Thinking Through Matter Together

On interdisciplinary collaborations in theatre that propose ways of becoming-with *between humans and robots*

"For it's new role as a virus, art will have to learn other practices; the 'old practices', meanwhile, might   very well inspire actions in other areas, in other sectors. There is a need for exchange.

Marianne van Kerkhoven and Anouk Nuyens,
Listen To The Bloody Machine

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Abstract

A growing interest for the meaning-making abilities of material technologies have been implemented in a theatre praxis where a technological performer can take place in the spotlight. The performative and new materialistic turn in dramaturgy both rethink the role of the human in relation to the non-human. The idea of thinking as a material practice is a useful lens when zooming in on the insights processes might offer on becoming-with. This thesis positions itself in the context of new materialism, and specifically the work of Karen Barad around intra-action and Donna Haraway on becoming-with. It seeks to understand how collaborators in a theatrical process work with robots in order to rethink new ways of becoming-with.

The thesis is built around two case studies, the making of *Happiness* (2019) by Dries Verhoeven and *Uncanny Valley* (2018) by Rimini Protokoll. An exploration of new materialist concepts, operationalized by involving the concept of collaboration, leads up to the topics that form the outlines of six semi-structured interviews. In these interviews, diverse collaborators that worked on the two performances with robots are surveyed on their experience and perspective on becoming-with and collaboration. The conversations are analyzed with the use of a dramaturgical lens. This dramaturgical lens, drawn from the work of dramaturgs Konstantina Georgelou, Efrosini Protopapa, and Danae Theodoridou, offers three key principles that signal a working force in a process. The analysis lays bare what themes and perspectives are shared amongst the collaborators, when the key principles allow them to engage in a conversation on becoming-with and collaboration.

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1. Introduction

Theatre and technology share a long history. In order to achieve certain effects on stage, theatre makers have sought the use of machines and technology even before the first 'deus ex machina'[1]. However, the machines used for theatrical effects such as light, smoke, movement or scenery have played an invisible supporting role for most of modern history. They were hidden behind the curtains or faded in the background the majority of the time. Arguably, there have been at least some changes in regard to the visibility of technology on stage, such as the Brechtian approach where the spectator ought not be fooled and mesmerized, but explicitly confronted with the theatrical strategies and mechanics in order to be invited to reflect on the world outside. Still, it was not the apparatus itself that was regarded by the audience as one of the actors per se.

More recently, a shift has occurred in the approach towards technology in theatre alongside a broader philosophical shift towards less anthropocentric paradigms. Peter Eckersall et. al. refer to these shifts in the introduction of their book *New Media Dramaturgy* (2017) as they unfold new ways of looking at the performative role of technology:

> As key players in an artwork, the behaviour of elements within the dramaturgy - whether they are, for example, lighting patterns, robots or atmospheres - influences every aspect of it as well as calling into question how works are made, how they are performed, and how they are engaged with and received by spectators.[2]

A growing interest for the meaning-making abilities of material technologies have been implemented in a theatre praxis where a technological performer can take place in the spotlight. The performative and new materialistic turn in dramaturgy both rethink the role of the human in relation to the non-human. The idea of thinking as a material practice is a useful lens when zooming in on the insights an interdisciplinary collaboration might offer on becoming-with. This research positions itself in the context of new materialism, and specifically the work of new materialist scholars Karen Barad and Donna Haraway on intra-action and becoming-with. Becoming-with is operationalized using the concept collaboration. It is the flowing and forming of relationships that characterize perspectives on becoming-with. Performance studies scholars Maaike Bleeker and Marianne van Kerkhoven offer connections to dramaturgy and thinking-through-material.

This thesis seeks to understand how collaborators in a theatrical process work with robots in order to rethink new ways of becoming-with. Developing and programming a robot is not always a part of the core practice of theatre makers, hence a performing robot can be the result of a

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[1] This device, a sort of lever or crane, was used in ancient Greek theatre to let actors appear on stage as Gods, flowing through the air.

[2] Peter Eckersall, Helena Grehan, and Edward Scheer, *New Media Dramaturgy: Performance, Media and New-Materialism.* (Springer, 2017), 3.

collaboration between theatre making and other fields of expertise, such as animatronics and programming. Technological design processes have their own pace, stages and methods. In order to learn more about instances of becoming-with in theatrical processes with robots, I have researched if and how these processes align with the process of making theatre. This research focuses on the collaborative process that precedes performances that propose a becoming-with in humans and technology. The concept of becoming-with lies at the core of this project, alongside collaboration. The main question that I will answer trough this research is the following:

> How do interdisciplinary collaborations between theatre and technology reflect on becoming-with in a process?

The question will be answered by working through a set of subquestions, that are answered per chapter. Firstly, the exploration of concepts seeks to answer what the academic discourse proposes on becoming-with in processes. This exploration provides insight in how these concepts help interpreting material agency. Secondly, I set out how a dramaturgical perspective can function as a lens on becoming-with in interdisciplinary processes that precede theatre performances involving robots. I will argue that the lens works as both a framework for the analysis as well as an interpretive tool. Finally, I interpret the conversations using findings from the two chapters before, in order to answer how theatre makers from two case studies reflect on the concept of becoming-with. I do so by answering how these reflections find their place in a process that demands a close collaboration between theatre makers and designers from various other fields.

1.1 Relevance

Because of the Covid-19 pandemic in 2020, many theatre companies turned to technology in order to reach their audiences. Companies such as Theater Utrecht broadcasted registrations of plays from previous seasons[3], and International Theatre Amsterdam explored a way in which the liveness of a theatre performance could translate to the screen at home through once-only live performed streams.[4] However, there were theater groups that had already experimented with (partial) online attendance of audiences, such as Nineties Productions in their piece *Memento Mori*.[5] This performance, taken into a fully online reprise this year, led to an open call for other artists looking for ways to incorporate technology in their process.[6] Together with the Performance Technology Lab, amongst other collaborators, the plan attached to this open call seeks out to find new ways in which theatre and technology can inspire each other.

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[3] https://www.theaterutrecht.nl/voorstellingen/thuis-theater-utrecht
[4] https://ita.nl/en/shows/romeinse-tragedies/1569929/
[5] https://www.ninetiesproductions.nl/en/memento-mori/
[6] https://www.ninetiesproductions.nl/open-call/

In my own work as tech dramaturg at the Ulrike Quade Company it is precisely this field that I research as project developer on incorporating technology in the theatrical process. It has become apparent to me in the last few years that there is an eagerness in the theatre field to explore what role new technologies can play in theatre, both in process as well as performance and content.

The interest is mutual, as professionals from the technological field seek out knowledge from the field of performing arts in order to have technology be more effective or accepted in society. The recently launched research project Acting Like A Robot[7], a collaboration between academics from the field of dramaturgy (UU, HKU) and robotics/AI (VU), engages in the question how knowledge from theatre can help the field of social robotics.

This thesis embarks on a very specific practice where theatre meets technology. Both case studies involve theatre companies that have their robots built and programmed by collaborators outside their own team. This thesis should therefore be read as an exploration in how to research the perspectives and experiences of diverse collaborators on the role and agency of the technology in a process.

1.2 Structure

This thesis contains three chapters: An Exploration Of Concepts, A Dramaturgical Lens and Analysis: A Tale Of Two Robots. Together they illustrate the path towards answering the research question. The initial step is an exploration into the concepts becoming-with and collaboration, leading up to a topic list and set of questions. These were used to conduct seven interviews with collaborators from the works *Happiness* and *Uncanny Valley.* The topic list was used as a red thread through the semi-structured interviews. As every collaborator had their own field of expertise and interest, I chose to let every interview have its own dynamic. Not every interview therefore covered the exact same questions, as I was looking for the specific moments where my conversational partner approached their interpretation of becoming-with. In order to find these specific moments of interpretation, I have added a dramaturgical perspective to the analysis. An entangled, depersonalized approach to dramaturgy offered me a lens to look for instances of material agency in the perception of the interviewee. This lens is made up by three key principles. Each of them are used to filter each conversation, together forming the analysis.

Chapter two, Exploration Of Concepts, is an analysis of the discourse on becoming-with and collaborations. These two concepts are the starting point of the exploration, with the concept of becoming-with branching out into related concepts such as post-human performativity, thinking through material, intra-action and apparatus. Collaboration is introduced as a form of operationalization of becoming-with, and is framed by theory on interdisciplinarity. This overview functions as a context for the interviews that I carried out with several collaborators of the two

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[7] https://performingrobots.sites.uu.nl/2020/02/23/acting-like-a-robot-theatre-as-testbed-for-the-robot-revolution/

projects that together form the case study. At the end of chapter two I reflect on how the theoretical framework was instrumentalized into a set of topics and questions that formed the core of the semi-structured interviews I conducted.

Chapter three, A Dramaturgical Lens, forms a step between the interviews and the analysis where I explain with what lens I have looked at the data. A dramaturgical perspective has the ability to discover what the collaborators ascribe agency to. With a relational approach as a context, the book *The Practice of Dramaturgy,* by Konstantina Georgelou, Efrosini Protopapa and Danae Theodoridou proposes an entangled understanding of dramaturgy. Namely, as a "shared responsibility for all collaborators involved in the production of a performance"[8], breaking away from the notion that it is solely a dramaturg's endeavor. The responsibility they refer to, is made up by principles they elaborate on as key working principles: mobilizing questions, alienating and commoning.[9] The conversations that make up the case study of this research are structured and interpreted starting from these core principles, making their particular, temporal and situational approach to dramaturgy the core method for this research.

As all collaborators have participated in the dramaturgy of the process, an analysis of this dramaturgy as a collaborative process aims to unveil how interdisciplinary collaborations can offer new ways of becoming-with. The key principles also offer a way to look for acknowledgment of material agency and corresponding intra-action as meaning-making process in the conversations. This enables the possibility to unfold how matter, as collaborator, manifests as a dramaturgical force within creative processes involving humanoid robots.

The fourth chapter contains the results of an analysis of the interviews, using the dramaturgical lens as introduced in chapter three. The two case studies that I analyzed for this project are *Uncanny Valley* by Rimini Protokoll and *Happiness* by Dries Verhoeven. Both of these theatrical performances reflect on the relationship between the human and the technological non-human, as well as on their own materiality. I researched how these standpoints come to be through their processes. I have looked for ways in which design processes and creative processes influence each other on these ideas, and where the interdisciplinary collaborations provide new ways of becoming-with. These in turn can be seen as proposals for new collaborations, ones between humans and technology. The analysis reflects how each of the collaborators experienced ways of becoming-with, or lack thereof. This is structured by using the three key principles separately as lenses. The separate findings are followed by cross-connections that could then be made between the conversations.

In the final chapter, the research question is answered using the findings from chapter four.

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[8] Georgelou, Konstantina, Efrosini Protopapa, and Danae Theodoridou, eds. *The practice of dramaturgy: working on actions in performance*, (Valiz: Amsterdam. 2017) 17.

[9] Ibidem, 25

2. Exploration Of Concepts

In this chapter I lay out an analysis of the discourse on *becoming-with* and *collaboration*. These two concepts are the starting point of the exploration, with the concept of becoming-with branching out into related concepts such as post-human performativity, thinking through material, intra-action and apparatus. Collaboration is introduced as a form of operationalization of becoming-with, and is framed by dramaturgy and theory on interdisciplinarity. This overview functions as a conceptual framework for the interviews that I carried out with several collaborators of the two projects that together form the case study.

2.1 *A Matter Of Thinking:* becoming-with

This research positions itself in the context of new materialism, and specifically the work of Donna Haraway and Karen Barad around their concepts intra-action and becoming-with. The idea of becoming-with is formulated by Donna Haraway to imagine an interconnected way of being in the world. In her book *Staying With The Trouble: Making Kin In The Chtulucene* (2019)[10] she explains how such an interconnectedness can be envisioned as string figures; being, moving and thinking are acts of entanglement. Being entangled in this sense, means a constant responding to and from all beings and things. This phenomenon she calls *response-abilities,* a term that allocates an agency to all players in this entanglement:

> Shaping response-abilities, things and living beings can be inside and outside human and nonhuman bodies, at different scales of time and space. All together the players evoke, trigger, and call forth what—and who—exists. [11]

This, what she calls, tentacular approach to thinking is particularly interesting in the context of this thesis. It proposes an active role for all entangled parts, both human and more-than-human, and rejects any hierarchy when it comes to becoming:

> More precisely, com-menting, if it means thinking-with, that is becoming-with, is in itself a way of relaying [….] But knowing that what you take has been held out entails a particular thinking "between." [12]

The word relaying describes the ongoing flow that makes up any meaning and becoming. Haraway has deconstructed the binary understanding of semiotic and material throughout her work. This

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[10] Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene,* (Durham and London: Duke University Press, 2016),

[11] Ibidem, 16.

[12] Haraway, *Staying With The Trouble*, 34.

resulted in Haraway being at the forefront of the material shift, as she made space for matter. This inspired other new materialists such as Karen Barad, who connects performativity to the idea of becoming-with.

Barad is a feminist physicist-philosopher who ties together physics and philosophy through the agential and performative qualities of matter and is considered a central thinker in this paradigm. Barad offers a framework through which matter takes up a prominent place in how we understand the world.[13] Her concept of intra-action, as a more processual and ongoing exchange of matter and meaning, paves the way for a new understanding of how we interact with the world around us, including technology. Barad has built upon various feminist new materialist thinkers such as Donna Haraway, moving away from binaries such as nature/culture and human/non-human by redefining performativity. The notion of phenomena that in meeting each other materialize as meaning-maker in the world reflects on a processual approach; hence becoming in the concept becoming-with. Barad refers to this process not as interaction, but intra-action, as it is about how the relata, the elements that venture in a relationship together, do not hold a certain meaning *a priori.* Matter comes to matter through those relationships, that she refers to as "an ongoing open process of mattering through which 'mattering' itself acquires meaning and form in the realization of different agential possibilities".[14] Intra-action refers to matter that comes to mean something through its situatedness, thereby rejecting the idea that it contains meaning as is suggested through other ideologies such as semiotics. Intra-action in performance offers alternative ways of understanding, as Joslin McKinney shows in her chapter on new materialism and scenography:

> Applied to performance, this concept of intra-action suggests that engaging with or attending to the material dimension of theatre is the foundation of the aesthetic experience. It is a way of 'knowing' about a performance that challenges 'exclusively human systems of comprehension and communication'[15]

The idea of thinking as a material practice is a useful lens when zooming in on the insights processes might offer on becoming-with. Performance studies scholar Maaike Bleeker describes how this way of thinking can be recognized in performance design in her article "Thinking That Matters: Towards A Post-Anthropocentric Approach To Performance Design" (2017). What she means with *thinking as a material practice* as evidenced in performance design becomes clear when she proposes how

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[13]Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter." In: *Signs* (28: pp. 801-31. 2003).

[14] Barad, *Posthumanist Performativity,* 817.

[15] Joslin McKinney, "Scenographic materiality: Agency and Intra-Action in stage designs by Katrin Brack," In: *Contemporary Scenography: Practices and Aesthetics in German Theatre, Arts and Design.* Wiens, BE, (ed.) (Bloomsbury Publishing PLC , 2019), 18.

participation through spectatorship in an artwork is a form of *embodied thinking*. Bleeker proposes how this approach to thinking applies to the role of the spectator:

> Such thinking happens in the world, in intra-action with the world rather than in the head of the autonomous subject. Thinking, thus understood, is something we participate in by engaging with a work of art.[16]

Bleeker refers to Barad's idea of material agency not only as a view on the performance, but also as an ongoing process when spectators interact with it. She posits both their interaction with the scenographic material as well as the interaction in the process towards the performance as explorations through response; a way of *thinking through matter*.

The agency that is ascribed to matter from Barad and Bleeker's new materialist perspective is what Jane Bennett calls *thing-power*. Thing-power refers to specifically man-made objects and materials that emit a form of agency: "thing-power gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness, constituting the outside of our own experience".[17] It proves relevant when working with robots in a performance context. It opens up to a way of thinking about matter that is preceded by a human-led process to obtain agential qualities.

2.2 Operationalizing In Process: Collaboration

In this thesis, becoming-with is operationalized using the concept of collaboration in the way that meaning is being made through collaborative relationships between relata. The term collaboration can be interpreted twofold as a framework for this thesis. First it refers to both the collaborative process where artistic and design processes intertwine, secondly to the perspectives on collaborations with the non-human these processes propose. The creative practice functions as a laboratory where these approaches are being rehearsed and experimented with. Viewing the process as part of the laboratory demands a repositioning of the artist in that process, as well as a positioning of a work of art in the context of certain paradigms. Working with a robot involves a positioning in the debate on human-robot-interaction, as it explores the meaning-making, communicative powers of technology on stage. As a means of meaning-making, robotic performers reflect on the ontological perspectives of their makers as they speculate on possible relationships between humans and technology.

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[16] Maaike Bleeker, "Thinking That Matters: Towards A Post-Anthropocentric Approach To Performance Design." In *Scenography Expanded: An introduction to contemporary performance design,* eds. McKinney, Joslin, and Scott Palmer (Bloomsbury Publishing, 2017),132.

[17] Jane Bennett, *Vibrant Matter: A Political Ecology Of Things,* (Duke University Press: London. 2010), preface xvi.

It is hard to imagine a performance that is materialized without any form of collaboration. Stemming from the Latin words *col,* meaning with, and *laborare,* to work. Working-with is not limited to the artistic team boiling up performances. It is also not limited to the team as a whole, technical, practical, productional collaborators and alike. Even the pen that is used to scribble down remarks during rehearsals could be regarded as a collaborative force, as was suggested in one of the interviews. Arguably, the realm of collaboration needs to be stretched into a more macro-dramaturgical point of view. This term is used by Marianne van Kerkhoven to describe how dramaturgical work through which theatre reflects on and takes a place in a societal context.[18]

Kerkhoven and Anouk Nuyens' book *Listen To The Bloody Machine* propose a perspective on what collaborations with the more-than-human can entail. They set out to describe in great detail how a work directed by Kris Verdonck materializes through the combined effort of all sorts of collaborators. The conversations, observations and insights show what relationships are established between the various human and more-than-human collaborators. These in turn demonstrate how possible meanings of the performance manifest through an embodied way of thinking. The story of the process leading up to the performance *End* is told from the perspectives of many involved parties, discussing their relation to the material, to performers, to audiences and all other collaborators. Their motive behind creating the book is to illustrate how much of a heterogeneous, collective practice this process is. They emphasize that art is not made in a linear fashion, using a model or method. When they look at the way art is made with a macro-dramaturgical lens, they describe what learning about this practice can offer:

> For it's new role as a virus, art will have to learn other practices; the 'old practices', meanwhile, might very well inspire actions in other areas, in other sectors. There is a need for exchange. Exchange is the basis of all life.[19]

Maaike Bleeker connects the meaning making abilities of matter to scenography by referring to the rich theatre history of makers that show an inseparability of meaning and materiality such as Robert Wilson and Kris Verdonck. She argues that such works of art do not come to be by the imagination, the drama and the narratives shaped by artists, but by "a practice of exploring ways of organizing and shaping materials of various kinds."[20] This approach is remarkably interesting within the context of this thesis as it proposes ways in which performance design itself is a way of becoming-with. Drawing from Barad's notion of post-anthropocentric performativity, Bleeker states that the process of meaning making on stage, whether it be in the context of rehearsals, design or

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[18] Marianne van Kerkhoven, "Kijken Zonder Potlood In De Hand" in *Van Het Kijken En Van Het Schrijven: Teksten Over Theater,* Samenstelling En Red. Peter Anthonissen et. al. (Leuven: Van Halewyck, 2002), 127.

[19] Marianne van Kerkhoven, Anoek Nuyens and Kris Verdonck, *Listen to the Bloody Machine: Creating Kris Verdonck's End*, (Utrecht: Utrecht School of the Arts, 2012), 33.

[20] Bleeker, *Thinking That Matters,* 125.

the performance itself manifests through a form of intra-action. She calls this *thinking-through-material*, where thinking is defined as "a material practice that proceeds through enactment, through something that mediates between the people involved but also between people and things"[21]

Bleeker proposes a way of looking at the whole that a theatre performance consists of, through the concept of apparatus. The theatrical apparatus is the composition of elements that together make up a sort of "planet", as Eleanor Fuchs calls it. A machine, Bleeker argues, that has its own agential force in terms of meaning making. This concept is useful when looking at how the collaborators reflect on the robot in the context of theatre. It is not the robot as a machine in a vacuum that is researched in this project, it is the whole apparatus of which the robot is one of the elements. From that perspective it justifies how all collaborators in the process, both human and more-than-human, relay within in the intra-action that is the process, as they are all in one way or another involved in the making of meaning, the embodied thinking that both collaborators as well as spectators are involved in and committed to.

The dramaturgical relationality that is implied by Bleeker, finds an explicit definition in *New Media Dramaturgy* (2017). Eckersall et. al. approach technology no longer merely as an instrument or extension of theatre, but a central element, taking up space both on the physical stage as well as in content, themes and as an actor. A new relational approach is deemed necessary - something that is clearly pointed out when they elaborate on Kris Verdonck's work HUMINID:

> Perhaps through its 'presence and posture' we can envisage a situation in which the focus is less on the identification of predetermined positions and more on affective flow around 'material composition', on relationality between indeterminate entities[22]

In their chapter on robots and theatre, the idea is constructed that the meaning-making abilities of a robotic performer lies in the interaction it establishes. This idea can therefore be seen as a dramaturgical perspective on becoming-with. The performative potential of an object is expressed through the concept of *conatus*. This philosophical term refers to the will to live or tendency to move. It was used by Descartes to illustrate how the world and what is in it is ever in movement, instigated by God. Conatus in robots in theatre have the potential of exploring the "possibility of kinship and empathy",[23] because of the testing ground the stage provides for forms of agency.

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[21] Maaike Bleeker,'Thinking No-One'sThought',in *Dance Dramaturgy: Modes of Agency, Awareness and Engagement,* ed. Pil Hansen and Darcey Callison (Basingstoke:Palgrave Macmillan,2015), 69,70.

[22] Eckersall, *New Media Dramaturgy: Performance, Media and New-Materialism,* 39.

[23] Eckersall, *New Media Dramaturgy: Performance, Media and New-Materialism,* 108.

Collaboration gets a more nuanced meaning taking this potential into account. Kinship that is researched while in collaboration with the more-than-human has occurred extensively in the field of social robotics. The work of Guy Hoffman[24] on robotic movement and emotion and Marco Donnerumma's practical experiments and scholarly papers[25] are examples of researches that focus on human robot interaction. Donnerumma's work can be seen as a new perspective on what a collaboration with a robot could entail: on how moving together with robots invokes new ways of feeling empathy. It is his work that serves as a key theory throughout Irene Alcubilla Throughton's thesis on human robot interaction (HRI) and collaborative movement.[26] Their findings concentrate on how mimicking leads to a false sense of empathy and how quality of movement plays a part in the understanding of and feeling with a performing robot. These specific insights help ground how to reflect on what a collaboration can be and do.

The collaborations that form the case study of this research are interdisciplinary. I use the term as defined by Allen F. Repko and Rick Szostak (2017). They distinguish interdisciplinarity from multidisciplinarity by the lack of integration of disciplines that is present in the latter. Multiple disciplines are applied alongside each other, but only contribute in separate parts to the final product. Interdisciplinarity, on the other hand, integrates the knowledge and abilities present, resulting in a product that is more than the sum of its parts.[27] This definition resonates with the previous venture into becoming-with. It acknowledges that the relationality within a process holds a meaning making potential.

Finally, I want to take a step outside of the artistic discourse on collaboration and broaden the concept, as the reflections on processes entail many inter-human collaborations. In order to embed the concept of interdisciplinary collaboration within my analytical framework, the novel field of *team science* provides a complementary perspective. When speaking about collaborations and interdisciplinary teamwork, the field offers a way to assess the relays within a process from a more neo-liberal standpoint. Team science is focused on how teams or collaborations can be rendered effective, improve or excel. In their article "Individual-Level Competencies for Team Collaboration with Cross-Disciplinary Researchers and Stakeholders" (2020) sociology scholars Paula S. Nurius and Susan P. Kemp touch upon various characteristics of a successful collaboration. They set apart five qualities in participants of an interdisciplinary collaboration; active listening and reflexivity, engaging diverse worldviews, talking across differences in ontologies and epistemologies,

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[24]Guy Hoffman and Wendy Ju, "Designing Robots with Movement in Mind." in *Journal of Human-Robot Interaction (*3, no. 1: 89-122).

[25]Marco Donnarumma, "Beyond the Cyborg: Performance, Attunement and Autonomous Computation." *International Journal of Performance Art and Digital Media, (*13, 2017) no. 2: 1-15.

[26]Irene Alcubilla Troughton, *Feel with Me: From Simulation Theory to Empathetic Encounters in Human-Robot Interaction.* (Master's thesis: Utrecht University, 2019).

[27] Allen F. Repko and Rick Szostak, *Interdisciplinary Research: Process and Theory*, (SAGE Publications, 2017), 24, 25.

navigating conflict and relational skills.[28] The use of this framework demands another form of reflexivity: the static idea of successfulness and efficiency are to be questioned in a creative process. They, however, come up in conversations with collaborators, and enrich the dramaturgical lens later used in the analysis. It opens up space for both the question *if* it works and *how* it works.

2.3 Soil for the Conversation

This framework has led to a set of topics and accompanying questions. The questions and their corresponding topics stem from the exploration into becoming-with and collaboration, thereby instrumentalizing the concepts towards interdisciplinary processes. The topics formed the outlines of semi-structured interviews.

Topic list
From idea to applause: a reconstruction
> Expectations, choices, approaches

Interdisciplinarity
> Approaches to processes, sharing insights, what works?

Collaborations within
> Collaborations in expertise, technology, material. Reciprocal, linear, open, closed?

The creative process, performance and design
> Theatre making meets programming, animatronics meets scenography

Working (with) material
> The role of matter, distance and experiment/playfulness

Friction in working, thinking, doing together
> The meaning, impact and effects of questioning and friction

Relationality of the product and the process
> Does the performance resonate with the process?

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[28] Paula S. Nurius and Susan P. Kemp, "Individual-Level Competencies for Team Collaboration with Cross-Disciplinary Researchers and Stakeholders," in *Strategies for team science success: Handbook of evidence-based principles for cross-disciplinary science and practical lessons learned from health researchers*. Hall, Kara L., Amanda L. Vogel, and Robert T. Croyle, eds. (Springer Nature, 2019) 180-183.

3. A Dramaturgical Lens

In the following chapter I expand on the lens I used in order to analyze the data. I have conducted my research through interviews, aiming to learn about the perspectives present in two processes on becoming-with and collaboration. Discovering what perspectives and experiences were present in the process benefits from a dramaturgical lens. As inquiring an interviewee on their idea of becoming-with demands a very specific prior knowledge in a scholarly field, I have drawn from a dramaturgical perspective in order to find commons in diverse experiences. This lens works as a framework through which I have been able to structure the research, as well as a means to interpret the data itself. In the previous chapter I have already set out how an exploration into new materialist concepts has led to topics for the interviews. Here, I seek to unpack what a dramaturgical lens offers in terms of discovering perspectives on agential forces in a process.

Performance studies scholars Sigrid Merx and Liesbeth Groot Nibbelink formulate a perspective on an entangled dramaturgy. It functions as a framework on the relational approach dramaturgy can offer.[29] Their point of view, although focused on performances more than creative processes, offers a way to approach how an event relates to a phenomenon, such as ideas on becoming-with. It positions the triad of *context, composition* and *spectator* at the core of a relational analysis. When speaking about one, the researcher cannot disconnect from the other two planes. However, by initiating an analysis from one plane, the relation to the others can uncover useful insights on the overall object of analysis. For example, "when the focus in analysis is on how composition and context are related in a performance, it often helps to argue what *statement* is being expressed or presented."[30]

In *The Practice of Dramaturgy* (2017) a similarly relational approach towards the dramaturgy, but with a focus on processes is described. Dramaturgy scholars Konstantina Georgelou, Efrosini Protapapa and Danae Theodoridou propose key principles that were used in workshops and expert meetings to recognize the working dramaturgical forces in a process. In this thesis I do not just focus on what this dramaturgical approach makes out from the gathered data, but also how their perspective on dramaturgical forces can be used in another scope than it is examined in the book. The writers explain their preferred approach to the principles as characteristics rather than ready-made tools to utilize when aiming to work dramaturgically: "The book too presents these three inter-connected principles as underlying and occurring from a series of dramaturgical tasks, rather than tools or methodologies for dramaturgy".[31] I intend to use these principles therefore as search lights, taking into account that the entangled characteristics are all present in the dramaturgy of a process.

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[29] Sigrid Merx and Liesbeth Groot Nibbelink, *"Dramaturgical Analysis: A Relational Approach,"* (Utrecht: not yet published, 2019)

[30] Ibidem, 17.

[31] Georgelou et. al. *The Practice Of Dramaturgy*, 40.

The question is where, when and by whom the principles are activated, offering insight into what the collaborating forces are from the perspectives of the involved makers. This research is intended to expand the use of the principles from artistic processes with human collaborators, to a process where technology itself as well as the humans specialized in this technology, act as collaborators.

In subchapter 3.1, I have summarized the approach to dramaturgy of Georgelou et. al., alongside the three key principles they distinguish as working modes. In 3.2, I have expanded on how I activated these three key principles as lenses to look through while analyzing the interviews. Subchapter 3.3 specifies how the main concepts becoming-with and collaboration function as a filter that allow the interviewees to engage with each other's standpoints.

3.1 Tools In The Toolbox: Three Key Principles
An assessment of processes in theatre is always going to be particular and specific. Van Kerkhoven and Nuyens state that there is no ready-made model to be found in the world of the arts.[32] The research on case studies *Happiness* and *Uncanny Valley* therefore will offer no blueprint on how to collaborate successfully, efficiently or even meaningful. Even more so, that attempt would contradict with the framework fueling this research, as scholars such as Barad and Bleeker emphasize when speaking about intra-action as the relationship where meaning is made. This is why I approached the processes by conducting investigative, semi-structured interviews.

In order to be able to look at, pull apart and zoom in into aspects and characteristics of the process, a methodology focusing on working on actions provides a toolkit. Although perhaps not self-explanatory, a dramaturgical analysis is a useful approach when reflecting on a process and its collaborators. Dramaturgy is not limited to the work of a dramaturg. The word itself refers to the two greek words *drama* and *ergon*, meaning action and work respectively. The meaning of this combination of words can be interpreted in various ways, from dramatic action, the literal action on stage, to a characteristic of the theatrical text. Georgelou et.al. propose a return to the etymological dimension of dramaturgy by interpreting it both as 'actions at work' and 'working on actions'.[33] They focus on the latter interpretation, and unfold this as a relational understanding of dramaturgy in *The Practice of Dramaturgy*. Namely, as a "shared responsibility for all collaborators involved in the production of a performance"[34], breaking away from the notion that it is solely a dramaturg's endeavor. The responsibility they refer to, is made up by principles they elaborate on as key working principles: mobilizing questions, alienating and commoning.[35]

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[32]Van Kerkhoven, *Listen To The Bloody Machine.* 33.

[33] Georgelou et. al. *The Practice Of Dramaturgy,* 74.

[34] Ibidem, 17.

[35] Ibidem, 25

I use the three key principles as tools to structure the findings from the conversations that I had with participants of collective efforts working on performances with robots. The three principles are *mobilizing questions*, *alienating*, and *commoning*. The three principles, in the words of Georgelou et. al. "aim to open up, destabilize and problematize what happens in the encounters between bodies, materials and ideas that produce performance."[36] Together they make up forces that can be distinguished to engage with the dramaturgy of a process, the process of working on actions.

To start with the first mode, mobilizing questions is regarded as a dramaturgical force looking to "establish *new relations* between the agents involved in an artistic process, as well as between such agents and the work itself."[37] In other words, this mode is activated when an agent engages in a relationship with another relata and through that, raises questions that either bring forth new relationships or form the material itself.

The second mode is about alienating, the movement in a process that pulls and pushes away from a straight line. The mode acknowledges the productivity of the work itself, drawing from a divide that Andre Lepecki makes on where knowledge is situated in processes. He opposes a supposed knowledge contained by a the engaged circle such as makers, writers, dramaturges to a "situation of artistic encounters wherein all collaborators work for the piece to come, without necessarily knowing what it truly is about, what it wants, or what it needs."[38]

Finally, we arrive at the mode of commoning. "Today's commons need to first emerge and then be constituted within the state of prevarication. This is a crucial thesis, because it requires that we surpass binary assumptions about commonalities and differences, and rather engage in a 'search' that is guided by a certain degree of ignorance and investigates our social and political surroundings. Moving to the context of dramaturgy, we can specifically search for the commons in the apparatuses that aim to draw attention to and create relations during artistic processes."[39]

The modes described in *The Practice Of Dramaturgy* interlock with Barad's agential realism[40], as both acknowledge more-than-human forces that are at work when meaning-making relationships occur. When discussing the mode of alienation, the writers refer to Lepecki's argument on the authorial force of a work itself. He rejects the idea of anyone involved with more ownership, knowledge or authorship as opposed to someone or something else. Georgelou et. al. describe the challenge that arises from this as following:

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[36]Georgelou et. al. *The Practice Of Dramaturgy*, 25.

[37] Ibidem*,* 42.

[38] Ibidem, 47.

[39] Ibidem, 57.

[40] Barad, "Posthumanist Performativity", 803-804.

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In order for dramaturgy to enter a zone of precise, concrete and rigorous indetermination and *allow* the piece that no one know to become actual, we should invent a new a mode of experimenting, a mode of rehearsing that will allow us to operate from 'a place of quasi-nothingness' the writer has posited.[41]

By emphasizing on the relationality of dramaturgy, the approach of Georgelou et. al can be seen as a perspective on entanglement. Dramaturgy, according to the writers of *The Practice of Dramaturgy,* is a catalytic operation. This means dramaturgy has to be seen as a force, instead of a hierarchical or personal endeavour. They refer to Maaike Bleeker, on the instantiation of 'thinking no-one's thought', a phrase that explains the relationality of dramaturgy. This perspective of dramaturgy, the idea of 'working on actions', therefore has everything to do with the creative process. By letting collaborators of the actions and the becoming of a work reflect on what they did, saw and experienced, a perspective is outlined on how the process dramaturgically *worked*.

3.2 Activating The Key Principles

The writers describe how in workshops they detected the first principle, mobilizing questions, in a practice by drawing attention to the kinds of questions that were asked. Dramaturgy can be the force that enables questions to arise. In the interview I have looked for where questions did arise, and with what uncertainty or un-knowing the questions were affiliated. In some instances, questions are not per se answered in a process, but rather form the actual material of the work itself. In both cases, it draws the notion of the dramaturgical work away from the collaborator that offers insight, depersonalizing dramaturgy. This process (...) suggests that questions are to be found in de 'work' that is done, while at the same time it is the mobilization of such questions that produces further work."[42] Lastly I looked for references to instances where questioning was regarded as a directing force in the thought-process.[43]

The second principle is about alienating. This dramaturgical force takes place whenever there is a form of distance or rearrangement created in the work. An example is Lepecki's methodology of errancy as a dramaturgical mode, where misdirection and getting lost is seen as a tool to let a direction materialize outside of the creators lineair train of thought. Another is Barba's metaphor of an earthquake that shakes up and breaks through built structures in the process or work.[44] Keywords are the other, not-knowing, and the un-expected.

I have researched the interview for instances where the work is regarded as 'something else' than the mere sum of the input of the creators. This can be moments where the work itself is ascribed

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[41] Georgelou et. al., *The Practice Of Dramaturgy*, 48.

[42] Ibidem, 46.

[43] Ibidem, 45.

[44] Eugenio Barba, *On Directing And Dramaturgy: Burning Down The House,* (Routledge: New York, 2010), 11.

a form of agency, or more spatial references such as zones and spaces between collaborators or between the artist and the work. Key to this principle is the abjection of a lineair, enforcing process and set expectations. In a reflecting research such as this one, this principle is about how the collaborators were themselves surprised by the turns and results the process took.

Lastly, Georgelou et. al. propose the principle of commoning. There is a form of commoning active when the artist reflects on important relationships. In these moments, something is 'in common'. Key words are exchange, sharing and engagement.

In the interview, commoning was signaled when there was a case of debate on what is in common. Political theories Isabell Lorey regards the process of finding commons not as a search for homogeneity, but rather an ongoing discussion of what can be considered as common between parties and humans.[45] Besides a discussion on the commons, it is also the acknowledgement of "dramaturgy as a type of working that belongs to many that are taking part in an artistic process"[46] that signals commoning. It activates plurality and relationality, elevating them from characteristics to actual and practical tools.

As mentioned before, the main source that I use for a methodology, The Practice of Dramaturgy, proposes key principles that they used in workshops and expert meetings to recognize the working dramaturgical forces in a process. In order to answer this research question in a concise but precise way, I will apply this method on one interview that I conducted in the context of the internship. The writers explain their preferred approach to the principles as characteristics rather than ready-made tools to utilize when aiming to work dramaturgically. "The book too presents these three inter-connected principles as underlying and occurring from a series of dramaturgical tasks, rather than tools or methodologies for dramaturgy"[47]. I intend to use them therefore as search lights, assuming that the entangled characteristics are all present in the dramaturgy of a process. The question is where, when and by whom they are activated, offering insight into what the collaborating forces are from the perspectives of the involved makers.

3.3 Looking For Agency

Using Georgelou et. al.'s key principles lay bare what forces are at work in a process. In order to answer the main question proposed before, another perspective is needed on findings from these principles. This is where the new materialist perspective comes in. The analysis is structured by the use of the principles, taking into account the main concepts becoming-with and collaboration. As a shorter research I conducted for an internship at research group Acting Like A Robot found, the searchlight that are the key principles points out certain important and useful elements in the

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[45] Georgelou et. al., *The Practice Of Dramaturgy*, 56.

[46] Ibidem. 59.

[47] Ibidem, 40.

data. The focus for that specific research was on activating the three key principles as a method to research interviews reflecting on a process in the past. This however is where an analysis starts; what do the unveiled points tell when looked at from a new materialist perspective? [48]

If the three principles are the lens, the concepts becoming-with and collaboration are how they are sharpened. They help bring out those aspects of the process capable of proposing a post-anthropocentric working on action. These aspects are broken down into subchapters, offering insight in collisions and connections between the stories of the participants. Together they make up a sort of web, relaying between the three modes, making up the string figure that is the back-and-forth of becoming.

When processing the data, the first focus was on what an analysis of the interviews using the key principles showed. I then took all the findings of the interviews combined and looked at if and how these webs of collaborations portrayed characteristics of becoming-with and collaboration. This has allowed me to let the various collaborators engage in a conversation with each other on the themes that connected to the main concepts of collaboration and becoming-with the most.

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[48] For a research assistance position at Acting Like A Robot I used Georgelou et. al.'s key principles as a means to point out collaborations with technology using one interview as data. This next section was part of the conclusion: "This particular research offered insight into how the key principles of Georgelou et. al. can be expanded into a set of searchlights when in search of dramaturgical forces. For further research, however, a next step into processing the findings is much needed. A searchlight points out, enlightens, discloses. It is then that an analysis can take place. When these brightly lit points in a set of data are looked at from a certain perspective, they can lead to connections being made and findings being done."

4. A Tale Of Two Robots

In this chapter I present the results based on the semi-structured interviews I conducted with the two theatre makers. Both of them were in charge of directing performances that include robots. Besides these two conversations I spoke with other collaborators that were a part of these two processes. The objective of the conversations was to obtain insight in how these collaborators reflect on their processes that involved robots. I looked for ways in which their perspectives and experiences demonstrated ways of becoming-with. For this, a reflection on the agency of the technology is necessary. As described in the previous chapter, I have chosen to not just analyze the interviews with this in mind. I used a framework offered by the three key principles from scholars Georgelou et. al. as a lens, as these three principles refer to dramaturgical forces within a process.

The three subchapters separately cover what arose from the interviews using the key principles mobilizing questions, alienating and commoning as a lens. In the subchapters I firstly address overarching findings in the conversations and themes that appeared using that specific key principle. Secondly, I have highlighted what every separate interviewee has remarked in relation to the principles, by letting them respond to each other.

Happiness (2019), Dries Verhoeven

The two works this research focused on are *Uncanny Valley* (2018) by Rimini Protokoll and *Happiness* (2019) by Dries Verhoeven. Both performances were centered around an anthropomorphic robot, meaning the robots had a human-like appearance. They both, however, diverged from a complete human image by leaving parts of the internal machinery exposed. In the case of *Happiness,* the chest and arms of the robot showed the metal pipes, motors and wires that worked together in order for it to move. The robot in Uncanny Valley was made to resemble Thomas Melle, a writer and philosopher whose personal experiences and perspectives lied at the core of the

performance. With this robot, the back part of the head was left open, exposing the technology that the humanoid was made up from.

Uncanny Valley (2018), Rimini Protokoll (Stefan Kaegi) & Thomas Melle
© Gabriela Neeb

Where the robot ends and the scenography, decor or technology begins, is difficult to determine both in the process as well as the performance. Amy, as the robot from *Happiness* is called, is not separated in any way from her surroundings, as the computers on her back and on the floor are also connected to the motorized hatch where medication is issued during the performance. The robot is entangled with all the elements making up the performance; material, technological and ontological. This entanglement does not only occur during the performance, but is becoming throughout the process, immediately reflecting on the collaboration that make up the process of becoming. This is why I have gathered the human perspectives on the process across several disciplines, as unfortunately the robots cannot tell me directly how the collaboration went about. The technology, however, did influence the collaboration as a whole, as will become clear when these perspectives are interpreted below.

Dries Verhoeven made the performance *Happiness* (2019) and Stefan Kaegi is one of the theatre makers of the collective Rimini Protokoll and the creative force behind *Uncanny Valley* (2018). Both these makers were involved from the initial idea to the end montage, and both of them were artistically responsible for the work. I reached out to both their dramaturgs, Martin Valdez-Stauber and Hella Godee, as I wanted to learn about the perspective on the collaboration and material agency from a dramaturgical point of view. Valdez-Stauber is employed by the Muncher Kammerspiele and is involved mostly with the more experimental projects. He has experience with projects that involve technologies and technological collaborators, and took on the role of both an intermediary between the writer and Stefan Kaegi as well as between the creative and the

technological team. Hella Godee has a background in philosophy, and has worked with Verhoeven on multiple performances. She regards her role as that of a thinking companion, offering philosophical inspiration and discussion whenever needed in the process. She was involved in the early stages of the concept. This made her an interesting conversational partner for this thesis when it comes to the scholarly inspiration for the work.

The final two interviewees were Stefano Trambusti and Casper Wortmann. Trambusti is a programmer and puppeteer, and worked on both the robots. He can be regarded as the most technologically skilled of the group and has experienced both processes. This offered both insight into subtle differences in approaches as well as the perspective from someone who had the most hands-on experience with the technology. Wortmann was situated on the overlapping field between the creative and the technological team in the process of *Happiness.* He has a background in both artificial intelligence as well as performing arts, and was involved as an assistant to Verhoeven.

This collection of interviewees is not meant to outline the exact steps or findings within the process, but rather shed light on the varying perspectives on material agency when working with robots. I have looked for moments that point to an acknowledgement of agency, using the three key principles as described in the previous chapter. The results of the analysis are then used to answer the question on how the perspectives reflect on becoming-with, proposing ways of working together.

4.1 Mobilizing Questions: Listen To The Bloody Robot

4.1.1 General Findings And Themes

Mobilizing questions is a tactic that is deployed by a collaborator in order to advance in the process. It can be recognized when there is an abjection of a linearity and hierarchy in the process. In other words: I have looked for instances where according to the human collaborators technology took up a role questioning such routines. In search of who or what mobilizes questions in the process, a couple of themes stand out. The first is about whether technology can mobilize questions or if it needs to be represented by a human collaborator in order to function as such a dramaturgical force. Kaegi uses the term 'negotiation' to describe how he perceived the collaboration, accurately describing how the questions that are mobilized by any of the collaborators influence the process and with that, the work. However, in order to negotiate, the technology needs to be represented or imagined by him as a theatre maker, as it is not physically present for the majority of the process.

Another theme that surfaces in relation to mobilizing questions, is the question of a robot's ontology: Where does technology end, and does a robot begin? Martin Valdes-Stauber, dramaturg of the Muncher Kammerspiele, remarks that the animatronics designer told him he does not regard Thomas 2, as it was lovingly called, as a robot. He sees it as an audiovisual machine. Unfortunately, the designer did not respond to my inquiry for an interview so that I could have asked him what does make something a robot. The discussion around the robot-ness of the performance, several of the conversations found, was alive in the minds of multiple human collaborators. Interaction, either by

technology through sensors or through a theatrical effect, arose in multiple conversations as a characteristic. Wortmann, who has been an artistic researcher with Dries Verhoeven, remarks that although he does think *Happiness* is played by a robot, he means that the robot entails all the computers, mechanisms and technology together. Such an approach does not only question what the agent is that is a collaborator when talking about a performing robot, but it also opens up a way of becoming-with within the assemblage that is the robot.

The final main themes that thread through this subchapter are autonomy and dialogue. The collaborators position themselves and others in various ways towards technology. For example, Verhoeven talks about looking for space of possibilities in between the impossibilities of the technology. In those situations technology does not merely cater to the ideas of the theatre maker, but there is a collaboration in what the abilities and qualities of the particular apparatus do to steer the performance in a certain direction. Kaegi approached the collaboration with technology less as one of mutual exploration and more of a tool. They both however assessed a border between the artistic team and the technological design team.

4.1.2 The Collaborators In Conversation

Stefan Kaegi reflects on the process of *Uncanny Valley* as more linear, in contrast to other processes he has experienced. Instances where questions were mobilized, according to our conversation, were mainly human-driven. Kaegi describes a clear goal that was set out in the beginning of the process: to have a highly naturalistic robot give a lecture. Most questions arose from this aim, such as whether or not the outfit should cover the robot's chest, and were asked and worked out by himself and his team of assistants, a set designer and a dramaturg.

He proposes the term 'negotiation' to characterize the collaborations in this process. The negotiations with the technological team were of a practical nature. What is possible in the timeframe and with the assigned budget? It is in this negotiation, however, that Kaegi assigns some considerations to the technology itself. "The heavier the arm gets, the less smooth he moves, but the lighter it needs to be or the finger can do less movement."[49] An important note is how this back-and-forth with technology often did not occur while working with the material itself, but through the technological team as translator and predictor of possibilities. The necessity of human representation is found throughout the conversations.

Dries Verhoeven describes a similar process of negotiation. He points out that after the initial ideas that he discusses with his team, questions arise from the field of technology.[50] He allocates a dramaturgical force to technology not only because of its abilities, but also because of its cross-compliances, such as cost, time investment and available expertise. These cross-compliances further blur the border between how technology behaves in the process versus how it is represented.

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[49] Interview Stefan Kaegi, 2.

[50] Interview Dries Verhoeven, 1.

Already in the conceptual stage of the process, technology forces the team to rethink the composition of the worked out elements. In this early stage of merely working out concepts, he recalls finding out through conversations with Kaegi that 'the motors produce sound, so if fifty motors work at the same time, it produces an amount of noise that could get in the way of personal contact.'[51] Verhoeven and his team then imagine the use of a sound-proof glass wall, a choice that adds to the original message of the performance; connectedness or lack thereof in a world with artificial states of mind. Verhoeven admits he finds it fascinating when technology forces him to make certain choices that resonate with the themes and concepts of the work. This insight draws the notion of the dramaturgical work away from Verhoeven as the driving force, and depersonalizes dramaturgy.

He does, however, revisit exactly how much of a questioning agency technology has in his process.[52] When asked about ways in which technology could be perceived as more of a collaborator in a process, Verhoeven prefers a collaboration in which he remains autonomous. Other domains are allowed in at set moments in his process, and he shuts them out when they have offered him enough. Here, the difference between technology and the technological team becomes blurred. The technological team is perhaps a group of humans translating the technological possibilities, only to be let into the process when requested. Already in this representational construction the focus is on the range of known possibilities. This limits the agential forces technology can have within a process, through for example randomness and errors.

The dramaturgical force of the robot itself breaks free from its translators in the latest phase of the process, according to Verhoeven, as he states that it influenced the work more than the humanoid builder did. The particular mode of mobilizing questions arises in this fine-tuning phase as the robot, through tiny changes every run-through such as an arm moving a little slower or the head twitching unexpectedly, seemed to try and mimic the human stand-in that preceded her.

Casper Wortmann, researcher with Dries Verhoeven's company, recognizes this dramaturgical force earlier on and in other aspects of working with the robot. "I am dead-serious when I say that I regard technology as an animal, that evolves."[53] As an example, he speaks about the fake skin that is on the robot's face and was supposed to be applied on the body as well. It was costly, a hassle and hard to work with, which led to Wortmann's conclusion that perhaps the robot does not want this. He proposes to turn the process around; start from what questions the robot asks and mobilizes.

The dramaturg of Dries Verhoeven, Hella Godee, describes how in her perception, already questions are mobilized and answered by the material in the first phase of the process. She compares the process to the multiple stomachs of a cow, that allow grass to pass through multiple times while being chewed again and again. In this manner plans are tried, tested, questioned and

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[51] Interview Verhoeven, 2.

[52] Ibidem, 9.

[53] Interview Casper Wortmann, 5.

redefined. However, the material in this case is not often the actual technology. A placeholder or prototype is drawn into the process in order to mobilize the necessary questions. The fact that this was not the robot itself, but a human being, only able to act and offer within the realms of human possibilities, has influenced what agency the robot had in the process, Godee reflects: "I can imagine that if you put a robot there, even if it only worked for a third or a sixth, (…) we would have reached another way of thinking, more from the material itself."[54]

Stefano Trambusti describes a similar desire, and compares the role of the robot in the process with that of a puppet and his experience as a puppet theatre maker. In the way he describes how he is used to working with a puppet, he touches upon something that can be seen as mobilizing questions. When he would work with a puppet for the first time, they would get to know each other. The material would start a conversation, so to speak, with the human handling it. The puppet, through its characteristics and properties, would cause the makers to ask themselves "What is this telling me? What are the limits? How can it be understood, what does it like and what doesn't it like? What works?"[55] The ability to mobilize such questions is small when the technological team, where he was a part of, were mostly reproducing movements from a video of a human actress. To him as a collaborator, the robot's ability to mobilize questions was minor.

This not only had to do with the technology, if anything, he was able to play with it the most of all the collaborators. He touches upon the process and the trajectory itself.[56] We ventured into this proposition together during the conversation. The core of this exploration, rethinking the process, is that the creative and technological process together need some time to experiment prior to any set decisions. Not only would that offer the technology itself the possibility to play a more significant role in the becoming of the work, it would also take away the need for the creative thinkers to define the terms and outcome of the building process in advance.

4.2 Alienating: Imagination As A Substitute

4.2.1 General Findings And Themes
The act of alienating within a process is formulated by Georgelou et. al. as a tactic a collaborator can deploy. The question answered n the following section is about when it is the technology that is alienating, or shows a potential towards playing such a role in the collaboration, according to my conversational partners.

On first sight, it appears as though these processes demand a rather imaginative way of making and designing. The Dutch word for imagining, "voorstellen", has triple meaning in a design process. As my interview with Verhoeven was in Dutch, I noticed an interesting mix-up in my

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[54] Interview Hella Godee, 8.

[55] Interview Stefano Trambusti, 1.

[56] Interview Trambusti, 4.

understanding of him, when he sketched the process for me. "Voorstelling" can refer to imagination, but also to a proposal and a performance itself. Because of the impossibilities to play with the actual material, with no artificial skin to touch or see, limbs to move, space and time to take up, the imaginative powers along with communication and negotiation within a select team are what drive the initial design process.

However, such an approach to the process would keep intact the representative powers of textual and discursive thinking, a way of thinking that Karen Barad rejects as the predominant way that meaning is made. It implies that there is a reality, sitting still, free of agency and full of meaning.[57] The meaning of "voorstellen" as proposal in relation to the imagination, is therefore an interesting one using the lens of Barad's intra-action. Verhoeven recalls the need for the space to turn into the small cubicle, in order to feel what size it is supposed to be. Elements are added, played with, albeit not the finalized versions. The relationship is enacted within the process, in order to grasp the meaning of the material. In a way, the meaning of the finalized matter is rehearsed, in order to be able to formulate the qualities, abilities and agency of the material.

Another interesting theme that arises when looking for alienating forces, is about a confusion of tongues. The artistic and the technological collaborators ask different questions, and demand other ways of approach to the process. The communication required can serve as a means of alienating, as well as commoning. It forces a collaborator to re-phrase, re-examine and re-imagine, but it also forms a platform for collaborators to question and discover the commons. The technological questions boil down to what it has to do, a question they themselves try to answer by looking for how it can do what it needs to do. The artistic question, in a sense, is also focused on what it has to do, but more in the direction of the effect. What should it do to me, to you, to the spectator, so in a sense, the doing here is comparable to the saying, the transferral of meaning. Questions such as: what should the work communicate? Miscommunication seems to stem from the *why's* between both questions, and how in order to answer the former, the latter needs to be explored first and vice versa.

The importance of a shared vocabulary might be a way to improve the collaborative environment. This was first brought up by Kaegi , and also mentioned by Verhoeven, when asked about what they would tell their past selves using their hindsight knowledge. Both referred to some technical specifics that they would have liked to have communicated more clearly. This reinforces the idea of an assignment, rather than a collaboration. At the same time, not being able to transfer findings on either side of the field emphasizes a necessity to dive into the parallel processes. This could entail answering questions such as: when do you know exactly what you want, what the performance needs? Can you afford to make mistakes, to be uncertain, when the financial and temporal circumstances demand that the phase of not-knowing is behind you?

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[57] Barad, *Meeting The Universe Halfway*, 132 - 151.

Taking into account the previously described theme about imagination, a specific tactic emerges; one where material is the language, or in a more spatio-temporal sense, the movement is the language. Verhoeven explains how he not only helps his imagination by working with a human actor, something Kaegi also describes, but also uses scoot mobiles to see how for example what speed *works* for what meaning. Substituting the real thing, breaking down in elements before letting the assemblage take place out of sight.

4.2.2 The Collaborators In Conversation

The robot used in *Uncanny Valley* entered the theatre three weeks before the premiere. Imagination and substitution therefore played an important role in the process leading up to these weeks. In the case of *Uncanny Valley,* the text functioned as the framework for this period. Kaegi describes how he is still amazed that it all fit together so well, as they designed the lighting, the audio recording and the set while the robot was being built in another city. This linearity is not a characteristic of Kaegi's ideal process.

> I was much less surprised by the physical manifestation of the robot than I would
> probably be of an idea of how to use light on stage, or of the abilities of a performer. (…)
> We had quite a clear picture of what it was going to be and it was more or less like
> that.[58]

This exemplifies how such an approach, where the robot is being built away from the rest of the process, and for the majority of the available time, pulls away any alienating forces from the technology itself.

From the moment the robot was present, and Kaegi worked closely together with the programmer, some instances of alienating appear in his description. It is only then that the makers can think through the material, programming and immediately interpreting in a relaying manner. Kaegi refers to accidents in the programming that were able to surprise him. Still, Kaegi does not disembark from the notion that the human collaborators, be it him or the programmer, are ascribing meaning to the otherwise inanimate object. A fitting example for this is the decision to keep the back of the robot's head open, offering a view into the mechanics that are hidden under its artificial scalp. While the team was debating what would dramaturgically be the best decision, closing it off or leaving it open, the necessary engines outgrew the space in the robot and made it impossible to seal. Although this instance can be seen as technology influencing the dramaturgical decisions, for Kaegi it has to do more with the separate process of the robot builders.

Uncertainty is a main factor in the work of Verhoeven.[59] Technology to him has the ability to shake up a balance in the spectator, similar to the earthquake that Barba proposes as a means to

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[58] Interview Kaegi, 4.

[59] Interview Verhoeven, 1.

break up existing structures. Verhoeven acknowledges the dramaturgical force inherent to particularly new technologies. As they are foreign to the public, they alienate the spectator from their feeling of being in control.

In a broader sense, the technology that is present in Verhoeven's *Happiness* rearranged the process as a whole, suggesting a form of agency as the technology redirected and framed it. Technology that rearranges resonates with the abjection of set expectations and more common workflow that would have been present when working with humans as actors. However, building a robot paradoxically demands more planning ahead and, as introduced before, more imagination. To Verhoeven this means that he opens up a dialogue with the robot, and in collaboration finds out what are possibilities and characteristics of the specific technological agent.[60] He agrees that the term 'negotiation', introduced by Stefan Kaegi, is fitting.

> Stefano would take half an hour to make the little finger move, and it would not be the right movement. I kept bringing up 'it's very important that the little finger moves' but while seeing the humanoid I could then recognize 'what if it moves an elbow? Wouldn't that express it as well, or even better?'(p4) [61]

This example shows how, through negotiating with the (im)possibilities and range of the robot, the process shifted into unknown directions.

The most apparent signs of agency from the robot appear present themselves when errors occur.

> Moments in which she was dysfunctional were very interesting. It caused a shift in her position. We started this process trying to find a representation for an artificial substance in an artificial human. She started out as a model for the healing powers of those substances. (…) But she turned into a patient, needing a lot of care and either not-functioning at times or functioning in an unforeseen way.[62]

The way Verhoeven regards the robot and its actions, refers back to the principle of alienating as it breaks and shakes up expectations and structures in the process. The interplay between human, technological and material collaborators described above, albeit taking place in a rather late stage of the process, shows a form of becoming-with. Meaning is not produced in the mind of Verhoeven at this point, but rather in the relay; the relationship between multiple agents.

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[60] Interview Verhoeven, 3.

[61] Ibidem 4.

[62] Ibidem, 10.

Instances of alienation appear in the story of Valdes-Stauber when he describes the early stages of the process. Here, there is no actual technology to negotiate with, merely ideas, concepts, that are communicated with a spokesperson of the technology: the robot builder. In this hypothetical stage the possibilities and constraints that the technology offer, steer the process in a certain direction. From his own perspective, as a dramaturg with an above-average knowledge about technological processes, it did not have that effect on the process anymore after this initial negotiation. Technology, he remarks, can have agency in the sense that it surprises you and offers input in the process, but that was not the case in this specific process. Like Kaegi, he experienced the building process as too linear in order for that to happen.

Godee, Verhoeven's dramaturg, specifies this by stating that the lack of an experimental phase with the robot has restricted how the robot could have an alienating effect on the process. At the same time, coming in with already set boundaries and possibilities the robot also confronted Godee with the agency it had. The assemblage of all the elements took place quite late in the perception of Godee. As a result, the alienating abilities of the robot were limited. There was some space for experiment as the robot was programmed in the presence of the team, but the possibilities were already so limited that "(…) we already had a precise coloring picture of how we wanted to see her."[63] At the same time, the effect she describes that the robot had on the process in the phase where it was present connects to the principle of alienating. The robot's limitations make up for what she calls a personality that the collaborators had to deal with.

Stefano Trambusti notices a difference between working with puppets and robots in relation to their ability to shake up the process, similar to how it is able to mobilize questions. In working with puppets, the material is explored, by that acknowledging how meaning can be made through intra-action. One of the elements that complicate that process when exploring a robot is the long feedback loop. It takes a lot of time to change something in the code, such as the movement of a finger, meaning ideas cannot immediately be demonstrated and transformed. Frustration builds when technology steps on the brakes of the process. The errors that the robot brings into the process therefore both appoint agency, but also hinder the ability to think through the material.

It is worth looking closer at the technology itself and at what point it is involved in the creative process. Trambusti describes how, just as with other materials and elements in a process, specific technologies carry with them a history of development. An interface, software or a piece of hardware already comes with a set of possibilities and limitations as it was either fully or partially developed separate from the current implementation. Trambusti suggests that more knowledge about the prior trajectories of specific technologies could be beneficial for theatermakers. The collaboration with the technological team would benefit, as would the relationship with the material itself. This would entail research into why and how specific elements were developed. When Kris Verdonck worked with a washing machine, it was clear to all parties that the technologies and material in that apparatus were

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[63] Interview Godee, 8.

designed to do laundry. The washing machine's possibilities as well as limitations are up for exploration, but they would hardly disappoint; there is already a shared knowledge on why it for example was heavy. Programs that are used to code in or software used to control engines carry with them a similar objective.

In line with this understanding lies the question when something can be shown or presented; the dot on the horizon a performance process works towards. He comments that theatre and technology differ fundamentally here. Technology brings with it a binary characteristic; either it works or it doesn't. A non-technological performer can from a very early stage in the process perform something.[64]

4.3 Commoning: Playing By The Rules

4.3.1 General Findings And Themes
Negotiation As A Source
Bridging the previous principle with the principle of commoning, is the deployment of negotiation as a working mode. Where the term 'negotiation' seen through the lens of mobilizing questions predominantly refers to how the collaborators understood each others fields and findings, with the commoning lens it demonstrates how negotiation can be the fibers of which the performance is made out of. Kaegi brings up this concept when describing how visions, wishes and proposals are communicated throughout the becoming of the performance. It is almost as if they are setting out the rules, not as a strict law, but as a framework engaging with what is being framed. Negotiation occurred between him and the writer, as they were composing the text, building a frame around what needs to be heard. But negotiation applies to more collisions of work within the process.

A surprising similarity in most conversations is how, apart from commoning forces within the process, many regard the robot as a means to materialize the process of questioning what is common in the audience. Technology has a commoning potential according to all, at least in the context of a performance.

This connects to a theme originating from the commoning lens; of how the context of theatre played a role. Both Kaegi and Valdes-Stauber talked about how for them, the performance was a theatre performance, full stop. It did not border with installation art, mixed media works or anything like that, even more so, they demanded the play to be staged in a black box. Valdes-Stauber recalls that when the play performed in a more industrial setting, they felt like it was necessary to border the stage as a black box, as if to say 'Here different rules apply'. For Valdes-Stauber, it is exactly those rules that offer the robot in Uncanny Valley a way to develop a certain connection with the audience, and vice versa. The robot is not interactive from a technological perspective, it doesn't respond to

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[64] Interview Trambusti, 8.

faces in the crowd or registers the sound that are being made in its proximity. It, however, works interactively through its materiality, and the theatrical rules that apply for the spectator. Something Bleeker refers to as a form of a creation process: "how performances materialize on stage and how they make sense are two inseparable aspects of the outcome of thinking through matter."[65] In other words, by using the way in which the theatrical frame and the activity of the spectator engages with the material on stage, the agency and ability to shape and form meaning of the material itself is acknowledged.

The pragmatic approach

The knowledge that is needed before experimentation can take place is vastly different for a theatre maker than for a programmer or animatronics designer. The approach to a process is more pragmatic from a technological standpoint, something multiple collaborators remark on. In order for the technological team to know where to start, the creative team needs to formulate a range of functionalities without having experimented with them. The entanglement of different elements then takes place in the mind of the person with the most authority over the work. Kaegi referred to how this way of working accumulates into an assemblage of all different elements, perhaps more like the process of an opera. In opera, classically regarded as a Gesammtkunstwerk, all elements are developed parallel to each other. Because of the libretto and musical score, the montage phase does not need a range of motion for big dramaturgical changes.

4.3.2 The Collaborators In Conversation

The choice for a humanoid robot in *Uncanny Valley* was informed by the perspective that it would be a commoning force in the performance. Kaegi describes the intention to make the audience feel mirrored, have it empathize with the robot. The search for what is 'in common' is in this case less of a dramaturgical force in the process, and more an envisaged effect. This approach also appears in Verhoeven's interview, as also he utilizes this dramaturgical characteristic of technology. For Verhoeven, however, this does not mean the technological actor needs to resemble a human as much as possible in order to achieve this effect.

Taking into account what role the human example played in this process, it is not surprising that Kaegi recognizes most of the commoning forces in the naturalistic performance. The model for the robot was of course an actual human being, and while the robot was being built, the team rehearsed with an actor, playing a robot, playing a human. Therein lies a limitation when using an organic prototype. The material and the technology have possibilities outside of the realm of the human. However, these can not be discovered and incorporated when the working material is restricted by for example physical limitations of the human actor. Even though the objective of the robot was to mimic a human giving a lecture, the description of the last few weeks and the

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[65] Bleeker, "Thinking That Matters", 126.

collaboration with the programmer show how vitally different the relationship with a human actor was in comparison to the one with the actual robot.

> This was a very different process than a process of making a performance, because I don't normally define my protagonists gestures. Like, how much should the eye be open when he says this, how much should the lips smile?

The collaboration with a programmer demanded of Kaegi to micro-direct, on a level that is impossible with human actors. He even joked that this is what Bob Wilson would dream of, as he is known for his very precise approach to movement and text that often appear as separate rhythms in a performance, addressing and enhancing one-another.

The need for a prototype reinforces the underlying desire to think through the material itself. Kaegi refers to the term 'negotiation' when describing how he approaches all the collaborations in this process. Strategies involving prototypes but also sketches and models can be seen as ways to build a bridge between the theatrical process and the technological process in order to open up negotiation. This urge to find an exchange outside of the verbal domain stems from a lack of understanding the other fields of expertise and their matching vocabulary.

> It often feels like a big black box in the sense that you try to understand what the technicians could do, but the words you use are not communicating clearly enough to them (…) or you misunderstand because you use a different vocabulary. There I would situate quite some of the frustration of working with technology.[66]

The debate on what is common between ideas, groups nd humans, as Lorey describes the process of finding commons, is also a red thread through the process of *Happiness* according to Verhoeven. Technology opens up the possibility for commoning in a work, as watching a "stoic apparatus"(p.8) offers a way for the spectator to relate to it in a different way than with a human actor. Commonality gets to be discussed on a more abstract, societal or even amoral level. To Verhoeven, this is an effect that he holds dear in all of his work. *Happiness* plays, regardless of who is the onlooker. The meaning of it is made in the relationship that the particular spectator builds with as it assembles the elements that are offered in the piece.

The search for what is common that is conducted by the spectator however is no aspect of agency of the robot itself. Verhoeven says about the urge to find the human aspects in "lifeless" technology that it is interesting to him, but that ascribing agency to it seems too farfetched when looking at the technological possibilities.

Another reasoning behind instrumentalizing technology is brought up by Valdes-Stauber. According to the dramaturg of the Muncher Kammerspiele, the relationship between the audience,

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[66] Interview Kaegi, 3.

the robot and the theatrical elements such as the text, offer possibilities for new ways of creating theatre, and with that, meaning. In his reflection on how a process can incorporate technology he distinguishes three possibilities. "… Regarding technology on stage I would say there is three things you can use technology as a device, as a topic, or you can create a new theatrical situation."[67] With *Uncanny Valley*, he remarks, they pursued the latter. Relationality lies at the base of this situation, where meaning is made through the collision of elements and materials. This perspective resonates with the entangledness of string figures. Meaning, or in this case, the theatrical situation, is formed in a relaying manner.

However, when asked directly if he regards the robot as a collaborator, it is a bridge too far for him. Ascribing too much agency to material disregards human collaborations, then "this pencil is a collaborator".[68] Just as with Verhoeven, the technological development is what holds the robot back from having enough agency to be considered a collaborator. Valdes-Stauber does remark that in other processes he experienced the technology as more of a collaborative force, the reason being its ability to offer anything unexpected. When the robot arrived, it had the set of motors that was negotiated, and was able to do the movements the team decided on in the beginning of the production process.

Verhoeven's dramaturg is less hesitant about ascribing agency to the robot, and combines the commoning forces in the process with those that involve an audience. Although Godee refers to questions that are mobilized when working with a humanoid robot, the dramaturgical force she describes fits more with the principle of commoning.[69] Just like Verhoeven and Kaegi, she acknowledges how a humanoid instigates a debate on what is common. This debate is not limited to the physical aspects of the robot, but also includes its place in society and what rights and responsibilities apply to it. Understanding the robot in this manner, offering it a stage and a place in the debate, suggests a perspective on becoming-with. An entanglement is not only implied, but rehearsed through the work. She describes another debate about the common that the robot is able to invoke; one where the dichotomy between nature and technology, organic and artificial is questioned.

When I inquired about the role of the robot as collaborator in the process an interesting division arose. In Godee's perception, the technological and the creative process were intertwined because of the efforts of Verhoeven to stay involved. His knowledge of the robot as well as of technological possibilities in general made it possible for them to decide what darlings to kill and what developments to pursue. At the same time, she refers to seeing the robot so late in the process herself as a handicap. There was not enough room in the process for the robot to be a dramaturgical force as much as she would have preferred. It seems like the first observation of Godee limits itself

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[67] Interview Martin Valdes-Stauber, 2.

[68] Ibidem, 7.

[69] Interview Godee, 8.

to the physical possibilities of the robot. In the second observation, she acknowledges that these physical abilities are not one-on-one translatable to the imagination. There are aspects to the dramaturgical force of the robot, its meaning-making abilities, that require a performative context.

Space for this dramaturgical force might be hidden in the approach to experiment of the human collaborators. Wortmann, who besides making theatre has also studied artificial intelligence, remarks how his approach to a process is much more pragmatic when he is programming for a theatre maker as opposed to being involved in physical experimentation with a theatre maker. He expresses how this pragmatism is necessary in order to design something that the theatre maker then can work with. In his experience, when he delivers software on the set deadline, that is when the actual relationship with technology in the process starts. He argues that a deadline for technology might not mean the same as a deadline in theatre. The relationships that technology then can engage in form perspectives on becoming-with, and reject false dichotomies between the human and more-than-human through its materiality. With this perspective, Wortmann connects to the other interviewees.[70]

For Trambusti, the question of whether he regarded the technology as having agency was an easy one.

> Absolutely, all the time. It's like the technology guides you, you are only a feedback maker. (…) I try something, and the material itself and the technology itself chooses for you if it's working or not working. It's really hard to say that you can choose stuff, I think it's the other way around.[71]

It is interesting to note that of all the conversation partners I met for this research, Trambusti had the most technological background and therefore had the most direct interaction with the robot's becoming. As the key principle of commoning can also be signaled in the relationships that are engaged in, the awareness of the interaction with not just one robot as a whole but with all its differing parts appoints to this dramaturgical force being present in the perception of Trambusti. The technologies are already curated for certain reasons and composed before or while the creative process starts. These engage in a relationship together worth looking into, especially using the lens of intra-action as a way of meaning being made. Approaching the technological collaborators as a process in itself, a form of becoming-with, also stretches the understanding of their ever-changing agency within a process, rejecting a static idea of its meaning and possibilities.

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[70] Interview Wortmann, 9.

[71] Interview Trambusti, 7.

5. Conclusion

In conclusion, the collaborations that I have analyzed with a dramaturgical lens have shown varying perspectives on becoming-with. These perspectives influence not only how they work with technology, but also with other human collaborators. Besides reflecting on the analysis as a means to answer the main research question, I have also set out to reflect on the way I conducted the research. This chapter therefore also answers what insights the specific lens and the dramaturgical perspective offered when processing interviews.

When laying out the dramaturgy of the process, with all its relationships formed, collisions made and relays sent back, forth and through, the actual matter appears to take up a rather central role. The technology, with its limits and impossibilities as well as favors and preferences, proposes questions to the makers. This connects to how Georgelou et. al. write about the absent dramaturg, and how the dramaturgy of a process comes to be through the collaboration. The reflections of Verhoeven and Kaegi imply a central role for the robot in that collaboration. That role, however, is not used to its full potential.

Collaborations in interdisciplinary processes, where various kinds of expertise and knowledge work together, are inherent to the field of knowledge transferal. The processes differ per individual situation, as do the roles of the people I spoke to for this thesis. There are, however, certain phases that are characteristic to a process in the field of performing arts. In both cases there were moments of conceptualizing, experimentation, rehearsing and montage. They have in common that the robots appeared in the final stage of the theatrical arch: the montage. Collaborators from both *Uncanny Valley* as well as *Happiness* ascribe agency to the robot in this stage; from displaying unforeseen errors, attributing to a less hierarchical and linear process. Here, a becoming-with takes place. Because of the specific timing of the technological collaboration with all other relata of the performance, late in the theatrical process, its influence is limited and the agential force is sometimes experienced as frustrating or slowing down. Trambusti touches upon something interesting when he compares the binary characteristics of technological performing agents to non-technological agents in theatre. The latter could be seen as more of a scale. Perhaps what is performed is not yet complete or in balance with other elements on stage, but it can grow and develop while being performed.

Another conclusion is that all collaborators reflect differently on what collaboration with a robot entails. The perspective on agency that a robot had in a process ranges from very limited as the technology is not developed enough as Verhoeven remarked, to undeniably present in the eyes of programmer Trambusti. Expectations on how technology behaves seem to be the driving force behind these perspectives, as well as the ability to think-with instead of only imagine the robot. The perspective on the collaboration is also defined by the collaborators idea of autonomy. Verhoeven's example of choosing when to let in advice from the technological team proves how he holds authority over when the process turns into a material practice. His assistant and researcher Wortmann regards

it less as an autonomous and more reciprocal relationship, which leads to a more radical understanding of becoming-with.

When a technological design process runs, at least in part, parallel to a theatrical process, the collaborations need redefining. A dramaturg that usually would act as a connector between ensemble actors and incoming directors, now finds himself without human actors, playing a negotiating role between the spokesperson of the concept and the one of the practical possibilities. These findings do not only suggest that a combined process needs rethinking from first ideas to premiere, but also what kind of human collaborators should be involved and what their function should be. In both case studies, technology got to be represented by a human on multiple occasions. This representation could be a precondition for an interdisciplinary process, but also limits how collaborators reflect on the robots agency. When a theatre maker is not present when the robot offers anything unexpected, unknown or new, its agential forces are limited and with that the potential of becoming-with.

The representation of technology is two-fold. There is a human with a certain expertise on the technology's functioning, and there is the representation through language. In order to understand other collaborators, a translation has to take place, first from material to lingual representation, then into a shared language that is established in the specific collaboration. The terms *language* and *dialect* kept emerging in the conversations. Feedback loops, networks and tentacular thinking are all in demand of relays that in some way understand one another. Intra-action, as Barad states, is explicitly non-lingual, because of this layer of representation. It would suggest that there is an *a priori* meaning that can be represented. The collaborations, however, already portray ways in which a thinking-through-material can be achieved transcending linguistics; through prototyping. In both processes the absence of the robot was compensated by using a human actor. This solution has its downsides; a becoming-with is limited by the scope of human possibilities. It does however illustrate that a spatio-temporal approach to the becoming of both performances was aspired. The search for a prototype to think-with could be an interesting next step in the field of theatrical robotics.

5.1 Discussion
The approach I chose for this research, a dramaturgical lens on conversations on collaborations, offered a way to, in a way, read between the lines. Every collaborator had her or his own perspectives as well as ways to express that perspective on becoming-with. The three key principles that signal dramaturgical forces functioned as a lens as well as an analytical framework. This means it was both an academic foundation on becoming-with in the context of dramaturgical agency, as well as a way

to find overlap or contrast by allowing the collaborator's perspective to go into conversation with each other.

However, as Georgelou et. al. state themselves, the key principles do not offer a method into a holistic dramaturgical approach. The entanglement of the principles therefore at times made the separation made in the analysis feel arbitrary. What from one point of view could be seen as mobilizing questions, could also easily be recognized as an alienating force. I therefore argue that the most valuable conclusions from this research stem from the overarching themes that appeared as the separate voices were linked through a key principle. For further research it would be useful to experiment with this lens to analyze a live process, as its depersonalizing qualities make it possible to clearly recognize material or technological agency.

In line with this recommendation, there is more to research in an ongoing process. A possible follow-up would be a study on a process as it develops, with a focus on what expertise is leading at what point of the process, or case studies where collaborators experiment with their role as a whole. As a consequence of the Covid-19 crisis, I was unable to analyze the interdisciplinary process of a performing Pepper robot by puppet theatre company Ulrike Quade Company and the artificial intelligence department of the Vrije Universiteit. This was the initial plan for this thesis, and would offer insight in the questions on collaborative roles as stated above. I would strongly suggest anyone taking up this subject to involve a form of field research. The findings done in this research very specifically address technological agency in the perception of collaborators in interdisciplinary processes that lies in the past, and is limited by the amount of interviews and kind of collaborators I chose to speak with.

Finally, the parameters in this research are limiting to what common conclusions can be drawn. The robots in the case studies have a lot in common. They were made in Berlin by an animatronics designer, hence a material but also cognitive distance to the process for the creative team. The robots both arrived back into the theatrical process when many other decisions were already made, limiting the influence it could have on the performance as a whole. They were not only both humanoids, they were both based on a living human model. Taking these similarities into account, the conclusions should be read as explorations with very specific parameters. This thesis can therefore function as a starting point for further research into agency of technology, becoming-with and new perspectives on collaborations.

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