seen that both *Coco Chanel* and *I/II/III/IIII* steer the spectator towards this particular effect and therefore include ways to evoke this uncanniness as a *deliberate performance strategy*. *Coco Chanel*, I argued, is constructed in such a way that the performance emphasises the human-likeness of the puppets used and the object-likeness of the human performers. However, things are done to the bodies of these puppets that cannot be done to bodies of human beings in the world outside the theatre — which in turn facilitates the uncanny. In *I/II/III/IIII*, the machine that determines the dancer's movements conveys an illusion of autonomous agency which is achieved by hiding the machine's operators from the stage. In addition, the machine is not deliberately highlighted, which makes the agent even more mysterious. Both elements steer towards the uncanny.

When we now compare my findings from chapters 2 and 3, we see that they are for four reasons different from or an elaboration on my findings from chapter 1. First, in chapters 2 and 3 I exposed the *relationships that staged objects enter into with human performers* as the basis of these objects' transformations into agentic objects. We saw in chapter 1 that roboticists seem to assume that robots, once anthropomorphically designed, possess innate agency; the object theatre framework I proposed, however, shows that a staged object can obtain agency when it enters into relationships with others. Second, we have seen that the *construction of this set of relations* — part of the performance's dramaturgy — not only imposes particular effects on the spectator, as some roboticists already seem aware of, but also is at the core of how things can transform into agentic objects. Third, we see that roboticists tend to design anthropomorphic robots because, according to them, humans can more easily interact with creatures that look like themselves. In contrast to this observation, my findings in chapters 2 and 3 show that objects *do not have to be anthropomorphic per se* in order to be able to obtain agency and interact with human beings. While it is of course possible to design them anthropomorphically, this is no necessity. Fourth, object theatre makers

design and stage their objects in such a way that they *deliberately become ontologically ambiguous and uncanny*. Instead of trying to avoid this like roboticists seem to do, these makers include this often inevitable ambiguity that can lead to uncanniness as a strategy in their performance designs. Including the ontologically ambiguous and the uncanny in puppetry performances contrasts, however, with roboticists who try to avoid the uncanny: they argue, in accordance with Mori's uncanny valley, that by avoiding the uncanny in their designs humans can more smoothly interact with these robots.

## §2 | A source of inspiration.

As the upshot of this thesis, I give two reasons below as to why an object theatre framework can be inspirational for roboticists when they design social robots that must be able to induce the illusion of credible interaction partners. In particular, I show why it is useful to acknowledge to a greater extent than now prevalent in the discourse the complex relationships that a social robot can enter into. Subsequently, I propose to consider four different perspectives, originating from the differences between chapters 2 and 3 on the one and chapter 1 on the other hand which I discussed above, that can be included in actual social robot and human-robot interaction design.

The first reason why I think object theatre can be inspirational is that in object theatre agentive objects are central, *which social robots are as well*. Social robots have similarities with theatrical agentive objects, let's say the puppets used in *Coco Chanel*, because they must be animated in order to come to life but also because, once animated, the robot appears as an Other of which the Otherness is doubly emphasised: the live body of the robot that the human being interacts with is juxtaposed with the mediated body of the robot which bears a pre-programmed or tele-operated 'mind' that shapes the actions the robot performs. By doing so, an ambiguity originates in the robot, which makes it possible for the human interaction partner to perceive and understand this creature as both thing and agent at the same time. When looking at social robots in this way, we acknowledge the complex nature of these creatures and therefore the fact that a social robot is more than an entity that only expresses: it also addresses its interaction partner, from which follows its agency.

The second reason, following from this agency, is that the staged relationships that theatrical agentive objects enter into *can be transposed to human-robot interaction*: in such a setting the social robot can be compared with the puppet (both agentive objects); the puppeteer with the roboticist who programmed or the operator who tele-operates the robot

(both animate and manipulate the robot)<sup>1</sup>; and the human actor with the human being whom the robot interacts with (both are the agentive object's interaction partner). It is important to acknowledge in this respect the complexity of the relationships between human beings and social robots which expresses itself in different ways: the robot is, as said, an ambiguous creature that can appear as both object and agent; the manipulator of the robot, albeit pre-programmed or tele-operated, is often not visibly present in an HRI situation; and the human partner simultaneously plays the roles of both interaction partner and spectator of that interaction.

In order to endorse these complex relationships in social robot and HRI design, I would argue that it is firstly important to consider *in what framework a social robot functions*. A staged human-robot interaction, for example a testbed setting as we encountered them in the first chapter of this thesis, works within a theatrical framework in which an imagined world is shown that includes the particular interaction that takes place. Although a human-robot interaction in a 'real life' setting does not work within such a theatrical framework, I would argue that mediation does take place between the pre-programmed goals and actions that the robot performs on the one hand and its physical appearance or body on the other. Therefore, we can still talk about framing the mediation of the robot in a particular context. What this framework actually consists of is a hypothetical as-if situation in which the robot seems to have autonomous agency — because no robot exists yet that can transcend the illusion of sovereignty. Social robots must follow certain programming or code that is put in them by their programmers and therefore their actions follow a specific, predictable template. Because these programmers, just like the operators in *I/II/III/IIII*, are not visibly present during the interaction, the illusion of autonomy is kept up. Roboticists, I would argue, should be aware of this particular framework while designing HRI because by including it in their designs they can better frame these pre-programmed goals and that leads, hopefully, to a better achievement of those goals.

How this then can be done is by considering *the dramaturgy of a social robot and to a greater extent the implications this dramaturgy has for the HRI in particular*. This means two things. On the one hand, it makes sense when a robot designer designs his creatures in such a way that they can clearly carry out what their goals and purposes are, so that the human interaction partner can interpret and understand why a robot does what it does. As said, we can consider a robot an agentive object, and this agency can only be carried out if the intentionality of a robot's agency is clear to the person the robot is interacting with. On

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<sup>1</sup> Although a roboticist manipulates its creatures indirectly, we can argue on the basis of chapter 3 that the robot can still become co-present with its human interaction partner, just like the machine in *I/II/III/IIII* becomes co-present with the dancers. In short: it is not necessary for achieving co-presence that the manipulator is present in the interaction situation, which ensures that also a social robot can transform into an agentive object.

the other hand, it makes sense that a robot designer also includes the position of the human interaction partner in his design process, making him not only a designer of the objects that social robots are but also the constructor of the set of interactive relationships that emerge between social robot and human being: the human-robot interaction. A dramaturgical perspective helps here to build a framework in which the HRI functions, and to acknowledge the fact that also the human interaction partner determines the outcome of the interaction.

Third, because a social robot is not a human being nor a representation of a human being and because framing can help in making a non-anthropomorphic robot human-like, I would argue that it is good to acknowledge *the misguided focus on developing anthropomorphic robots: I/II/III/IIII* showed us that even a completely non-anthropomorphic machine can be considered as agentive object and also the puppets in *Coco Chanel* become agents although they are not completely anthropomorphic. Social robot designers could in this regard, I would propose, follow an approach several robotic art designers already have devised. Artists like Petra Gemeinboeck and Rob Saunders (*Accomplice*, 2013) and Jondi Keane and Charles Anderson (*Technics and Touch: Body–Matter–Machine*, 2016) have already experimented with non-anthropomorphic designs in which the objectness of robots that are meant to interact with people is affirmed. Monitoring these (artistic) developments and collaborating with artists to incorporate their insights in social robot design can, I think, work very well for considering alternatives for anthropomorphic social robot design — alternatives that do not centralise the human being in human-robot interaction but rather emphasise the necessary participation of both human being and social robot in order to make the interaction happen.

Fourth, we have seen that an agentive object always can (and maybe will) supply an uncanny image of the Other, and that this is a deliberate part of the performances I discussed in chapter 3. This is also important to consider with respect to social robots and HRI, as *in some designs the inclusion of the uncanny might be very fruitful*. Roboticists may deploy the uncanny in their designs for, for example, reaching a broader range of interaction possibilities. The uncanny in that way functions as a strategy that can be deliberately deployed and is not something that should be avoided at any price, something that Mori's uncanny valley prescribes. This can also be a way to build on the artistic projects I mentioned in the previous paragraph, since the uncanny is, as we saw in the previous chapters, a strategy that is often included in artistic projects that include agentive objects.

### §3 | Reflection.

In this thesis, I have tried to advocate for the interdisciplinary connection between two different research fields: theatre and social robotics. The underlying premise was to show that



theorising theatre is not only useful in the context of performances and other theatre-related utterances, but also in other contexts. Theatre scholars should try to extend the limits of their thinking to the world around them, I would argue: they should not only analyse what goes on inside the theatre building but also analyse the world out there — a world that I have tried to capture in this thesis in the form of social robots. This thesis is an example of that train of thought, since a theatre studies approach helped me to look at the interaction between human beings and objects and the effects thereof on the spectator. In that way I have both delivered a theoretical contribution to the field of theatre studies by elaborating on and nuancing theories about how a staged object can transform into an agentive object, and to the field of social robotics by arguing in what ways an object theatre framework can be inspirational for the design of social robots and human-robot interaction.

I would suggest that further research in the context of this thesis relates to the field of *new materialism*. This recently emerged academic field with representatives as Tim Ingold (*Redrawing Anthropology* (2011) and *The Life of Lines* (2015)), Jane Bennett (*Vibrant Matter* (2010)) and Rosi Braidotti (*The Posthuman* (2012)) focusses on issues that concern embodiment, subjectiveness and materiality — themes that very well connect to what has been discussed in this thesis. In particular, I think it may be interesting to consider the social robot in the context of this field, by looking at how human-made intelligence that is put in a physical machine nuances or maybe confirms the ideas of, for example, the agency of things.

Another departure angle for further research must be filled in by roboticists themselves considering object theatre indeed as inspirational. The ideas provided in the previous section are just hypotheses based on theoretical explorations, but whether these hypotheses sustain and prove to be workable in practice remains to be researched (and hopefully confirmed). In this respect, theatre, again, can function very well as a research platform, because putting a robot on stage works very well in order to evoke the illusion of a fully-working robot. In that case, it is not necessary to show a robot that possesses completely autonomous agency — and that conforms with the current state of robot design in which fully-autonomous robots do not yet exist. The suspension of disbelief of a theatre audience that leads to the acceptance of a deficiently working robot as a fully-autonomous creature can thus be very well included in research on how to design robots that are not autonomous but which a human interaction partner considers as sovereign.

A third, and last, perspective for further research we can find in the fact that I proposed in this thesis a form of design thinking: this text worked towards a conclusion in which I proposed a different perspective on the design of social robots and HRI. At the moment — probably in the nearby future — that the development of completely autonomous robots takes off and a social robot is able to learn from the interactions he participated in, its agency be-

comes the sum of not only its design but also the extent to which it already entered into relationships with others. In that case, not only design thinking is important to consider but also something we could call situational learning. More autonomous robots pose questions such as how someone can become friends with an Other, what happens when this Other due to misinterpretation changes into a killer bot, and how the relationship between a social robot and a human being changes when that human being becomes completely dependent on the robot (in, for example, autonomous cars). In this respect, theatre will, I think, prove to be a great environment to experiment with such situations and situational learning — as, again, a test environment that prevents things from going wrong in real life.

#### **§4 | Postface.**

In this text, I advocated for a way of thinking in which the line that divides agentic, living, subjective human beings from passive, lifeless objects becomes obscured. I had to make this division in the first place in order to clearly compose my argument, but returning to a quote I already discussed in the introduction of this thesis, I can say that this was "not just a matter of anthropomorphism or projecting human emotional responses onto objects" but rather "the beginning of an understanding of new modes of subjectivity" (Eckersall 2015, 124). I hope I have provided a searchlight for catching a glimpse of a world in which all living and lifeless creatures can possess agency, of a world in which humankind does not consider itself the most significant entity in the universe, and of a world in which human beings can learn not to transpose to other entities what they see, feel, hear and experience in terms of their own norms and values. However, this does not mean that I endorse a world in which robots, objects and human beings grow towards each other, evolving eventually in an entity that transcends them all. Moreover, it does not mean that I endorse a world in which between objects and subjects no difference exists at all. *That* would be anthropocentric, because then I would humanise every object that human beings connect with.

Thinking in terms of agentic objects does not dehumanise humankind. On the contrary, it makes us aware of our singularly human qualities and of how we can deploy them in our interactions with other agentic entities. If you would like to call that post-anthropocentric, I am with you.

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