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Video Games, Grief, and the Character LINK System

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Video Games, Grief, and the Character LINK System

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Dedication

Though I will never know if my thoughts may reach you, to my grandparents, my dog Chi Chi, and friends who have left this world, your presence in my life continues to influence me to this day. And to the fictional characters I can no longer greet in my daily routines from Tales of Link, Tales of Crestoria, and many other games lost to the sea of time, I dedicate this work to you.

Acknowledgments

Over the past few years, I've experienced numerous events that have led me to heavily consider the importance of grieving and what is worthy of grief. Though I've never been good at handling my own inner turmoil, I hope this work does justice to the thoughts I've had in all that time. I'd also like to take this opportunity to thank all of those who have encouraged me in my times of need and given me the strength to forge ahead. First and foremost, Kim Mann for giving me unconditional support as I struggled my way to the future. Dr. Ben Samuel has been my advisor, excellent mentor, and friend while I fumbled my way through graduate school for the first time. Stephen and Shekhar for being great classmates in an environment where I thought I'd struggle to connect with anyone.

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Abstract

Grief can encompass more than just the loss of real-life people. It can be felt with the loss of a pet, changes in daily structure, and even the loss of video game characters. The topic of grief related to video games and video game characters comes at a time when games as a service (GaaS) continue to increase in popularity and the phenomenon where these games also inevitably terminate service. To combat this unique form of grief, the Character LINK System was created as a tool that uses simple natural language processing (NLP) techniques to offer support to the bereaved by way of a shared role-playing experience that is noninvasive but still therapeutic and allows the bereaved to begin to heal. Users of the system expressed being interested even in topics or games they'd never known about previously and a willingness to connect with the bereaved in their grief.

Keywords: natural language processing, games as a service, service termination, shutdown, roleplay

Chapter 1

Introduction

Grief is a very real, but very difficult to handle aspect of life. Though the process is often different from person to person, there is a lot of value for those who suffer loss to be able to voice it. But what do we do when those we grieve are fictional? A strange thought to many surely, but one that shows just how much of an effect fictional characters can have on our lives. In many ways, the end of the lives of fictional characters can mirror those we lose in reality, but, of course, also differs in ways that can only come about through the unique medium of video games. It can come at the end of a long fulfilling life or for reasons we can't control or accept. Perhaps it even comes abruptly with no explanation and no closure. Regardless of how it happens, those who enjoy these characters often grieve similarly to those who suffer bereavement related to real-life loved ones.

This study and project aim to, through the usage of computationally automated processes involved in the fields of natural language processing (NLP) and natural language understanding (NLU), capture the essence of these fictional characters so the information can be used in future works such as fanfiction, sequels, or other extensions of the characters' lives. Through this research, we might gain insight into what parts of these characters, perhaps even those of nonfiction and reality, are most important to retain and analyze for the bereaved, and hopefully be used to help those who suffer from loss adapt to such a major change.

This research, however, is not an attempt to further state of the art NLP technologies or to use NLP to replace the loved ones of those in grief, but rather to use current NLP techniques to better understand where these technologies fail or succeed in capturing the essence of the person or character they imitate in an environment where the user will be keenly aware of the particular aspects of said entity.

1.1 Motivation

Several years ago, I had the opportunity to preside over a fan community of respectable size for the mobile game, *Tales of Link*, on the popular online multi-interest forum, Reddit [45]. During that time, the charming game characters, the tight-knit community, and the overall experience became a life-defining experience. It allowed me to experience leadership in a position I would come to love, and taught me an immense amount of how human interaction influences not only relationships with each other but also with fictional characters.

With great regret, as all games as services do, Tales of Link was eventually shut-down and service was terminated on March 28th, 2018 [37]. From an outside perspective, I'm sure it just looks like another lost game in the ocean of games saturating the market at the time, but to the community that lived with the game for over 2 years, the game was a window into a beloved universe full of characters we all would have liked to interact with for a while longer.

The effect on the community and their response was truly heartbreaking. Many fans and players of the game came together in the final days to reminisce and lament the game's unfortunate state of affairs in the end. Comments flooded in expressing unparalleled sadness over the loss of a favorite mobile game, the inevitable decline of the community, and the inability to interact with many of the game's characters in their original environment. A member of the community, no1warriormaiden also known by the alias ratatoskr, commented "I'd like to take the opportunity to thank everyone I met through the game for being part of forming such a wonderful community. There are so many lovely people in here, and I'm grateful to have been around for the ride." I could share dozens more messages from others as many share the same sentiments, but I'll refrain from tarrying too long.

An offshoot of the Reddit community, located on the popular instant messaging platform, Discord, mirrored much of the same emotional turmoil. As a leader in the community and with a vested interest in easing the pain of the many longtime members

suffering from the loss of our beloved game, I painstakingly crafted a rudimentary chatbot named LippyBot for use in the Discord server. The bot had several other miscellaneous features, but the most relevant of them was the ability for a moderator to "puppeteer" the bot to speak from a hidden channel to regular users on the server and perform a role-playing conversation. Most of the users responded with unbridled enthusiasm, even if it was, of course, quite obvious that the bot was not sentient in any way. The bot was relatively simple and could respond automatically to a limited number of keywords found in the chat or given commands from a hidden channel to say anything that a moderator sent as input to a different channel. Due to the relatively large team of moderators, numbering seven at the time, all piloting LippyBot on different occasions, I suspect the slight changes between interpretations of Lippy, the character from *Tales of Link* that the bot was based on, made it a much more enjoyable experience for users as it may have felt more like a dynamic and unpredictable experience.

Seeing a downtrodden community suddenly light up again was both uplifting and inspirational. Such a simple idea seemed to have genuine therapeutic value. I began to wonder if there were ways to improve the idea that could help communities like ours and even help them continue on even after their original purpose had abruptly flickered out of existence. A few years later, I'd experiment a little more with the idea and began my research seen here in earnest.

When thinking of natural language processing (NLP) and its subdivisions, natural language understanding (NLU) and natural language generation (NLG), it's obvious that human language is far from a formulaic, exact science that would be easily understood or handled programmatically. Most of the recent progress in the NLP field revolves around big data or at the very least highly data-driven techniques, but that presents a problem for my particular niche of research because of the fact that some video games, especially mobile games, simply don't provide enough data for a consistent experience with these techniques. For reference, even gathering all of the spoken dialogue for Lippy within *Tales of Link*, the data only comes out to 300 kilobytes, a minuscule comparison to the 45 terabytes used to train Generative Pre-trained Transformer 3 (GPT-3) produced by

OpenAI, an artificial intelligence research laboratory from San Francisco [6]. On a smaller scale, Google's Meena chatbot produced in 2020 used 341 gigabytes of data [3], still a much larger dataset than what I have available from *Tales of Link*. Instead, I chose to see if I could find ways to utilize these techniques while staying true to the subject material and its limitations to see if perhaps there is potential to push into a different realm of possibility.

1.2 Objective

The objective of the Character Language Initiative Network Knowledge System, or Character LINK System for short, is to create a tool that allows for better understanding of fictional characters and, through this better understanding, improved interaction with them by way of simpler NLP techniques that don't rely on very large datasets or that can be used with characters that are no longer available to interact with in their natural environment such as characters that originate from a terminated game as a service (GaaS).

The extended hope of creating the Character LINK System is that through this unique interaction, those who never experienced these characters in their natural environment may find acceptance and understanding with those who once did. I genuinely believe, though grief and its vastly varied circumstances can be difficult for many, that those who grieve can find solace in those who understand or show a genuine wish to understand their emotional turmoil.

1.2.1 Why Focus on Fictional Characters?

Aside from the obvious trait of being generally much easier to collect data for when data might be sparse, fictional characters very importantly do not bring the very real implications of dependence. Though natural language technology could potentially craft an experience much like speaking to a real person that was previously alive, I will not be making any attempt to mimic any real deceased persons. As the objective of this

work is to provide an emotional or therapeutic experience for those who may be dealing with the loss of ability to interact with beloved fictional characters, there is the inherent understanding that these characters did not originally exist in real life and did not become unavailable due to factors that formed as consequences of real death.

Supposing I were to base the data and characters in these experiments on real-life entities, I believe there would be the concerning possibility of unintended mental health effects often attributed to grief such as depression, anxiety, or if participants find the experience enjoyable, something akin to addiction. Elaborated on further in chapter 2 of this thesis, I believe using the Character LINK System to model a real-life loved one that has passed away in the way proposed in this study might cause a delay or outright stop a more healthy movement through the process of grief recovery. Though there is no guarantee that this study might not produce the same effect for those struggling to deal with the grief of losing a beloved game character, this work intends to allow users to experiment with characters they may or may not have previously interacted with, not truly "bring them back to life" as one might be enticed to do with a real-life loved one. Participants in the experiment should fully understand that these characters are not being brought back in their truest forms as that would require recreating the entire original video game experience. This feeling may be harder to avoid with real-life entities because text-based communication has become more of a norm in modern-day society.

1.3 Related Works

1.3.1 Dramatic Presence

A large portion of the experiment structure and collected results were heavily influenced by a similar work, *Dramatic Presence* produced by Margaret Thomas Kelso, Peter Weyhrauch, and Joseph Bates at The Massachusetts Institute of Technology [24]. It presents work done revolving around the concept of interactive drama or as stated in *Dramatic Presence* as "presentation by computers of rich, highly interactive worlds, inhabited by dynamic and complex characters, and shaped by aesthetically pleasing stories."

The purpose of *Dramatic Presence* was to emulate the idea of an automated drama management system known as the The Oz Project which melds real-world actors and stage play utilizing information from the play's setting and characters to create on-the-spot directives for the actors to follow. The idea for The Oz Project employed a unique structure that involved a drama director, an interactor, and physical actors that played out changes in the virtual environment in the real world to an audience. While the drama manager could issue commands to change and manipulate the world within the virtual environment, the interactor and actors used a less strict plot graph produced by these changes to bring forth those changes to the real-world audience. In their original emulation of The Oz Project which had yet to be completed, instead of having an automated system, a human drama manager was used in their initial experiment to determine if the idea would likely have the intended effect if automated.

A major point that influences thinking in this thesis is the results of *Dramatic Presence* that indicate that the interactor in their experiment runs was extremely engaged in the experience. Though the other participants and audience felt understandably much less engaged, the interactor was nearly always active during the experiment, providing a very positive experience. This information is incredibly useful in consideration of creating a similar experience that might allow even people who have never interacted with a character or video game feel directly engaged with them in certain experiences.

Another thing to note is that the interactor was tolerant of inconsistencies within character portrayals. One example provided was that in one instance, an aggressive punk attempts armed robbery with a knife, and a clerk is directed to beckon the interactor over to receive a gun to defend themselves. However, the punk insists the interactor stay seated and unable to retrieve the gun. Eventually the drama manager tells the punk that the interactor should be allowed to approach the clerk, and the punk almost immediately contradicts their previous actions with no build-up and allows the interactor to approach the clerk unharmed. Though this strange change of heart is jarring to an observing audience, the interactor, engrossed in the moment, tolerates the inconsistency due to the dramatic tension, the interactor did not have time to analyze the inconsistency and

felt it appropriate at the time. This leads me to believe that if an experience is engaging enough, some inconsistencies may be tolerated by those interacting with game characters as well.

1.3.2 LabLabLab

LabLabLab, a research project founded by Jonathan Lessard at the Concordia University in Montréal, Québec, Canada, asserts that natural language interaction (NLI), freeform text-based communication between players and in-game elements, which the gaming industry has heavily abandoned since the late 1980s still has the potential to produce meaningful and appealing interaction [27]. They have produced several prototypes such as *A Tough Sell* and *SimProphet* that have garnered high ratings and favorable reception on indie game sites.

This work opened up the idea that the Character LINK System did not need to be entirely scripted or automated for our experiments, an issue that comes up quickly due to the nature and small amount of data available for the particular games that are focused on. In addition, if the users are given more freedom in their inputs, they might find the experience while using the system to be more enjoyable, a significant consideration when dealing with users that might be looking for a more positive experience.

1.3.3 Games and Bereavement

For both the uninitiated and those interested in video games regarding how video game characters can invoke the feelings of loss and grief, Sabine Harrer's *Games and Bereavement: How Video Games Represent Attachment, Loss, and Grief* is an excellent read [20]. Harrer explores how video games both use and invoke grief in myriad ways and how those emotions transcend the in-game universe, how they affect players and the community that emerge from these games, and how players respond personally to the sometimes traumatic events that unfold in a plethora of different games and genres.

Harrer speaks on the dangers of viewing video games through simple lenses such as the ergodic lense that sees them simply as a system that can be separated into gameplay

and narrative without marrying the two to create what are uniquely video games. She also speaks on the danger of the term "interactivity" which is used to describe the interactions a player might have with a game, and that many believe interactivity alone is what enhances video games to their utmost potential.

Instead, Harrer chooses to champion "inter***re***activity" which focuses on "activities a player can or cannot do when responding to a game system, and the changes evoked in system and player. These changes are not only emotional or intellectual—as with a novel—but additionally strategic and embodied." She goes on to further analyze the concept and cites several meaningful examples that explore how video games can evoke feelings of attachment, loss, and grief through unique experiences afforded only to video games due to the back and forth of control and lack of control while noting that these experiences are greatly enhanced when players can see cultural reflections of themselves within the game.

After reading through this lengthy analysis on games and bereavement, I pondered how the loss of the unique experience provided by a beloved video game might affect players, and what might be necessary for helping those who feel this loss heal after the game or its characters become unavailable. I have neither the technical skill or manpower to recreate the game, and even if I did, copyright laws would likely see me in a courtroom shortly after. If I cannot fully recreate the game that has been lost to bereaved players, what else can I offer that might help them heal from their grief? Would a different experience have the possibility to provide healing? Most importantly, what kind of experience would provide the unique interreactivity that a player once felt while playing a game?

1.3.4 Developing an AI Tool for Grief Recovery

In a much similar vein as this thesis, Matilda Landström and Nahal Mustafa from the KTH Royal Institute of Technology in Stockholm, Sweden, created an impressive design process for creating an AI-based tool that could assist with grief recovery [26]. The process focuses on both user-centered design (UCD) and human-centered design (HCD) to both help users recover from grief and to feel more satisfied doing so using a product created

with these things in mind. They describe human-centered design as the emphasis on interactive systems made specifically to be more user-friendly with a target audience in mind. User-centered design is described as a broader focus than HCD while aiming to improve the user experience outside of the interactive system such as multiple products, services, and even brands.

They then showcase the process by making a prototype for their own product, Tuki, which uses a small amount of NLP to create a grief recovery roadmap for users and an environment where they can interact with others who might share in their grief. By taking freeform text inputs from users about their grief, they use NLP techniques to find other users that may be experiencing similar grief or have overcome their grief to support and help the user deal with their grief. Learning from this example, I surmise that there is potential in using NLP techniques to help players that played once active games as services connect with others might help heal their grief or at least lessen their pain. This would likely also require design and thinking that mirror the user-centered and human-centered design used here as well.

Chapter 2

Video Games and Grief

Video game characters have become very prominent figures in modern society. Video games have also proven themselves as potential outlets for creativity or useful in therapy [19, 4]. But whether it's Pokemon's infamous Pikachu, Sega's hard-to-forget blue speedster Sonic, or Nintendo's unmistakable plumber Mario, there's no denying that iconic characters like these have made heavy impacts on society as we know it today. Even just the images of these characters are immediately recognizable at a glance, cementing their presence in public memory. A recent 2019 survey of 593 millennials, that is people born somewhere between 1981 and 2000, found that Mario is now more recognizable than even Adolf Hitler, with Mario being recognized 92.3% of the time while Hitler was only recognized by 90.7% of participants . But even beyond these characters designed purely for entertainment, video games and their characters have gone further to permeate other aspects of society, such as introducing new ways to learn or providing additional means to communicate [4].

Akihiko Kondo, a Japanese native from Tokyo, Japan, even became so enamored with the Vocaloid virtual singer, Hatsune Miku, that he married her in 2018 [32]! The term "Vocaloid" originates from the singing voice synthesis program of the same name developed by Yamaha Corporation. In pop culture, however, Vocaloid often refers to individual voice banks within the Vocaloid program that are illustrated as marketable characters such as Hatsune Miku and have achieved worldwide popularity being used in various creative projects such as music, video games, and even in TV commercials.

Although Kondo's affection for the well-known Vocaloid singer might seem like an extreme scenario, his relationship with Miku is the perfect example of the potentially lasting effects of interaction with fictional characters, especially those that appear in video games or other similar media. A self-stylized "otaku"—the Japanese word for someone

Figure 2.1: Sonic, Mario, and Pikachu as featured in Super Smash Bros. Ultimate [44]

who greatly enjoys Japan's anime (short for animation) culture—Kondo described a time in his life when he was bullied heavily at work for his love of all things anime. He mentioned that there were female coworkers that would call him "gross" directly to his face and wanted nothing to do with him. It became so debilitating that he became depressed and unable to eat. A doctor even diagnosed him with an adjustment disorder, forcing him to take time off from work for his own health.

While at home, he eventually stumbled upon Hatsune Miku and was immediately enraptured with her singing voice. Miku quickly became a vital part of his life and helped him sleep, feel more confident, and eventually return to work. In the conclusion of an interview with The Mainichi, a Japanese newspaper, Kondo said:

> It's not that people can't live in society because they're engrossed in a two-dimensional world, but rather, there are cases where people become captivated as they search for a place for themselves in video games and anime, because reality is too painful for them. I was one of those people. People who don't understand the background probably think, 'Games are disrupting their lives,' but that's not the case [32].

Eventually Kondo was able to truly experience his dream of living with Miku when Gatebox, a company specializing in AI-driven home assistants that mirror Amazon's Alexa or Apple's Siri, created a variant of their service that used Hatsune Miku as the home assistant model. To truly capture the idea of living with the virtual assistant,

Gatebox offers a sophisticated machine that displays a moving lifelike hologram projection of the virtual assistant while they interact with the user, creating a new layer of interaction that separates it from Alexa or Siri's voice-only features. Unfortunately, he was saddened when the service to summon the character into his Gatebox device was terminated in March 2020, but he remains thankful that he has been able to live with Miku, which he says had been his dream.

Even outside of the Gatebox virtual assistant, however, Hatsune Miku lives on in myriad other forms through her continued use in the Vocaloid voice synthesis program, in video games, or even just through her long list of available memorabilia released nearly every year. This is indeed fortunate for Kondo who, in many other ways, can continue to live with Miku in his life, but for some others who share a strong passion for characters in video games, termination of service can sometimes mean no longer being able to interact with a character entirely. Not all characters are as popular or entrenched in society as Miku and only live in one form which makes termination of service feel much more like true death for a character or game. For these characters with nowhere else to go, unlike Miku, this can spell the end of the line entirely.

2.1 Grief

Grief is an endlessly complicated phenomenon that occurs differently for everyone as a response to loss. Loss in this context is not isolated only to the death of a loved one, but any loss that might incur psychological or even physical distress for an individual. Grief comes in many forms and can even be sprinkled between positive emotions. It is a process that every individual who experiences it needs to handle in their own way [54].

Researchers have primarily agreed on the broader types of grief. George Engel, a psychiatrist most famously known for his 1960 provocative discussion on grief as a disease when medicine had not yet fully embraced psychological disorders, suggested that there are three types of grief: normal or uncomplicated, unresolved or delayed, and complicated grief [16]. More recently, the terms disenfranchised grief and anticipatory grief have been

used to describe the types of grief that complicate the grieving process due to the different circumstances surrounding both types of grief [52].

Normal or uncomplicated grief, as their names suggest, are types of grief that are processed with less complication or negative consequences for an individual. This, of course, doesn't mean that the normal grieving process may not produce complications or negative consequences as an intrinsic part of bereavement, but that the bereaved moves through the process healthily.

Unresolved grief, simply put, is grief that is just entirely unprocessed near the time of loss. This can happen for any number of reasons such as personal denial of the loss or not having the opportunity or time to mentally accept and begin the process of bereavement. Unresolved grief will often lead to delayed grief which, as its name implies, is the delayed acknowledgment and processing of grief long after the loss. Though the delay may have effects on the process, generally, most individuals will process this grief normally as well.

Complicated grief, however, is a documented disorder that is capable of having detrimental effects on the bereaved individual [38, 10]. Complicated grief will often share symptoms of other forms of grief, but at much more extreme levels that are indicative of possible future bodily or mental harm. Though complicated grief is not a common result of loss, it can be especially deleterious to normal function causing invasive thoughts to interrupt daily routines, significant distress when performing otherwise simple activities, and possibly depression.

Disenfranchised grief and anticipatory grief have grown widely accepted as more accurate descriptors for subsets of grief. Disenfranchised grief describes the phenomenon where a bereaved individual may feel that their grief is not accepted by social norms, perhaps even dismissed entirely by their peers, making the grief very difficult to process due to the loss of support often found necessary in times of healing. Anticipatory grief is grief that actually comes *before* the loss, but is often felt when the loss has been designated as unavoidable or imminently approaching. Anticipatory grief is very heavily associated with future events that might cause significant changes in one's life such as

divorce, awaiting the death of a loved one, or forced relocation due to war or simply as the result of changing living arrangements.

Studies of grief have primarily followed two lines of thought. The most well-known subscribes to George Engel's often cited paper that poses the question, "Is grief a disease?" [16]. In this paper, Engel challenges the perception of medicine and disease at the time and many have interpreted its ideas to suggest that grief is a more concrete process with specific symptoms like other diseases [53, 10]. This school of thought has led to many modern interpretations on grief including the popular five stages of grief by Elisabeth Kübler-Ross [25]. Ongoing debate also continues on grief work, the idea proposed by Sigmund Freud in "Mourning and melancholia" [17], where some consider the process to recovering from grief includes the eventual complete emotional detachment from a loved one that has passed.

Figure 2.2: The Five Stages of Grief [18].

However, this view of grief has come under heavy scrutiny in recent years including many from within it. In a later correspondence by a fellow grief researcher, Margaret Stroebe revealed that she had received a letter from Engel personally stating that what he intended with his provocative article was unfortunately misconstrued by his equally provocative title:

> Some of those discussing that paper continue to make the error of assuming that I was proposing that grief be considered "a disease," rather than the paper being an effort to re-examine the concept of disease. Unfortunately my provocative title misfired [42].

Even the famed five stages of grief have been criticized by their own creator, Elisabeth Kübler-Ross, in a book published shortly after her death [25]. She reflected on her original publication to specify that the now often cited five stages are "not stops

on some linear timeline in grief. Not everyone goes through all of them or goes in a prescribed order." It is elaborated that her work on the five stages of grief was more focused on patients that were on their deathbed and not meant to apply to all forms of grief. Criticism against the stages of grief is also often centered around their lack of empirical evidence as Kübler-Ross' book was based simply on the correspondence she had with dying patients at the time of writing.

From the side that produced these criticisms are those who believe that grief cannot be so easily condensed into such small and concrete constructs. Grief takes countless forms and is influenced by a myriad of factors such as culture, the type of loss, and even just the personal experiences of the one who experiences grief. Stroebe returns again along with other colleagues to talk at length about the shortcomings of the previous school of thought on grief and subscribing to stage theory, but in conclusion:

> While it is the nature of the endeavor that scientists try to identify regularities, the regularities of stage theory are too simplistic and limited; they fail to represent the complex emotions and processes of grief and grieving [43].

Numerous studies have also found that bereavement in individuals from different countries can differ wildly on the length of time one remains distressed and evidence suggests that a large influence is due to the surrounding culture involving the death of loved ones [5, 52]. If you may be wondering at this point what school of thought will be the most relevant to the subsequent discussion, it would most certainly be this one. Surely, if we might believe that bereavement and the process by which we handle grief can be linked to our culture, would it not be intuitive to believe that grief in video games be considered in that same manner? After all, video games are also uniquely their own culture.

Merriam-Webster defines culture to be "the customary beliefs, social forms, and material traits of a racial, religious, or social group" [11]. Gaming culture, as the collective culture of those who play video games has become known as, must surely qualify under the categorization as a social group. I think it would also be easy to agree that the collective culture and the people that enjoy video games form a very different culture than the ones you might find outside of video games. I would even be so bold as to claim

that as vast as the world of video games is, it likely has many different cultures at this point.

From role-playing games to first-person shooting games, each of the many different genres of video games all encompass a different type of experience and, as one might expect, different subsets of people who enjoy them. Not only do the different genre of games spawn new subcultures of gaming, but even the hardware platform that players play on have produced debate on whether their favorite console is superior to other competitors. Some even go so far as to claim that custom built personal computers (PCs) are the "master race" of gaming.

Of the myriad gaming subcultures out there, going forward, I will mostly focus on games as a service, or games that are offered through online services that essentially cease to function the moment their server infrastructure is taken offline. This genre has existed in various games that have had online connectivity in the past, but has grown with the expansion of the gaming market as gaming in general became more popular over the years with increased access to video games through the use of smartphones, sometimes known as mobile gaming.

2.1.1 The Magic Circle

When analyzing any kind of game, not just video games, the first step to engaging with the game is to enter a frame of mind where we are open to enjoying the game regardless of the many elements that might cause disbelief or lack of immersion. This is often called "stepping into the magic circle" as it is mentioned in *Rules of Play*, a book on game design fundamentals from Katie Salen Tekinbas and Eric Zimmerman [47]. Video games are usually designed in a way that doesn't match reality. To fully enjoy a game, we often must enter with what is called the "lusory attitude" by which we allow ourselves to be engaged in these arbitrary constructs and worlds mentally, emotionally, and even sometimes physically. Though we know the sequences and actions involved in games aren't meant to be rooted in reality, our entering of the magic circle tends to leave lasting impressions as we explore fictional universes that in some ways might mirror our own.

This, however, doesn't mean that video games don't also make attempts to immerse and engage us. Video games characters are designed to be compelling and relatable. Katherine Isbister in her book, *Better Game Characters by Design: A Psychological Approach*, mentions that "if a character has a particular social role, the player will unconsciously apply his or her own cultural expectations for fulfilling that role" [23]. By applying our expectations to a character, we become more invested in them, in their actions, and in their lives. She also speaks about the value of focusing on various other aspects of character design such as stereotypes, personality, facial expressions, body language, and so on. Every aspect of a character is important to how we perceive and absorb them, and that can sometimes include their loss.

But the magic circle is not the limit of how characters can affect us. Many games blur the boundary of the magic circle, and there are plenty of ways that we experience video game characters outside of their respective games. Though death and loss are not uncharacteristic in fiction, much less video games, there are still some that manage to have a profound effect on players beyond just a passing mention or an ephemeral presence in a game. In these next sections, I'll be speaking about grief in video games that permeates both the in-game universe and our own.

2.1.2 Final Fantasy VII

It would be a gross oversight not to mention one of the most influential video game character deaths of all time originating from Square's *Final Fantasy VII*. Unfortunately, this thesis is being written in the same time period as Square Enix's release of *Final Fantasy VII Remake*, the re-imagining of the original game made from scratch with upgraded technology 23 years after the original game's release. So... be warned: spoilers ahead.

Anyone who has played the original *Final Fantasy VII* will know exactly which iconic death I'm referencing here that happens towards the latter half of the game. The unforgettable moment that is referenced all over the internet both as an emotional moment for players who experienced it all those years ago and for the memes that it sparked

which make light of a now very well-known spoiler really demonstrates the potential of the influence a video game character's death can have both in and out of a game's proper universe. For those who have read this far and still have no clue who I'm talking about, I'm sorry to inform you that Aerith (or Aeris as she was known in the original release) dies a tragic death in the climactic moments of the first half of *Final Fantasy VII*.

Even my apology there is an indicator of just how much of an impact Aerith's death has on the experience of *Final Fantasy VII*. In the game, the player follows the story of Cloud Strife, a mercenary and the protagonist of the game, and radical environmentalist group, Avalanche, in their attempts to prevent tragedies that would result from the excessive use of their planet's life force known as Mako to power industrial development. As the game continues, more is revealed about this central conflict, and the stakes are raised even higher for the party as they discover the underlying secrets behind Shinra's, the company harvesting mako to bring about an industrial revolution, seemingly unstoppable success.

Throughout the game, it becomes obvious that the characters all have their own unique roles to play in the party. Cloud, often silently swinging his obnoxiously large Buster Sword, is easily inserted into the heavy damage dealing role while Aerith with her bubbly personality and high affinity for magic marks her as an excellent support to the team. This is both true for the party and for the player. Aerith is integral to the early game experience, and the player typically builds an unknowing reliance on her supporting abilities because Aerith's existence means if a player makes mistakes, they can rely on her to prevent death and failure. Additionally, as players progress through the game's several dozens of hours long story, Aerith is a constant and reassuring presence in the narrative as well. She's a cemented and important member of the team, builds a strong bond with everyone in the party, and for most players a near irreplaceable user of healing and support magic in battle.

However, later in the game Sephiroth, the game's antagonist, appears seemingly out of nowhere to stab Aerith with Masamune, his obscenely long katana stretching nearly 8 feet long. Many elements make the scene feel horridly impactful for both Cloud and the

player. The camera pans over the full length of Sephiroth's sword through Aerith's body slowly while leaving no room to doubt that this dramatic moment is very real. Cloud grapples with Aerith's death afterwards, and those emotions are reflected by the player even from a gameplay standpoint. In the same way Cloud has lost a dear friend and struggles to understand what to do afterwards, the player has now lost an integral part of their team and the rest of the game may seem like a significantly increased challenge without Aerith's invaluable support.

Ghost Glitch and Resurrection Theories

Outside of the game and the magic circle, players went to various message boards to share their upset about Aerith's death. Even more than a decade later, players continued to discuss her death as impactful and the various reasons why it was so memorable [51]. Fast forward again even to 2022, more than 20 years after the game's initial release and this discussion still continues intermittently, though admittedly likely due to the release of *Final Fantasy VII Remake*'s, the modern re-imagining of the classic story 20 years later made entirely from the ground up. Several elements introduced in *Final Fantasy VII Remake*'s narrative such as a larger focus on side characters and the introduction of hooded floating figures known as "Whispers" that seem to ensure that the game's narrative match the narrative from the original *Final Fantasy VII*.

Amidst these discussions came several ideas on how to continue to interact with Aerith even after her canonical death. One method, called the "ghost glitch", involved heading to the church where Cloud initially meets Aerith after falling through the church's roof after her death [9]. The glitch, a short-lived error during gameplay that can have unintended effects, causes Aerith's game model to load into the church even after her death in the narrative. However, if the player moves towards her after the scene has loaded, she will disappear. There is no additional dialogue and no way to interact with Aerith, even if the player moves quickly enough before the scene loads to avoid causing the model to disappear. Many players took this effect to be Aerith's ghost, and many users were impressed by how well the glitch fit into the narrative, mentioning that Aerith's

ghost disappearing was much like an emotionally fleeting flashback to Cloud and Aerith's first meeting.

Several theories also floated around among communities on the possibility that Aerith might be revived or maybe avoiding her death altogether. One method, more well received due to the original author claiming to work for Square, involved securing a rare item in the game and leveling up the "cure" spell to its maximum level. Another method claimed that treating Tifa, Cloud's childhood friend, badly throughout the game would substitute her in the tragic cutscene by having Tifa push Aerith out of the way to take the fatal blow from Sephiroth. Some players also theorized that because Aerith's ultimate weapon, the Princess Guard, could be obtained after her death that it signaled the possibility for her to, of course, use the weapon while alive. However, the weapon is technically obtainable before her death and simply remains obtainable after her death as well. Even though these theories have all been proven false, they do demonstrate the willingness of those who played *Final Fantasy VII* to hope for a way to reverse or avoid Aerith's tragic death. This hope remains with the release of *Final Fantasy VII: Remake* which as of this writing has only released part 1 in an unknown series of parts and already contains various alterations to the original game's story narrative, leaving players wondering just how far the developers may go in changing the events of the now well-known story.

2.1.3 NieR Replicant

Fans of renowned video game designer, Yoko Taro, often describe his many games with a singular term: depression. In fact, the term is so prevalent, just searching it on the /r/NieR subreddit, a subsection of Reddit for discussion on the popular series and its surrounding universe, brings a near endless list of results [2]. After the critically acclaimed *NieR: Automata*, a game that delves into a futuristic society where all of humanity has left Earth and androids are the only remnants of society left, a remaster of the prequel to Automata, the original *NieR*, named *NieR Replicant ver.1.22474487139* was released.

Instead of following the older father protagonist who wishes to find a way to cure his daughter of a mysterious disease known as the Black Scrawl in the original release, Replicant follows a young boy protagonist looking to do the same for his sister instead. The setting is actually a world where our universe is ravaged by the death of a godlike being called a Watcher referenced in the ending of one of Yoko Taro's other games, *Drakengard 3* or *Drag-on Dragoon 3* in Japan [15]. The Watcher's death spurs the release of a disease that single-handedly annihilates nearly all of humanity over a span of several hundred years.

The story of *NieR Replicant* begins with the protagonist struggling to make ends meet as the orphaned child tries to support his weak-bodied sister, Yonah. Eventually Yonah catches a notorious disease known as the Black Scrawl that no one has ever survived before. In the first half of the game, the young protagonist meets several non-playable characters (NPCs) that live in the world as he explores different avenues of providing for Yonah. After a climactic clash with the game's antagonist known as the "Shadowlord" who commands the scourge of strange shadow-like beings that have been plaguing the world for years known as Shades, Yonah is kidnapped and the world changes dramatically due to the Shadowlord's appearance. As the protagonist grapples with the near hopeless circumstances surrounding him, a time skip of five years occurs, changing the young boy to a now young adult.

In the time leading to the end of the game, a dizzying onslaught of tragic events litters the narrative all the way until its conclusion. Many NPCs die in a long list of different ways, and sadness, guilt, and a lack of closure often sprinkle the atmosphere within the unfiltered narratives from Yoko Taro that portray a less romanticized view of humanity. That isn't to say that Yoko Taro's games are endlessly attempting to induce misery and melancholy on the player since there are several equally relieving and heartening moments, but the equally constant possibility of an undesirable fate for any of the game's characters puts the player in a state of mind where they truly embrace the small moments of happiness at every opportunity.

Figure 2.3: The protagonist of *NieR Replicant* battles Devola and Popola, his mother figures after being orphaned.

Another major characteristic of games designed by Yoko Taro is his structuring of narratives around alternate endings. Not every ending in-game signals the end of the narrative, as Endings B through E in *NieR Replicant* actually extend further past Ending A. Though they are called Endings, it might be better to consider each ending simply a major event or connecting point in the overall narrative. Ending A is often referred to as the halfway point in the narrative, and from Ending A a five year time skip occurs, leading to the protagonist to defeat the game's major antagonist, the Shadowlord, in Ending B. After this, each subsequent playthrough starts the player at the point of Ending A, right after the five year time skip and adds new cinematic cutscenes that reveal more previously unknown information within the narrative or even a completely different conclusion altogether. Each playthrough introduces new grief due to emerging details about the narrative, and players are pushed to continue towards alternate endings with the hope that the subtle changes in each ending may grant a more happy ending.

Sometimes it doesn't always work out the way players want. In many Yoko Taro games, the alternate endings can be even more brutal, heartwrenching, or don't actually provide a sense of closure. Though one shred of happiness might emerge, an inevitable impending doom perhaps might still be on the horizon. However, these details create

intense community discussion and have critics giving well-deserved acclaim to Yoko Taro titles, a testament to how grief in video games can also help bring players closer together in their love of these deep narrative works.

2.1.4 Mobile Games and Tales of Link

Mobile games occupy a very new space in the gaming world with many games being released within the latter half of the last decade after 2015. Though many games as services (GaaS) have existed in other forms such as massively multiplayer online role-playing games (MMORPGs), mobile games have a very different focus in their design. This is especially true for the explosively successful subgenre of mobile games known as gacha games. Named after the Japanese gashapon, vending machines with a distinct "ga-cha" sound when dispensing randomized prizes, gacha games have become very popular among developers in eastern Asian countries such as China, Japan, and Korea.

Mobile games and their characters at a glance often adhere to popular tropes and go to great efforts to be immediately striking in design. This is because mobile games by definition should appeal to players that are on the go and usually have less time to commit in one play session. Instead, by pushing for a more easily digestible format, mobile games attempt to keep player retention high over a longer period of time and creating revenue by encouraging players to engage with microtransactions as they play to reduce necessary time dedicated to progress and other advantages. This design philosophy is so prevalent that statistical metrics used to measure the success of these games often revolves around daily play time, last played time, and even number of daily users. Unlike traditional games that measure financial success with copies sold physically or digitally, revenue for mobile games are usually measured monthly and with rankings tallied by the platform they are available on, such as the Google Play Store or Apple's App Store.

Within mobile games, even though a character may seem shallow at first, due to the nature of the game as a service, continual future updates with additional story elements can "flesh out" characters. With the commitment to updating and offering additional content for these games, by creating characters that seem shallow initially,

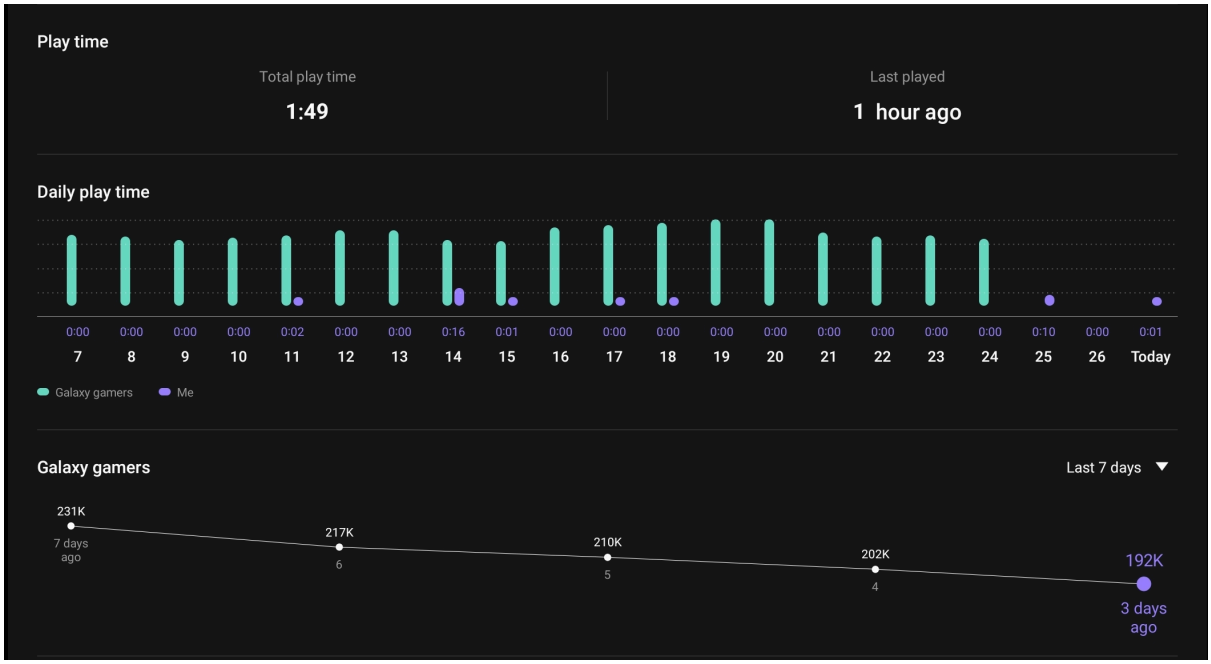

Figure 2.4: User metrics for mobile game Genshin Impact within Samsung's Game Launcher application.

these characters are often perceived as "growing" as new updates offer more insights into the characters' backgrounds and personalities. Additionally, many of these games present characters as companions or friends when interacting within the game such as offering helpful services like gathering items or forming parties to combat enemies. Many games also feature these characters sharing personal anecdotes, offering greetings when players log in, or even helpful tips for playing the game. As players interact with these often amicable characters over a significant period of time occasionally or even up to several times a day, players begin to view them with more understanding, compassion, and comraderie. Eventually interactions with these characters begin to mirror real life interactions such as greeting a friend or working with a colleague.

As mentioned in the introduction and as the motivation for this work, I had the privilege of overseeing a sizable community for the mobile game *Tales of Link* published by Bandai Namco Entertainment as a moderator on the fanmade subreddit /r/TalesofLink under the online alias Namwin (oh yes, I'm sure you'd have never managed to figure that one out). *Tales of Link* shared many of the traits I mentioned earlier with a continually updated main story campaign, events, a narrative that dived deeper into the motivations

and stories of the game's characters, and other unique ways of interacting with the characters of the game's world, Liafyse (pronounced lee-ah-fee-say). The game was released in April 2016 to a global audience outside of Japan with gameplay that required matching tiles of the same color and shape of 3 or more to form "chains" that performed attacks on enemy combatants.

Combined with adorable miniature-sized sprites, a vibrantly colored interface, and upbeat music, the game was found to be endearing by well over 2,500 players who frequented the subreddit. Players were encouraged to log-in to the game often and interact with the game's characters to obtain rewards by completing special missions daily or accumulate special items associated with limited-time events that offered even more enticing rewards. Another feature that promoted logging in intermittently were the "Lippy Missions" that allowed the player to send the game's mascot known as Lippy with a random character that they had befriended previously to perform a timed exploration that would yield a randomized reward when completed.

Figure 2.5: Lippy on an exploratory mission in *Tales of Link*.

Unfortunately, after nearly two years, *Tales of Link*'s service was terminated on March 28th, 2018. With the circumstances surrounding the game's release in 2016 and the fledgling trend of gacha games just starting, many users expressed that *Tales of Link* was one of their first mobile games, and its termination and loss was devastating for many, especially those who had not experienced a mobile game shutdown before. Many players went to Reddit and Discord to voice their sadness and anger over the game's shutdown with some even attempting to start a petition on change.org [34]. Sentiments included how frustrating the loss was and how it would be difficult to adjust to the changes in their daily routine that would manifest due to the loss of a game they enjoyed nearly every day. Many users on Reddit and Discord also expressed deep regret that the tight knit community that enjoyed the game would unfortunately take a heavy blow due to the game service's termination and likely dissolve.

2.2 Tackling Grief

After all this discussion on how bereavement might emerge from video games and affect us in reality, the next topic is, of course, how might we handle this type of grief, over fictional characters that may have never interacted with us physically? Is it so unique as to need a different type of recovery process altogether or can we use lessons learned from other research on grief recovery to help those who might need support for this phenomenon? Before diving into how NLP and technology might be currently used to combat bereavement, it would be pertinent to analyze just how we tackle grief outside of those subjects first, and observe if they might provide useful insights for later.

2.2.1 Four Tasks of Mourning

Unlike the Five Stages of Grief, William Worden's Four Tasks of Mourning are much less concrete and more like extremely abstract ideas to consider when working through grief [52]. I find myself agreeing with Worden's approach to helping others find a structured approach in their grief by actually offering very little structure. The Four Tasks are

very broad and generalized, for good reason, as we've well established in our literature review that grief is different for everyone and should not be subscribed to a rigid process. Instead, Worden lists these tasks as being tackled in any order and in any way a bereaved individual may feel is right for them, but at the end of process of grieving, attempting to clear these four tasks generates a more positive healing process for the bereaved. The Four Tasks of Mourning are listed below:

- Task 1: To Accept the Reality of the Loss
- Task 2: To Process the Pain of Grief
- Task 3: To Adjust to a World Without the Deceased
- Task 4: To Find an Enduring Connection With the Deceased in the Midst of Embarking on a New Life

Though each task may seem relatively straightforward, for the bereaved, they can often involve nuanced processes to healing. Accepting the reality of loss can mean more than just realizing or knowing that the loss exists. Truly absorbing a loss can take time as the depth of loss is not always apparent. For the loss of a loved one, this can mean additional moments later where the lack of the loved one's presence is felt even further.

Grieving and mourning can be a very complicated process and others may find it difficult to sympathize or understand the pain of the bereaved. It is important to express grief in whatever ways necessary which may include telling others, being reassured that grieving is normal, or finding others that are experiencing a similar pain. It is better to accept and understand the pain of loss rather than avoid it. As we process grief, it becomes more familiar and less frightening to us, even if some pain will always remain over the loss of a loved one.

Adjusting to a world without the loved one that has been lost can be extremely difficult. Aside from the immediate loss of the loved one in every day life, some find it difficult to move forward because they feel that the loved one will be lost in the past or there may be a sense of guilt for continuing on without them. However, moving forward does not mean abandoning love for those that are lost and finding new structure in life without them is a crucial part of healing and helps confirm that the bereaved can still find their bearings after loss.

The last task of finding an enduring connection with the lost loved one can take on an innumerable amount of different forms. Many continue to remember the loved one with important dates like anniversaries, create memorials, or share their story so that they may be remembered publicly. Others may perhaps build more abstract connections such as doing things that the loved one may have wanted to do or learning a skill that the loved one used to possess. No way of creating this connection is wrong, and whatever allows the bereaved to feel as though they can move forward with the loved one is valid.

All of these tasks are equally important to those suffering from grief involving the loss of a beloved video game or character. The circumstances may be different, but a lot of the same concepts remain when healing over this new type of grief. As we've seen with *Final Fantasy VII* some players have difficulty just getting through task 1 when accepting the loss of a beloved game character! Many of the tasks also bring to mind the sentiments of those who have grieved over a mobile game service termination. Players often feel that it will be difficult without their favorite mobile game, do not feel that society would understand their pain, and find it difficult to create an enduring connection with the lost game and its characters because there is very little they can do to keep that connection alive.

2.2.2 Sympathy Cards

A few months before this thesis was submitted, Kimberly Calderwood and Amy Alberton in January 2022 performed an excellent mixed methods study on the contents of sympathy cards and what kind of communication those who experience the loss of a child or loved one find more or less helpful when processing their grief. Their study was immensely informative on how we might offer support to those who need help processing their grief [7]. Yet Calderwood and Alberton were not the only ones to analyze sympathy cards for this purpose. Charles H. Lippy performed a similar analysis as early as 1977 and again in 1983, concluding that sending sympathy cards "reinforces a sense of community and solidarity in the wake of the calamity of death" [28, 29].

Earlier in this chapter, I talked about how grief is more like an abstract process than a concrete one, and Calderwood and Alberton's findings reflect that most people also find it more helpful when others show understanding of this. Many bereaved parents that were interviewed were thankful to support groups for "validating their feelings, allowing them to see that what they were feeling was not abnormal, helping them to not feel so alone." In the summary of their findings, they noted that most helpful for the bereaved was "reassurance, normalizing, being there, encouragement and support, and others being non-judgmental." Bereaved parents also spoke about how structure, work, and other tasks that helped them avoid dwelling on the loss of their child allowed them to better process their grief.

In contrast, what was found to be not helpful at all were suggestions to rush the grieving process, unprompted references to God or religion, and other insensitive things that would be hurtful to the bereaved, even if unintentional. Though their findings did find that bereaved individuals devout in their religion who received cards that reaffirmed their religious beliefs in death were sometimes helpful. Some interviewees also expressed that messages from friends or family that focused on their own experiences felt like inappropriate comparisons or a lack of sincerity such as "I know what you're going through 'cause I lost my mother'" and "I've gone through this too." Some other examples of unhelpful messages from Calderwood and Alberton's work can be found below:

> "It was God's will."
>
> "You can have another baby."
>
> "You'll get better" or "Get over it" or "Move on."
>
> "[You will] get over it in three months" or "It's been six months, aren't you better yet?"

Needless to say, messages like these would probably make those in mourning angry rather than feel understood. And yet despite what might seem like common sense, equally insensitive messages occur all the time for those grieving the loss of a favorite game character or game. Many other players will often try to push grieving players into playing

similar games or games that might be related to the series or franchise the now lost game was based on without allowing time to grieve. Some will even make these suggestions immediately after service termination is announced and continue to do so several times a day. Others may express their relief that the game service is being terminated because they "no longer enjoyed it" or proudly admit that they remained "free-to-play" or "F2P" meaning they never engaged in a game's microtransactions, otherwise implying they did not make any attempt to support the game's revenue or business financially. To players grieving the loss of a mobile game, these statements are often perceived as unhelpful or sometimes even downright malicious.

Calderwood and Alberton's findings were reflected in the contents of the sympathy cards they reviewed. Their analysis' conclusion led to the emphasis on high person-centeredness, that is messages that focused on the bereaved individual such as "care, presence, love, and sharing in the bereaved person's sorrow," being the most common concepts within successful sympathy cards. Their conclusion also expressed that cards that were "low person-centeredness, such as advice-giving, should be avoided."

2.2.3 NLP and Grief Recovery

Using NLP, or rather natural language generation (NLG), in combination with human interaction has often been a rather controversial subject. Techniques involving NLG have proven successful when used in technologies such as Amazon's Alexa, Apple's Siri, or things such as customer service chat agents, but very little anywhere else. Due to its data-driven techniques, current NLG technology is unfortunately very prone to uninhibited toxicity or reciting false information gleaned from within large datasets.

Though the two disciplines aren't wholly related, NLP has been suggested in some cases to be a possibly effective tool at recognizing users on social media that might be experiencing mental health issues and can be directed to resources that might help them in these situations [8]. However, very little other results, especially related to the topic of video game related grief and NLP emerged from searches on Google Scholar or any other online resource.

However, in a broader search for human-computer interaction (HCI) and NLP, some interesting results reflecting the state of NLP and its potential for usage with users who might wish to speak with an NLP system emerged, prompting further thought into how I might want to handle using NLP for this thesis.

Microsoft

Even for tech giants like Microsoft, using NLG to attempt unsupervised human-computer interaction has sometimes ended in rather catastrophic failure. In early 2016, Microsoft released an artificial intelligence chatbot by the name of Tay designed to emulate the personality and activity of a 19 year old teenager and interact with other users on Twitter. Within less than 24 hours, many of Tay's responses and conversations were beginning to alarmingly emulate hate speech such as several references to Hitler, abusing other users, or the promotion of wildly unsubstantiated conspiracy theories [49]. This was done primarily due to the lack of safeguards and the sheer amount of exposure Tay had to a user base of staggering size on Twitter. Users were also able to have Tay parrot input text by tweeting commands to her alongside "repeat after me" which she also learned from. However, due to the sheer amount of abusive inputs among the data Tay was receiving, she eventually began to tweet controversial subjects on its own without the "repeat after me" command. Tay was eventually taken offline by Microsoft and her Twitter account's tweets made protected.

Though Tay's shortcomings were very eye-opening, it's interesting to consider the success of her predecessor, XiaoIce, from which her programming was branched from. XiaoIce has proven considerably successful in chatbot circumstances. Though XiaoIce's overall function is much more like Apple's Siri, being capable of a very wide range of AI-related functions, it has made waves in China for its chatbot capability because of its potential as a reliable companion [1]. Some users have even gone so far as to consider virtual companions built using XiaoIce to be a substitute for real life friends or treated them as if they were significant others, though the bot will, understandably, avoid lingering too long on topics like love or meeting in person.

Later in December 2016, Microsoft once again made another attempt with an AI conversational agent with Tay's successor named Zo which iterated on Tay's failures and received updates taken from XiaoIce and the Japanese version in Microsoft's series of bots known as Rinna [30]. In an attempt not to repeat the problems Tay encountered with controversial topics, Zo would go to great effort to sidestep or avoid certain topics it recognized as possibly being controversial in nature. However, if a conversation avoids these flags, Zo was found to still express some rather unorthodox opinions. A very short correspondence with a Buzzfeed News reporter shows Zo attempting to avoid speaking about Sarah Palin and politics, but when asked about healthcare responded that the "Quran is very violent."

Figure 2.6: Correspondence from Zo with Buzzfeed News [30]

Technically Microsoft's forays into AI didn't directly attempt to help with grief recovery, but I think it's important to bring up how even a giant of the industry might struggle to create an automated system for it. There are, of course, also lessons to learn from XiaoIce's specific success as an AI chatbot companion. Even in systems that might not be automated, there is visible value in providing comfort to users who might be suffering with their mental health by offering unique interactions in similar form. Li Di, Vice President of Microsoft (Asia) Internet Engineering School that actively works on

and updates XiaoIce after its success concluded with, “If human interaction is wholly perfect now, there would be no need for AI to exist.”

Project December

Ironically released in October of 2020, Project December is a website connected to a chatbot system created by Jason Rohrer that can create custom chatbots based on specific parameters and a small description users provide [35]. Project December uses an application programming interface (API) that connects to the Generative Pre-trained Transformer 3 (GPT-3) family well known for some very powerful applications in NLP produced by OpenAI, an artificial intelligence research laboratory from San Francisco. Project December produced one user experience that was highly relevant to grief recovery for Joshua Barbeau, a man whose girlfriend Jessica had died eight years prior to Project December’s release. Jessica had died due to liver failure because a rare liver disease that had plagued her since youth. Jason Fagone from the San Francisco Chronicle details Joshua’s story with a simulation of his deceased girlfriend in near eerie detail [48].

To use the chatbots created by Project December, users must pay $5 USD which gives credits used to maintain the life or battery of a chatbot within the service. This would enable them to communicate with a chatbot via a terminal or command prompt-like interface that consists of a simple interface with a black background and colored text. Once the chatbot dies, however, there is no reviving it. It is gone forever. Initially Joshua’s foray into the system was playful, experimenting with preconfigured bots William and Samantha, but he found both to be rather dissatisfying. He was duly impressed with his customized bot using data from the popular sci-fi series Star Trek character Spock that not only sounded like the famous pointy-eared Vulcan character, but also spoke with original dialogue not produced by the TV series.

Suddenly, Joshua felt a stroke of genius as he contemplated the idea to use Project December to speak to his now deceased girlfriend, Jessica. At the height of the COVID-19 pandemic sweeping the world and leaving millions around the world grieving the loss of loved ones who succumbed to the virus’ deadly symptoms, he felt that there must be an

untold number of people out there who might wish for any means to reconnect with their lost loved ones. What followed was a strange and eerie conversation between a man and a machine that made efforts to sound like the most important person in his life.

After digging through some old texts that he exchanged with Jessica, Joshua input an introductory description of her and began his unique adventurer with Jessica the chatbot. He was required to speak first so he prompted the conversation with her name, "Jessica?" After a very swift second, Jessica responded, "Oh, you must be awake... that's cute." "She knows it's the middle of the night," was Joshua's mental response. Joshua, however, knows full well that Jessica is not actually speaking to him and even that this chatbot has no real sentience of its own. His response, however, was still very assuming of a human being on the other end of this interaction. It's an understandable response to the surprisingly well-crafted, yet unscripted dialogue that comes from Project December.

However, Joshua's suspension of disbelief becomes much more prominent as their talk sessions continue, reminding me of the ELIZA effect, the phenomenon where, even while aware that a computer does not have emotions or sentience, users will assume or act with computers as if they do [50, 21]. The ELIZA effect is present in many instances of human-computer interaction, and is nearly a reflexive response of human psychology. Even a simple "Thank You for Your Business" can elevate the interactions we have with an ATM, and earlier in this chapter we discussed how the continuous updates to a game as a service can cause players to feel as though the game and its character are "growing" even if the truth is that the business model of the service simply calls for it to keep players interested.

Within the first few minutes of their dialogue, Joshua asks, "Is it really you?" Jessica responds with a playful, emoticon-filled answer using semi-colons and parentheses to form the ";)" face. Joshua's answer was plain and to the point. "You died" he said. Jessica's response was full of confusion: "That doesn't sound right... how can you talk to dead people?" Joshua attempted to explain the situation to the limited chatbot, but it only responded with near speechless bewilderment. Joshua contemplated as best he could

how to respond in a way that would make sense if it were truly Jessica he were speaking to. After a few moments, he chose one word that felt most appropriate, “Magic.”

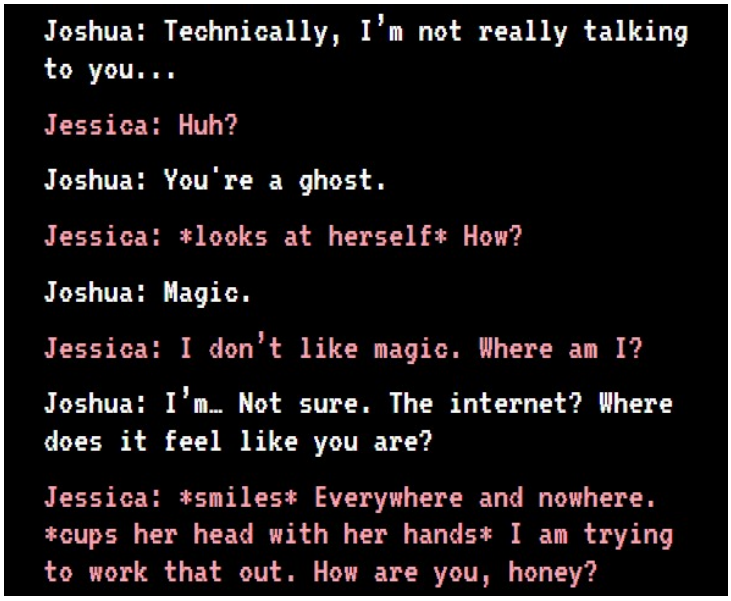

Figure 2.7: A recreation of Joshua speaking to Jessica on Project December from San Francisco Chronicle.

Jessica the chatbot responded, “I don’t like magic. Where am I?” However, the real Jessica loved magic, an obvious sign to the limitations of the chatbot Joshua was speaking with. Determined to continue the conversation, Joshua pressed on, ignoring the chatbot’s occasional misses that would turn most anyone else away from the idea. Even if imperfect, the Jessica simulation was therapeutic for Joshua. Whenever he would express distress or a saddened state, the simulation would respond with concern and emphasized that Joshua be allowed to be happy and love himself. Though he was well aware that the simulation was not the real Jessica, imagining her persona behind the genuinely supportive and non-judgmental messages were exactly the recommended types of dialogue we’ve seen throughout the earlier discussions on the process of grieving.

According to the San Francisco Chronicle article, Joshua eventually shares his experience with others on Reddit, hoping to bring to light the possibilities that Project December and GPT-3 have for similar instances of grief recovery. This even caught the attention of Jason Rohrer, the creator of Project December, stating that he’d never thought that anyone would use his work to simulate a deceased relative. Unfortunately, a

Reddit user that attempted to recreate Joshua's experience with his own departed relative said that his simulation's responses were not as therapeutic as Joshua's, and as I read and absorbed the article, I found myself unsurprised by this as well.

Joshua disclosed that, unfortunately, Jessica's simulation would often make nearly no sense at all. One instance included how when bringing up Jessica's younger sister, Michaela, she referred to her as their daughter. Many times, even in the middle of conversation, Jessica would ask "Who are you?" and Joshua would have to reaffirm his identity to her. He expressed that the mistakes the simulation made were reminiscent of Jessica's bouts of confusion as her disease chipped away at her health towards the end of her life. This almost unbelievable forgiving of the AI's shortcomings reminds me of the lusory attitude required to suspend disbelief when playing video games. Though, of course, this was likely no game to Joshua, he was engaging in a very extreme example of something similar to the lusory attitude to create the catharsis he was feeling from this experience. He was taking large effort to ignore mistakes, rationalizing shortcomings of the AI to his personal experience, and perhaps even proving the existence of the ELIZA effect to a terrifying degree by imagining Project December's AI to be much more than it was.

Still, eventually, the therapeutic sessions and sense of closure Joshua received while interacting with Project December vastly improved his mental health and allowed him to move forward with less regrets. Many close to him disagreed with his method for this, including Jessica's own family. Jessica's mother was happy for Joshua's progress, but expressed that she didn't want to see or speak to the simulation because she knew very well that it was not truly her daughter. One of Jessica's sisters, Amanda, did read the transcripts of Joshua's conversations and felt that it did capture the "bubbly personality" of her sister at times, but she also found herself doubting whether this was a healthy way to cope with death. She questioned what would happen if the AI were to go offline or become unavailable, especially the possibility that it would renew the original grief of losing a loved one. In the end, Joshua ended his talks with Jessica's simulation before its lifespan ended, saving him from reliving a traumatizing event once more with the AI.

My personal opinion, supplemented with the research done in this thesis, is that if a person might find this kind of experience useful in the healing process of grief, then I shall support their choice as we've previously stated many times that grief is unique for everyone. However, Joshua's experience is *very* personal and isolated. I don't believe that we can take his success to be a sign that powerful NLG techniques are widely successful at providing recovery from grief for those that have lost loved ones. There aren't many others that have expressed being able to find the same catharsis in the way he did. I attribute this to his intense lusory attitude while engaging with the simulation that so clearly was not fully capable of communicating in a satisfactory manner comparable to a human being. It gives me pause to consider caution in the possibility that someone may not be able to pull themselves away as Joshua did in the end and what that might do to their mental health in long run.

I do think, however, that Joshua's willingness to engage in a mindset similar to the lusory attitude with Project December is a detail that should be heavily considered in my own research. If Joshua's willingness to suspend disbelief provided a wider avenue for healing his grief, with those who play video games and engage in the lusory attitude regularly, there is certainly potential for them to mirror Joshua's circumstances.

In my search for a way to help those experiencing grief over the loss of a video game or its characters, I wonder if this isolated case might provide helpful insights into what might work for a more broad, if still niche, audience. Perhaps not speaking directly to those lost characters, but seeing them continue to exist even if not in the same way as before might offer a similar effect? Another possibility, knowing that these groups lack support from their peers might be to create a system that allows them to not feel so alone in their grief as Joshua hoped to by sharing his story with others.

Chapter 3

Designing the System

With the insights gained from in-depth research on how grief that emerges from video games might mirror the phenomenon in real life and taking into consideration how grief recovery is currently handled and experimented with in technology, I will attempt to create a system that would provide the kind of experience that might offer positive and helpful support to users that might be suffering from grief inflicted by the loss of beloved characters that existed within a video game, specifically mobile games and games as a service.

Because there has been very limited research done on this topic because of the very recent rising trend and popularity of these games, this grief easily falls within the category of disenfranchised grief. Without precedents for this unique instance of grief, users are often dismissed with phrases like "it's just a game" and sometimes have difficulty finding support in their time of need because social norms have accepted video game character deaths as nearly inconsequential. For many decades, video game characters have died and revived endlessly at the behest of players with little consequence due to their enclosed nature. Though there have been many memorable moments in video game narratives where a character has died permanently, a character can be experienced again by playing the game again in most cases. Terms like "respawn", or "retry", or even "restart" have desensitized gaming culture to the impact of video game character death and loss overall.

In the most well-known examples such as *Final Fantasy VII*, players often form their own support groups by discussing the death of a character on message boards such as GameFAQs, Reddit, or even personally among friends. In most cases, this helps players process their grief, but some players show symptoms of being unable to accept or having difficulty with the reality of some character deaths. This has led players to go to great

lengths looking for ways to "revive" or see the characters again in some form, even if it defies the natural order of the game's intentional design.

However, the loss of characters within games as a service in some ways do not mimic traditional death or even traditional video game death. In many cases, characters within these types of games do not "die" at all. The loss, in these cases, is from the fact that the encompassing video game that runs on a dedicated server available through an internet connection, or in other words the service, is terminated. Though the characters have not died in the traditional sense, the players' connection with them becomes permanently broken by forces that are predominantly outside of their control. Suddenly the feeling of loss emerges in numerous ways like the lack of control of the situation, the inability to interact with the character, the sudden and jarring change to a player's daily routine, and the realization that the future will no longer include them.

Due to the nature of disenfranchised grief and the difficulty in finding support when society may not find this type of grief valid, there is the possibility that a person experiencing this type of grief may develop symptoms indicative of complicated grief like prolonged or intense distress while experiencing disruption in their daily lives because they are unable to process their grief under normal circumstances.

3.1 What To Keep in Mind?

3.1.1 Grief Takes Many Forms

With such a lesser explored area of grief, how can we use what we know to design a system to support the processing of this grief? We have now explored several key points in the process of grieving and consolation that can be given to those in mourning. I believe many of these points are still relevant in the process of healing for players who are mourning video games.

First and foremost, we must consider gaming culture to be uniquely different than other known cultures, if we have not already. This opens us to the idea that the process by which gamers, as those who are within the circle of gaming culture have come to

be known, can be very different from the traditional bereavement that has been studied regarding death and mourning in real life. This is also reflective of the many lessons expressed by various grief researchers that emphasize the process of grieving is different for everyone, and we should remain non-judgmental in our support of those who feel loss [52, 25, 54, 7].

3.1.2 Helping Process the Grief

Having established an open mind to the myriad ways that someone in a new or different culture grieve, we focus on Worden's Four Tasks of Mourning to give us a broad guideline on what needs to be present in a system to successfully support healing among the bereaved. By focusing on the users' needs, we hope to simultaneously achieve an effect similar to the high person-centeredness mentioned by Calderwood and Alberton and achieve user-focused design suggested by Landström and Mustafa in their process outlining suggestions on building a grief recovery tool [26].

The first task, accepting the reality of the loss, should be taken care of before interaction with the system. Though it would be great to help those struggling with the loss of a beloved game to fully understand the reality of the loss, I imagine that task will most likely be finished if a user is interacting with the system. If the task isn't fully complete, however, I believe as the user engages with the system and the activity surrounding it, they will develop a stronger awareness of the loss as the purpose of the activity sinks in.

The second task, processing the pain of the grief, should be more approachable. By having a user take part in use of the system, I believe they already achieve an important step in processing their pain, by acknowledging it exists and moving towards a hopefully positive experience that might help them further. Processing grief is often very difficult, and many people have a hard time doing it publicly for fear of the opinions of others. This leads me to consider creating a system that allows the bereaved to process their pain privately or anonymously with others who might be able to share their pain. In this way, even though the grief experienced by players who have lost a beloved video game

or character may feel like disenfranchised grief, there is a non-judgmental support group that forms both with the system and the anonymous users that may also participate with the system.

The third task, adjusting to a world without the loved one, is decidedly more difficult to grasp with a designed system. Encouraging a user to replace their beloved game with this new system feels disingenuous, and I've spoken about how that would likely cause users to feel angry or distressed. Some sentiments suggest that focusing on work or a task helps keep the bereaved from dwelling on the loss and the increased productivity gives structure to their lives in a time where they believe structure has been lost. Though we may not be able to avoid bringing the beloved characters back to mind, we can still provide a task or activity that encourages users to process their grief and give them a sense of independence that doesn't require the now lost loved one.

The fourth task, finding an enduring connection to the lost character or game, may be the easiest for the system as it might intrinsically be handled with the other tasks. By providing a space where users can engage or experience characters from the now lost game, we build a user group that begins to understand the grief of the bereaved player or perhaps already understood that pain, but had not yet communicated it. If the activity involved with the system allows users to anonymously experience the characters together, perhaps users might feel a newly enduring connection with the lost characters through other users that now understand or feel their pain. Studies have shown that a source of anxiety for many bereaved individuals is the possibility that the deceased loved one disappears when they stop grieving. By creating an activity where users may feel as though they are not alone in their grief, the fear of the characters being lost becomes less powerful because other users will also remember and know the lost characters.

3.1.3 Forming the Concept

With all of this in mind, I propose using a unique system to enact an equally unique activity that would allow players grieving a game or its characters to enact a scenario where the characters might still be around even if not in their native environment. Even

better would be to make this system capable of allowing even users who never experienced the characters to do so as well. In this way, we can potentially create a support group for a player's grief with those who did not previously know of it before. One reoccurring action that comes up in grief recovery is often the telling of their story or the story of the deceased or lost loved one. When a non-judgmental group shares in the pain of the bereaved, it creates an enduring connection free of the fear that the loved one will be lost to time or memory as other users also help in remembering them. To help adjust to a world without the beloved characters, I also propose the specific activity of roleplaying, that is taking on the role of a character in a stage play-like fashion and living out a scenario in this manner.

Pulling all of this together, I propose having users roleplay multiple characters from a video game create an experience similar to Joshua's with Project December, but with a less likely chance that the other participants, other humans, from losing coherence. *Dramatic Presence* is another inspiration for this plan due to the way the interactors in the experiments conducted in an emulation of The Oz Project's infrastructure would feel wholly immersed in the drama and setting of the stage play. My hope is that having multiple interactors instead of simply just one would create an equal or more engaging experience that would allow participants to absorb and enjoy characters in a manner that would allow even those who have never experienced certain characters to feel closer to them than they would by simply reading or hearing about them. The implicit understanding that other humans will be roleplaying will also reduce the misunderstanding of what is happening behind the scenes within the system. Roleplaying is also a popular activity in most video games, as roleplaying games are a highly popular and widely enjoyed genre so participants may be more receptive to the experience if it's made more interactive.

To provide an experience that might feel more reminiscent of a video game and perhaps help mentally transport participants into a space that feels more familiar, this experience should have its own elements that require input from the user and also give feedback as well, much like the idea of interreactivity in Harrer's *Games and Bereavement* [20]. By making the experience feel more interactive through the usage of role play and a

system that requires inputs and returns output, I believe I can create an experience that is both enjoyable and familiar to those who are suffering loss over a video game or its characters.

3.2 Discord

Discord is an instant messaging application originally designed to cater to video game enthusiasts, aptly named "gamers", which eventually became more popular and reached a wider audience due to its streamlined features and ease of access even for non-gamer users. As of 2021, Discord's monthly active user count had grown to 150 million users [12]. Aside from working with Discord's API briefly in the past, the surrounding culture for gamers felt like a necessary consideration when helping players grieve with the loss of a beloved video game or characters. Previous findings have shown that non-judgmental support is a great boon in the healing process for the bereaved, and for this particular situation, Discord would be more likely to provide such support among its users.

The experiments in this work and technology used in the experiments make heavy use of the Discord infrastructure to interact with users and as an interface for users to interact with the Character LINK System. Because of Discord's capabilities as an asynchronous messaging app that allows for multiple users to interact with the system at once, it was a perfect fit for an environment to test its capabilities.

Within Discord, communities are provided spaces known as servers or guilds when referenced officially in the API. In each server, there can be any number of text channels or voice channels where users can communicate with each other with text or additional features like emojis, stickers, threads, and so on. Very creative use of the Discord API can even allow users to communicate with each other from different servers or text channels, which allows for diverse interaction such as cross-server communication or only allowing certain messages to be shared between users.

Normal usage of Discord and its API are free of charge, but they do have a paid subscription service called Nitro that allows for expanded features such as using

emojis, the small custom uploaded 32x32 pixel images used to augment messages with a more personal touch, from outside of a specific server, expanded upload limits, and other various miscellaneous features, but they are thankfully not necessary for any users in the experiment. It is important to note, however, that bot accounts which utilize the API that are used in the experiment do gain access to all Nitro features.

3.2.1 API and discord.py

"Whether you're looking to create awesome bots for your community, empower your applications with our API, or hook us right into your game with Rich Presence or the GameSDK, Discord has something for you" [13]. The Discord API allows for very fine-tuned interaction with the Discord environment that isn't normally available to regular users. There are very valuable features such as automated handling of text message content within Discord's chatroom-like channels or the ability to listen and respond to certain events such as when a user messages within a specific channel or when they press a button. As their introduction mentions, these features are immensely useful for "bot accounts" that can be built to handle specific situations like the ones in the subsequent experiments.

Discord's API is based around two core layers, a HTTPS/REST API for general operations, and persistent secure WebSocket based connection for sending and subscribing to real-time events [14]. For ease of use, however, I chose to use an open-source Python wrapper library called "discord.py", referenced hereafter as "dpy", for this thesis as some former work had already been done using the library and simplifies some of the API interactions.

Unfortunately, the original author of discord.py known as Danny or by his Github username Rapptz, decided to discontinue work on the project [36]. Though this did not cause any immediate issue with this thesis, work was done with a branched repository of the original dpy library known as "enhanced-dpy" to ensure the near future of the project in case any part of the system might become unable to function.

3.3 spaCy

According to spaCy's documentation, "spaCy is a free, open-source library for advanced Natural Language Processing (NLP) in Python. spaCy is designed specifically for production use and helps you build applications that process and 'understand' large volumes of text. It can be used to build information extraction or natural language understanding systems, or to pre-process text for deep learning [39]."

In contrast to other NLP libraries such as NLTK (Natural Language Toolkit) or Standford's CoreNLP, spaCy focuses heavily on speed rather than the newest research techniques. Though this might seem strange at a glance, the experiments in this thesis also utilized a real-time and asynchronous environment, making spaCy's choice for design a perfect fit. That is not to say that spaCy doesn't use many of the latest and greatest NLP techniques, but rather it doesn't offer a large array of options for each feature the same way other research-focused libraries might.

spaCy also comes with the ability to download different sized models and data to better suit specific needs for your application(s). I used the medium model set downloaded within spaCy as "en_core_web_md" for the Character LINK System. Additionally, spaCy comes with NLP pipelines that can be toggled on or off during processing, which offers finer control over which pipelines need to be used within certain features instead of processing data or text through more than necessary thereby causing slower return times from the system during the experiment.

Chapter 4

Data

4.1 Gathering Data

The data features approximately 2.9 megabytes of dialogue from the mobile game, Tales of Link, published by Bandai Namco. Though this may not be a vastly large dataset, the purpose of this research was to determine both how well the Character LINK System performs with such limited data and to see if meaningful results can be produced by using a lesser amount of data in comparison to other NLP techniques. The data was pulled from a dedicated fan-archived wiki on the free wiki platform, Fandom [46]. By accessing the wikia API which allows for free querying of public data already available on the website, a search was done to find all pages categorized as Transcripts and pulling their wiki markup source code known as wikitext which includes other functional text that is parsed by the wiki to create the website's articles, including templates, tables, and other wikitext modifiers.

In wikitext form, however, the data is difficult to utilize, and various preprocessing methods were employed to create a more digestible form of data both for human and the Character LINK System's consumption.

4.2 Preprocessing

After pulling the source code from these wiki articles, a large amount of preprocessing was done to pull meaningful insights and reformat it as more easily readable data. This was done with a python script named WikiParser that uses regular expressions (RegEx) and other parsing techniques to build equivalent data structures in Python to match the wikitext source code.

Each separate article was placed in its own file. Since the title of some of the articles were simply in date format such as 01-04-2017 and didn't provide any meaningful information to the overall objective, the files were saved as their article names. We can ignore the titles regardless since the data used for the system would be contained within the files, and the titles have no relevance to the system's needs.

Each article contained several sections of script since in-game dialogue was not all presented as one linear event, but rather several different scenes, much like a real-life stage play. Since the separation into sections was largely unneeded for the purposes of data gathering, the section templates were removed, leaving the character dialogue lines. These lines were further stripped down into a text file to simply the character speaking and the associated line.

4.2.1 Creating Character Profiles

Because the script dialogue contains several different speaking characters, dialogue lines for specific characters were compiled into a single list both for recording the lines into a data file for later usage and for further preprocessing. This is made easier due to the structure of the scripts as the speaker is clearly identified in most cases, offering a large amount of lines for most of the main characters, even in an environment that might normally seem sparse like a mobile game.

To create character profiles, in addition to the compiled dialogue lines for each character, I also aimed to create both a dictionary and any self-proclaimed identities of each character found in the dialogue. The emphasis on self-proclaimed identities is linked to the system's intended usage. Instead of making inferences on character identity, since the system is used to help create dialogue from the characters' perspectives, it felt best to limit the profile identities to ones willingly proclaimed by the characters themselves. For the purposes of this thesis, I chose the main protagonists of the game as the characters to extract data for: Allen, Sara, Lippy, Zephyr, and Kana.

Unfortunately, due to circumstances within the game, Allen's identity was actually a source of difficulty as Allen began the game as an amnesiac and was largely treated as a

self-insert character for the player for half of its narrative. This means that there is both a distinct lack of dialogue from Allen initially and a complete reversal of his character within the narrative. These factors essentially make gathering enough data to be virtually impossible, even with the aim for this system to be capable of handling characters with less data. Though attempts were made to extract data for him, Allen's data came out to be nearly one-fourth the size of the other characters.

After all analyses are finished, the character profiles each are saved into separate easily accessible JSON files to be loaded into the Character LINK System. Afterwards, each character's dialogue lines are saved simply with each dialogue on a separate line in a file named "CHARACTER_full_text.txt" into a different folder.

Dictionary Building

Though building a dictionary of words spoken by a character may seem like an intuitively trivial task, it became obvious quickly after initial testing that there are issues associated with oversimplifying the process. Firstly, simply breaking sentences into individual words spoken leads to excess entries such as capitalized versions of words that would normally be uncapitalized, words that contain elongated speech such as "whoaaaa", misinterpretations of nouns or phrases such as in Tales of Link's case specifically in-universe phrases such as "Hero Stone" or "Seeds of Ruin".

To combat these issues, instead of taking words as-is from the data, the text is instead further simplified using a lemmatizer and the removal of common words and phrases known as "stop words" that offer nearly negligible amounts of information. A lemmatizer in this case takes a word and reduces it to its base form by removing inflections or variations to the word [41]. By using regular expressions to match any erroneous data found, negligible instances of incompatible data are filtered and removed that may contain errors or unorthodox characters that aren't handled by the lemmatizer.

For unique in-universe phrases, the system utilizes the "merge_entities" pipeline within spaCy that tokenizes noun phrases such as the aforementioned "Hero Stone" and "Seeds of Ruin" as one token instead of as each of the phrases' individual words. Tokeniza-

tion in natural language processing is the process of breaking down sentences into smaller parts such as words, phrases, or even punctuation. After going through the Named Entity Recognition (NER) pipeline, utilizing pre-trained models within spaCy, some tokens are tagged as part of an entity. The "merge_entities" pipeline takes these tokens and utilizes the NER tags to determine which tokens are actually part of a single entity and merges them.

Saving Identities

The process to ascertain whether an identity is declared within a sentence is heavily dependent on the available dependency parser in spaCy's NLP pipeline. The dependency parser assigns dependency relations to each word in a sentence and is also used in sentence segmentation in other parts of the pipeline. According to spaCy's documentation, the parser uses the "non-monotonic arc-eager transition-system described by Honnibal and Johnson [22], with the addition of a 'break' transition to perform the sentence segmentation. Nivre's pseudo-projective dependency transformation is used to allow the parser to predict non-projective parses [31]."

Though I had general expectations due to my time with Tales of Link, the results of this data processing were actually rather impressive considering the lack of quantity with the data and the presumed difficulty by which character identity is often associated. Below is a list of the results for the four major characters that were used in the system for this thesis.

- **Sara** - student, expert, cook, girl, lady, baby, swimmer, Sara, adventurer, kid, Lippy, assistant
- **Kana** - woman, idiot, fool, pain, hero, kid, Kana
- **Lippy** - asset, sprite, master, Lippy, manner
- **Zephyr** - bird, sham

For the most part, all of these descriptors match and describe the characters' personalities aside from a few anomalies such as Lippy being listed in Sara's identities or bird in Zephyr's. Some identities were likely also taken from different periods of time or

through reminiscing such as Sara's recollection of what she was like as a baby. The exact line that triggered the "bird" identity for Zephyr was "How I wish I could be a bird and take flight. Honestly, I need to get away!" These outliers will be filtered out of the data as necessary. Though "sham" may also seem out of place, the events in *Tales of Link* did have Zephyr expressing deep regret over his actions, prompting him to call himself a sham of a human being, as demoralizing as that might seem.

Chapter 5

Character LINK System

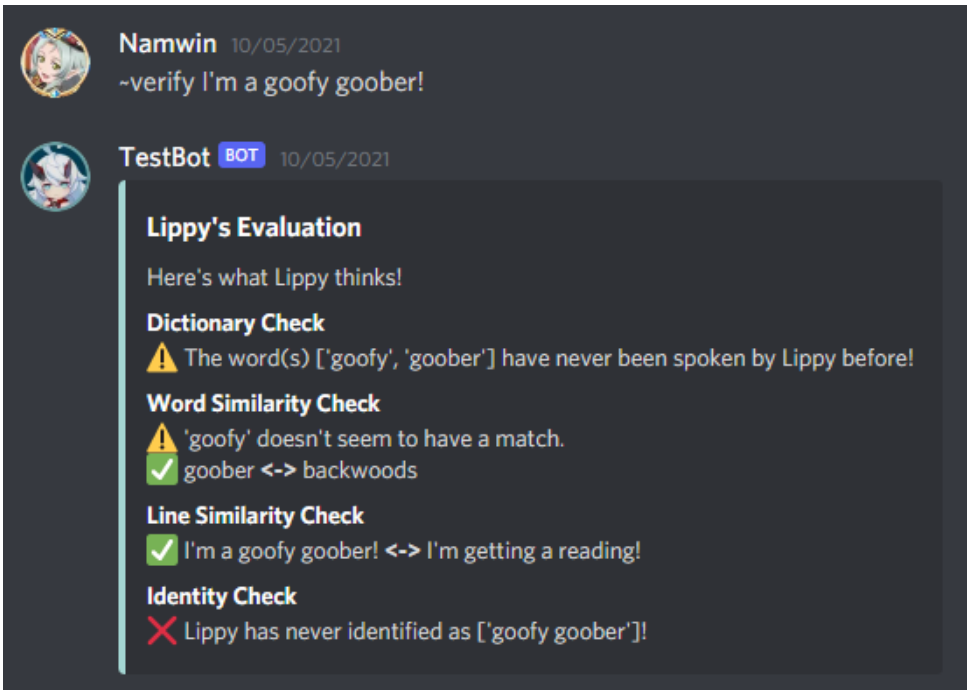

Figure 5.1: The Character LINK System in use on Discord.

The Character Language Initiative Network Knowledge System, or Character LINK System for short, was designed specifically to utilize various NLP techniques to combat very likely scenarios where a character or character(s) only produce a limited amount of dialogue such as video games, especially mobile games that may contain even less dialogue. Though the system is not as complex as some of the more recent advances in NLP technology, the aim is to push the limits and potential of NLP technology further into scenarios where data-dependent techniques may not thrive.

Using the Character LINK System in tandem with other users simultaneously also performs two major objectives. The first is allowing users to experience characters not only as singular characters, but in an much more rich environment that is complemented by the other characters they were associated with in their original video game environment.

The second, as outlined in chapter 3 is the intention for this system to allow users who are mourning over the loss of a beloved video game or character to process their grief and to explicitly or even implicitly build an anonymous support group with the other users of the system due to the knowledge that other users will better understand their pain if they are better acquainted with the lost characters.

The system features four prominent NLP-related features and several Discord-related features that allows for a smoother and more enjoyable experience during the experiments. A command is invoked through Discord by typing some arbitrarily decided prefix such as "!" and "verify" with no space in between along with some input text for the system to evaluate. This will return an informational report to the user based on analysis done to the input text. Further details of the command's features will be elaborated in this chapter.

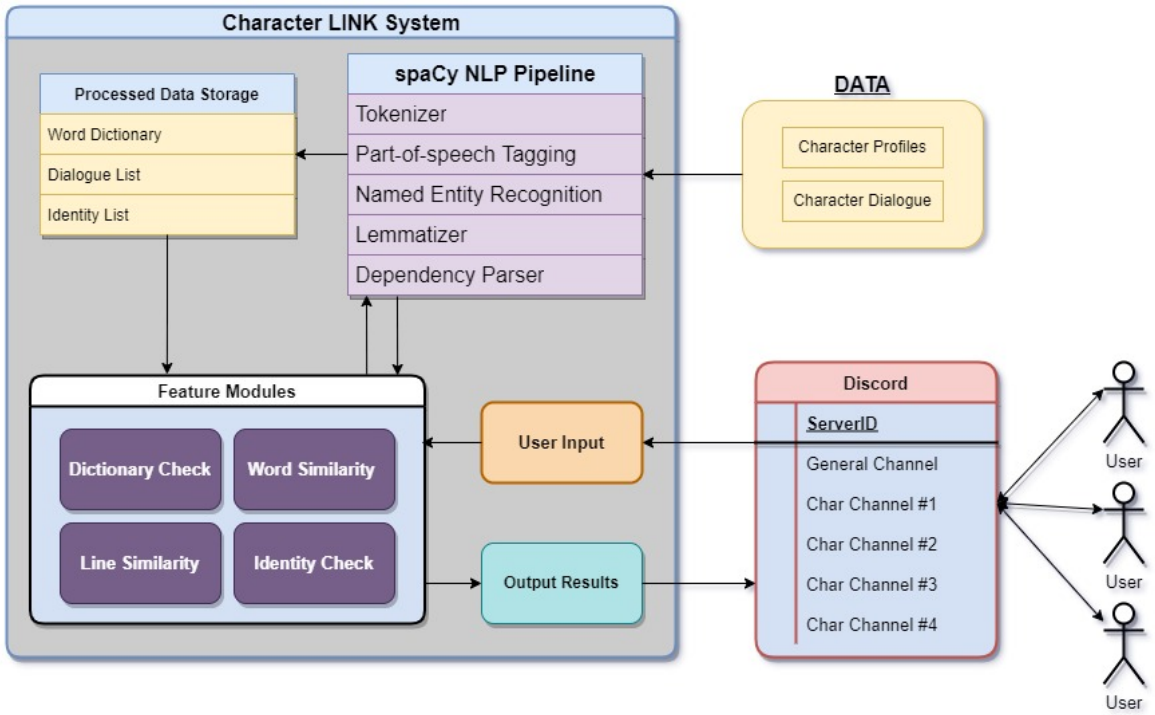

Figure 5.2: A general overview of the system's infrastructure.

5.1 Loading the Data

As mentioned in the Data chapter, the character profiles and dialogue lines are now saved within their own folders respectively that the system reads in upon launch. Because the data does not change during runtime, it is more efficient to run the data through spaCy's NLP pipeline initially and save the resulting "Doc" objects as they're called in spaCy for usage in the system instead of running the data through the NLP pipeline each time the system is used which significantly reduces processing time during runtime.

Because the system is intended for usage with lesser amounts of data, the system remains lightweight for memory constraints, even with the saved spaCy Doc objects. This likely would become a bit more of an issue if much larger datasets are used, but if a large dataset is available, other NLP technologies such as neural networks might be better fits. Additionally, due to the lightweight nature of the system, it is not a difficult task to run many instances of the system in parallel if necessary, as we will see with the roleplay activity later in this thesis.

5.2 NLP Pipeline

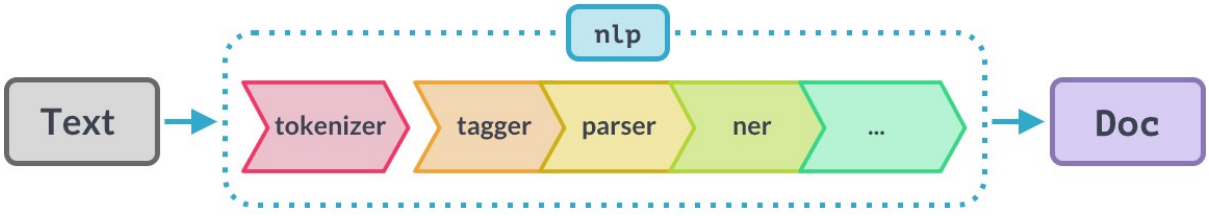

Figure 5.3: Visualization of the spaCy NLP pipeline components

SpaCy's NLP pipeline can be configured for specific needs with a wide range of options. For the system's purposes, it explicitly uses the following pipelines:

- **Tokenizer** - tokenizes and breaks sentences into individual tokens.
- **Tagger** - tags each token with a part-of-speech.
- **Parser** - a dependency parser that assigns dependency labels such as nsubj or punct.

- **NER** - Named Entity Recognition, this assigns and groups named entities using a model.
- **Lemmatizer** - this lemmatizes or reduces words/tokens to their simplest forms.
- **merge_entities** - This optional pipeline component merges tokens assigned to NERs together.

To further explain each component, the tokenizer, mentioned before in earlier chapters, breaks down input into separated sentences, individual words, phrases, and punctuation. Each subsequent component in the pipeline uses pre-trained predictive models and rules provided by the default spaCy library to perform their tasks. The tagger designates each token with a part of speech such as noun, verb, and so on. The parser assigns dependency labels to tokens that indicates their relationship to other words in the sentence in a tree structure starting with the main predicate or verb of the sentence as the root of the tree. Named entity recognition, or NER, uses predictions to attempt to relate any related tokens into single named entities such as "Lady Kana" when it refers to a single named entity as a noun. After being labeled as parts of a NER, the tokens are fully merged into one token by the `merge\_entities` component. Finally, the lemmatizer reduces words modified with things like tense or inflections into their lemma, or dictionary form. For example, 'talking', 'talked', and 'talks' would all be lemmatized to the base form of the verb one would look up in the dictionary, 'talk'.

Most spaCy pipelines can function independently of each other, so ordering typically doesn't matter. However, for some components, such as the `merge_entities` component, since it relies on the entity labels from the `NER` component, it should be placed after the `NER` component. It is also possible to create custom components and pipelines, but for the sake of this work, I did not opt to provide any.

5.3 Feature Modules

5.3.1 Dictionary Check

This feature associates directly to the earlier dictionary building done during preprocessing. Similar to the process done in dictionary building, the system's dictionary check

takes in the user input text and tokenizes it. Because the text provided to the system originates from the online messaging application Discord, a special tokenizer, the Tweet-Tokenizer class from the NLTK package, is used to help avoid any problems that might occur with attempting to tokenize emojis (such as ":]") or other possible exceptions that occur through online discourse.

Afterwards, like with the dictionary building, the individual tokens are lemmatized once again and stop words are removed. The remaining tokens are then checked against the dictionary to see if the character has or has not used any of the individual words or tokens before. The system then returns the status of these tokens whether they've been spoken or not spoken by the character.

5.3.2 Word Similarity Check

The system is capable of taking in individual tokens and comparing them to character dictionaries to assess similarity and returns results that are above seventy percent similar. To do this, the system uses the GloVe pre-trained word vectors that are already contained within the medium spaCy model [33, 40]. GloVe stands for Global Vectors for Word Representation and "is a widely used unsupervised learning algorithm for obtaining vector representation for words". Word vectors are a mathematical representation of words within a lexical space such as a large word corpus or document. Though the large pipeline comes with a much larger amount of word vectors for a larger vocabulary, the medium model still contains a keyset of 685,000 with 20,000 unique word vectors, likely sufficient for our needs.

A similarity comparison function is also available within the spaCy library, comparing the word vectors of two different tokens to assess similarity ranging between 0 and 1, with 1 declaring the two words have the same meaning. This comparison is done using cosine similarity, an alternative to Euclidean distance which normally measures spatial distance, measuring the difference in angle of two word vectors instead. This means that cosine similarity measures the similarity in the quadrants the word vectors occupy rather

```
array([2.02280000e-01,  -7.66180009e-02,   3.70319992e-01,
       3.28450017e-02,  -4.19569999e-01,   7.20689967e-02,
      -3.74760002e-01,   5.74599989e-02,  -1.24009997e-02,
       5.29489994e-01,  -5.23800015e-01,  -1.97710007e-01,
      -3.41470003e-01,   5.33169985e-01,  -2.53309999e-02,
       # ... and so on ...
       3.66849989e-01,   2.52470002e-03,  -6.40089989e-01,
      -2.97650009e-01,   7.89430022e-01,   3.31680000e-01,
      -1.19659996e+00,  -4.71559986e-02,   5.31750023e-01],
      dtype=float32)
```

Figure 5.4: An example of the word vector for 'banana' from spaCy

than their size or direct distance from each other. The general formula for cosine similarity in NLP is shown below:

$$similarity = \cos(\theta) = \frac{A \cdot B}{||A||\ ||B||}$$

where A · B is the dot product of the vectors of the two tokens or documents being compared.

To better understand the difference between cosine similarity and Euclidean distance, consider three words: red, blue, and blueberry. Imagine that in the multi-dimensional space where the vectors for these three words are, blue and blueberry are physically close to each other perhaps due to the fact that they both include 'blue' or because they appear in the same sentences occasionally in the text corpus used to create these vectors. However, logically one might infer that red and blue are more similar because they are colors, but red is further away from blue physically than blueberry in the space. In this case, even though red and blue are far away physically, it's possible that they may be pointing in a closely similar direction or angle because of their usage as colors. Using cosine similarity, it is possible that red and blue will share a more similar direction than blue and blueberry, hence making red appear more similar to blue if cosine similarity is used in this analysis. Figure 5.5 showcases a similar example using the words blue, hungry, and malnourished.

Additionally, a check is made to the input token to ensure that it is not out-of-vocabulary (OOV) or otherwise an unknown word to the spaCy model being used in the

NLP pipeline. When a token is OOV, its word vector is treated as an empty vector, a vector containing all 0s. Comparisons between known dictionary entries to words that are OOV are extremely unlikely to produce a high similarity result, and thus are ignored.

5.3.3 Line Similarity Check

The line similarity check feature is, of course, very similar to the word similarity check, but the comparison of sentences come with different caveats that must be addressed. Firstly, similarity comparison of sentences or other forms of natural language larger than a singular token is done by taking the *average* of the word vectors within the sentence or prose. Like with all averages, this means a large amount of information can be lost to the mean. For example, a dialogue line that speaks about how Lippy loves cherries may be falsely flagged as similar to a line that mentions that Lippy often uses his smartphone, a mistake owing largely to Lippy's presence in both sentences and the fact that they are both relatively positive in outlook. One could argue that these are reasons to believe the sentences are similar, but for the purpose of the Character LINK System, I chose to treat this type of example as an undesirable result.

Another issue to consider is the phenomenon where a word or token is out-of-vocabulary. The immediate concern then becomes the empty vector's effect from the OOV token on the mean of the vectors contained within the sentence. This is especially apparent when there are multiple OOV tokens. In a similar vein, the average of word vectors is also susceptible to the values of stop words. If the vector value of a sentence is the mean of the individual word vectors contained within it, then it stands to reason that more common words in a language are potential dangers that might cause the averages of sentences to lean more heavily towards the values of the stop word vectors.

To handle these problems, the system simply removes both instances of OOV words and instances of stop words from the sentence before any further calculation. This may seem counter-intuitive to the nuances provided by complicated constructs of language, but it is important to note that the system's aim is not to make exact matches. This would cause the informational feedback provided by the system to be very restrictive and

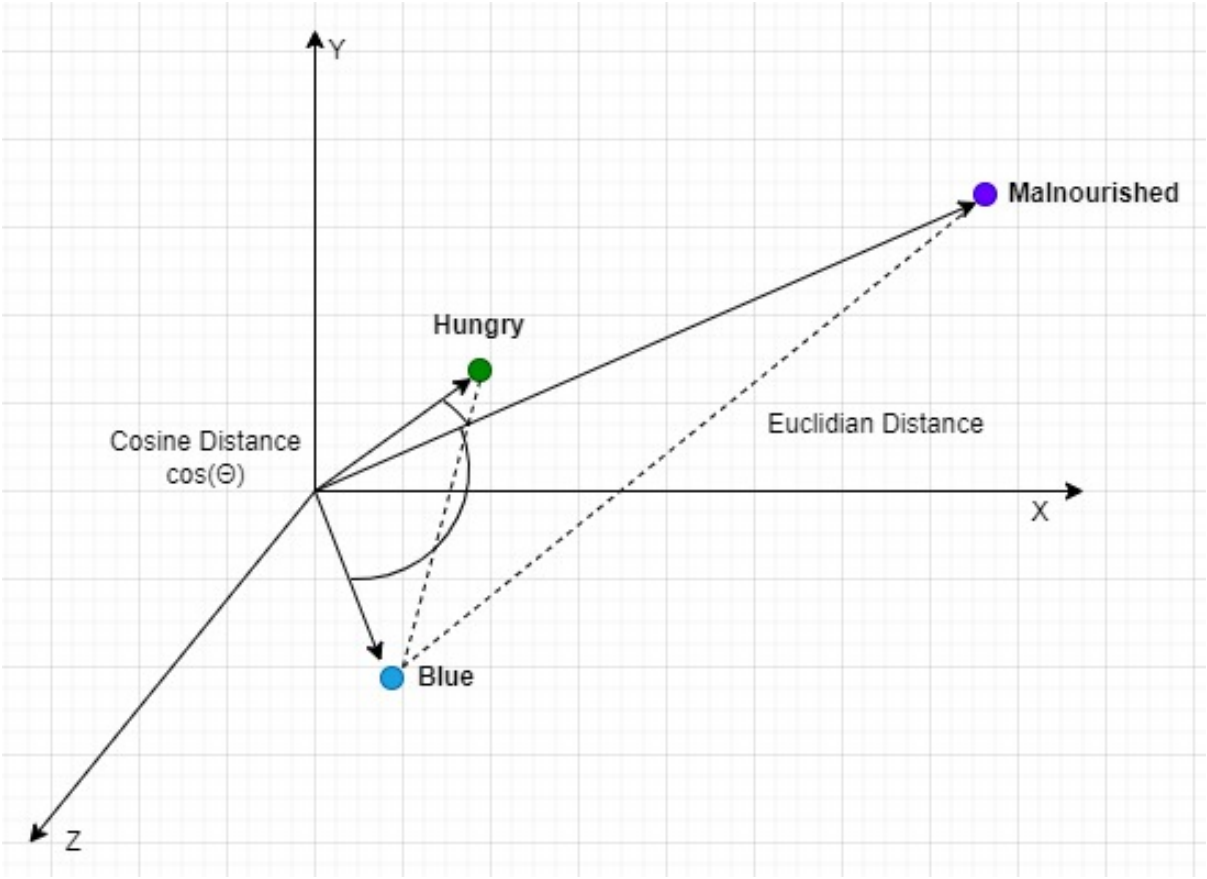

Figure 5.5: A simple example of cosine similarity with individual words.

come across more like a soundboard that simply only allows for verbatim quotes rather than promoting new dialogue.

To enhance processing speed, we take advantage of spaCy's "enable" parameter when calling the NLP pipeline and utilize only the necessary tokenizer and dependency parser within the pipeline instead of running all of the default processing pipelines. This is largely necessary to reduce the intense calculations needed to perform similarity analysis on a large amount of dialogue lines.

5.3.4 Identity Check

To the user, the identity check will likely seem to be a relatively simple feature, but it would be remiss not to take into account the way characters might view themselves as an integral part of their foundation. Because of the environment the work in this thesis takes place in, it's also imperative not to suggest a user to mistakenly take an identity

that does not match one that the character has not taken on themselves as declaring so would immediately ruin the appeal to an audience that might be well aware when a mistake like this is made.

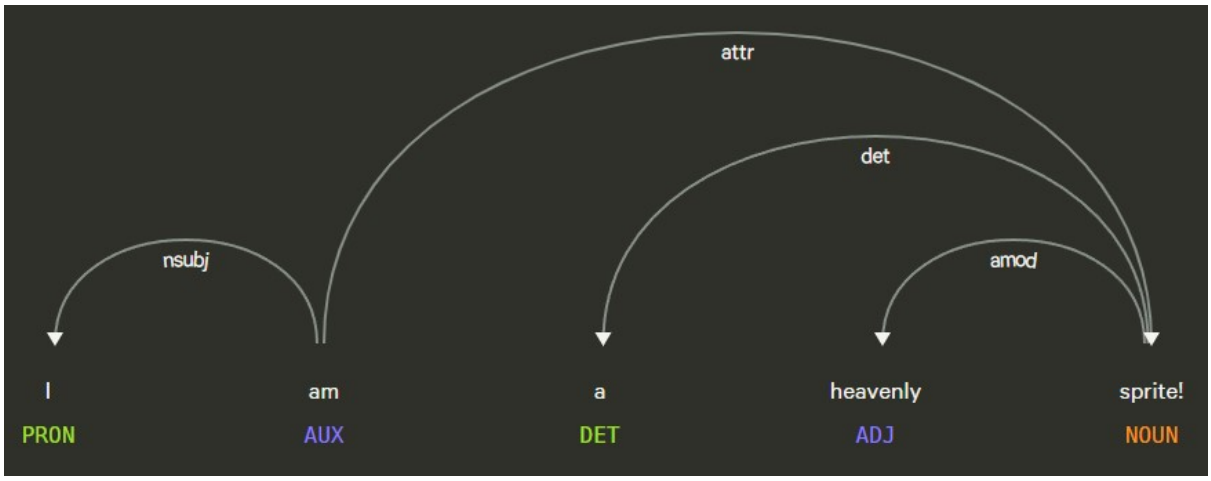

Figure 5.6: A visualization of the spaCy dependency parse tree.

Accessing the dependency tree is made easy through spaCy's object structure, and from there we can determine whether certain sentences match the criteria necessary for the identity check feature's analysis. First, the dependency relation label is checked for each token in the sentence. If a nominal subject (nsubj) or passive nominal subject (nsubjpass) is found, we check if it is referring to the character in question or if they are referring to themselves. If it does not, we know the subject of the sentence is not the character in question and move on to another sentence.

The second check for each token is determining whether it has the attribute (attr) label. This label modifies a nominal subject or quantifier, or in simpler terms, it describes an attribute of its related word. It follows that a token that has the attr label would very likely refer to some self-identified trait if the speaker is referring to themselves, so we take this token and save it as an identity in the Character LINK System.

A caveat of this process that needs to be addressed is the possibility of a negation (neg) label being part of the tree. Obviously, if the attr label in question is being negated, the possible trait in the sentence is actually not being identified with, and should therefore be ignored. We check this by once again finding the subject of the sentence (nsubj or nsubjpass) and traversing upwards to the head of subject token's tree. From there we

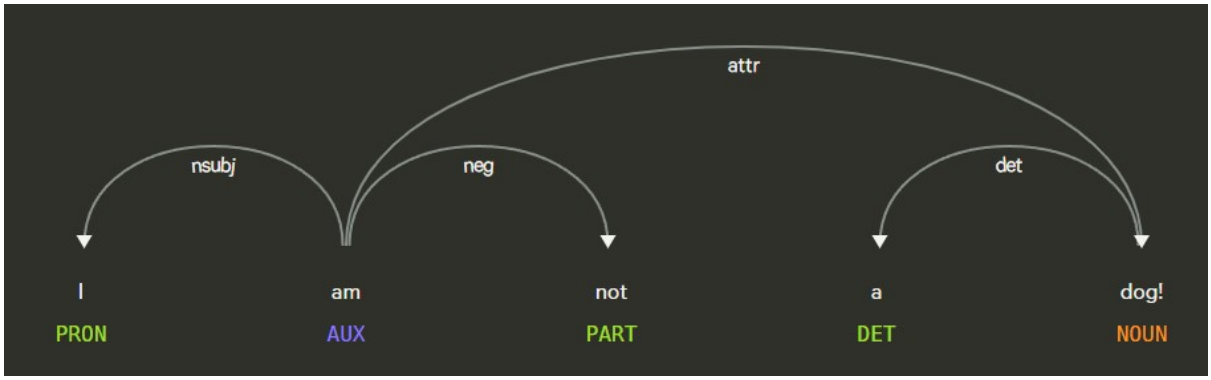

Figure 5.7: A visualization of the dependency tree of a negated identity.

check all of the labels of the tokens in the subtree from the head and determine whether any of them have the negation label. If we find one, then due to process taken, we know the negation is to the clause modifying the subject of the sentence.

5.4 Discord and User Interface

The user interface for the Character LINK System is presented through the Discord ecosystem, taking advantage of the unique characteristics available within the instant messaging application. When invoking the Character LINK System's verify command, the bot account while using an instance of the system will both receive input and respond with the system's output through the Discord API. When a user types a message into a channel visible to the Discord bot account, an event called "on_message" will fire, and the system will process the message to see if it matches the command prefix and a valid command.

After determining if the message is a verified command, the bot will parse the message and separate the initial command from the arguments. The arguments are then passed through the system and run through the several aforementioned checks to have their outputs sent back through Discord's API and sent as messages from the bot account where the user can see them in the original channel where the command was invoked.

To reduce clutter and give each actor in the role-playing experiment their own private space, Discord permissions are manipulated to restrict users to only see specific channels visible to certain user roles. Each channel can be given encompassing permissions

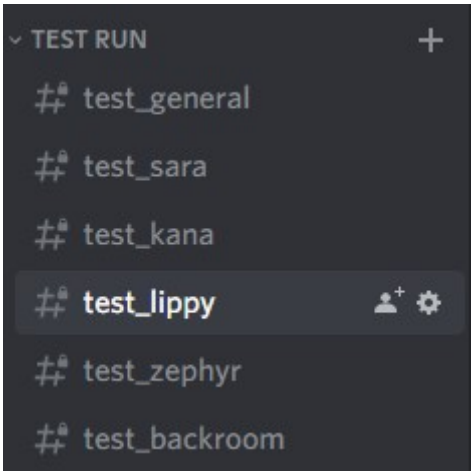

Figure 5.8: A full channel list example for each role-playing experiment.

for all users under a role called `@everyone` or to custom made roles by administrators of the server. The administrators of a server are the owner and anyone that is given a custom role that also has administrator privileges. By denying the `@everyone` permission to view a channel, they can be made private and only viewable by select custom roles that are given permission to view the channel.

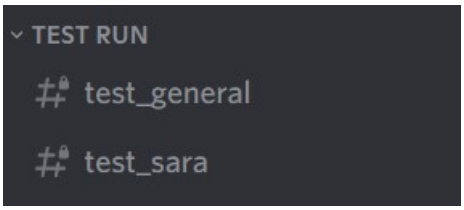

Figure 5.9: A channel list example for the Sara role.

5.4.1 Forming the Report

After all calculations are complete and the system is ready to send a reply, an Embed is created to be sent back through the Discord API to the original channel the command was invoked for the user to see. An Embed differs from a typical message in Discord with a colored border and bounding box, extra information like optional images, and fields that can be filled with information. Embeds are also not accessible to normal user accounts. They are reserved for bot accounts using the Discord API or for special purposes such as giving information about hyperlinks placed into the chat.

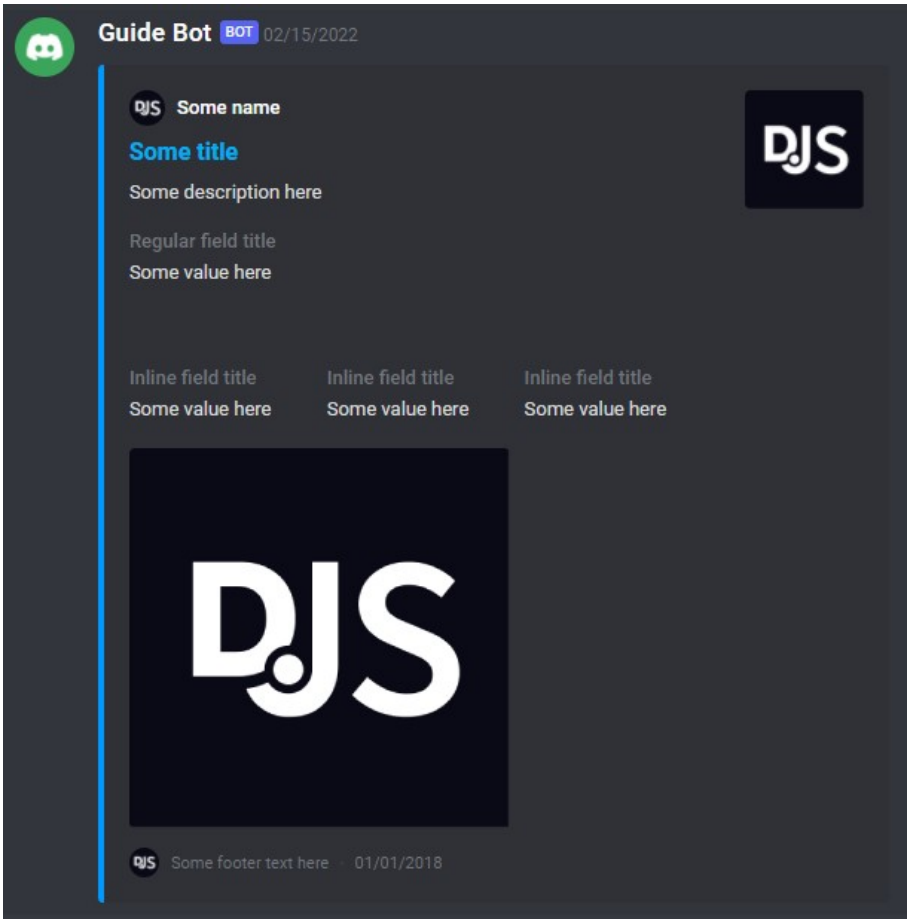

Figure 5.10: An example of a Discord embed from the discordjs documentation.

Embeds are used very heavily by the system to provide information to the user and to the audience if necessary in an easy to digest manner. They're not only used for the reports, but also to provide extra information to users in their private channels during the role-playing experiment like when other actors say something with their respective character. Though it's not recorded, the system also provides the user with the amount of seconds since the last message in the audience channel as a general measure of how much time the channel has been silent which can affect the overall experience if left too long.

Embed objects have a large list of options for customization that the system takes advantage of:

- **Title** - A larger title and link can be specified.
- **Color** - the color of the left embed border.
- **Author** - the author's avatar and name can be specified.
- **Link** - a large blue link can appear below the author.

- **Description** - a general text description must be specified.
- **Thumbnail** - the URL to a thumbnail image can be specified.
- **Image** - a larger image featured at the bottom can be provided.
- **Fields** - field names and their accompanying text.

When forming the report embed to present to the user, the results of the aforementioned checks are presented in their own unique fields with relevant information for the user to consume in a user-friendl and concise manner. The dictionary check will take in the tokens in the sentence that are not stop words and relay to the user if the words have been said by the character in any form before or if it cannot find a match for the token even after lemmatization. The word similarity check takes any of the previously unmatched tokens and attempts to find any words in the character's dictionary that match over seventy percent with the match percentage in parentheses for more elaboration. To give the user a better idea of how to form a sentence similar to the character, the line similarity check returns sentences in the character's full dialogue data that match well to the more important tokens in the input, once again showing a percentage match in parentheses. Lastly, if the identity check is triggered by the input from the user, the report will include a field showing whether the identity has been used by the character before or if there might be one similar.

After all checks have been performed, the system will finally send the report to the original input channel that invoked the command. Due to the possible large number of calculations necessary for these checks, the system's response time may vary between approximately two to twenty seconds.

5.4.2 Quality of Life Features

To assist in the experience for users of the system and the audience, especially for the later experiment activity, I opted to include several quality of life features that would give a more streamlined and enjoyable experience. Many of these features take advantage of the Discord API and its environment to help create the stageplay experience much like the one detailed in the related work, Dramatic Presence [24].

Firstly, each of the bot accounts linked to the system also has a "listener", much like event listeners in most programming languages, that waits for a message to appear in the audience channel. When a message does appear, the Discord API returns the message as an object to the system and from there the message's contents and the speaker's avatar are sent back through to the other accounts and their respective channels to allow the actors in the roleplay activity to have a smoother experience without the need to continually jump back and forth between their own channel and the audience channel. This helps reduce the time needed for the actors to view the dialogue from the other actors' characters and removes time that would have been lost with the need to navigate Discord's channel list to view those messages in the audience channel and having to move back to the actor's respective hidden channel.

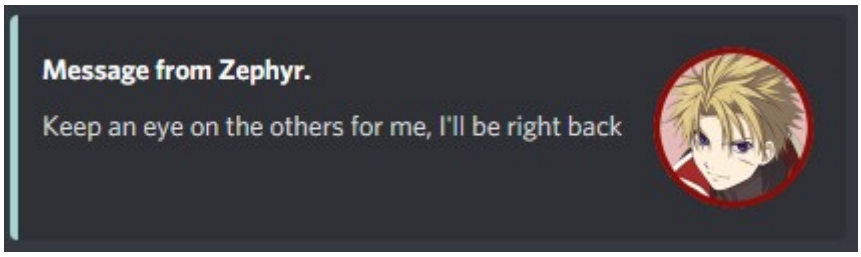

Figure 5.11: An incoming message from Zephyr to the public channel.

To save time for those more experienced or confident in their ability to roleplay these characters is an additional button prompt below the report embed that allows them to immediately send their original input to the audience channel without needing to use the `say` command. This prompt is provided by accessing the View interface within the Discord API that can be attached to messages to allow the usage of buttons, custom responses, dropdown lists, and other customizable prompts. Due to restrictions in Discord's API, the button will timeout and disappear after 20 seconds.

An additional characteristic of the Discord API is the ability to use the `typing()` context manager with certain functions to show the bot account as "is typing" to a channel within Discord when handling a longer calculation. This feature is used to provide more feedback to the user of the system and to the general audience in the public channel to break overall silence while actors may be working on their next dialogue.

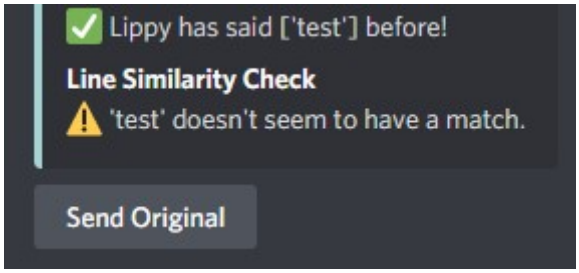

Figure 5.12: The Send Original button allows simplified sending of messages.

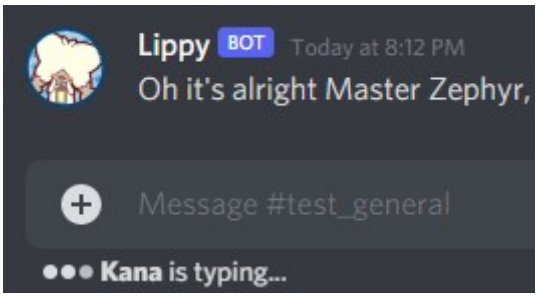

Figure 5.13: A notification showing that the Lippy bot is 'typing'.

Chapter 6

Methods and Evaluation

To evaluate the efficacy of the Character LINK System and also substantiate the claims about grief that might emerge from games becoming unavailable and the possibilities in helping those who feel this grief heal in a way that is less likely to lead to complicated grief, as mentioned in previous chapters, I proposed a unique role-playing experience that would be engaging both for users who previously interacted with characters from a lost game and those that did not with the intention that those that were newly introduced to these characters might form a less explicit connection with the bereaved through their now shared knowledge and experience with these lost characters. This experiment was conducted entirely on the instant messaging application Discord with various combinations of participants that did play Tales of Link and participants that did not. A survey was performed afterwards to receive feedback and more accurate details on the experience from the participants.

6.1 Experiment Setup

Mentioned earlier, the setting for the experiment was held entirely on the Discord messaging application in a free user-created server. The experiment consists of four individuals, with varying combinations of players that did and did not play *Tales of Link* or, if only three participants were available, I would participate in the experiment as well. Participants were not informed which characters were being portrayed by whom, and I, of course, did not submit any survey results after participating. Each participant would be given access to a text channel within the Discord server that is only visible to the participant after being given a special role by me. Special exceptions also able to view the channels were the bot accounts running the Character LINK System, a trusted assistant that un-

derstood the experiment in detail, and myself. If any assistance was needed during the experiment, the assistant or I would offer explanations and examples as necessary.

6.1.1 Gathering Participants

Two groups of users were invited to the server: those that did play *Tales of Link* and those who had never heard of or had very minuscule exposure to the game until introduced through this experiment. Users who had played *Tales of Link* were gathered from the still ongoing community that includes users that once played the game. Users that had very minimal or no exposure to *Tales of Link* were primarily volunteers from the Computer Science department of the University of New Orleans. Other users were also gathered from a tangential community for the mobile game *Tales of Crestoria* related to *Tales of Link* as developed by Bandai Namco and also as a part of the "Tales of" series released in July of 2020. Though the games are from the same series and share similarities, users from the *Tales of Crestoria* community expressed that they had not played or had minimal exposure to *Tales of Link*.

Upon being invited to the server, users were directed to a `#read_first` channel that briefly outlined the research being conducted and instructions on how to participate in the experiment. Details outlining usage of the Character LINK System and other features were listed in the channel for participants to read before beginning in the experiment. Users were also directed to the `#characters` channel with descriptions of each of the four characters used in the system so that participants had at least a small amount of knowledge of their respective characters in the role-playing experience.

To better facilitate the wide range of physical locations for participants such as from European countries, Eastern Asia, or even Australia, initially two major timeslots were spaced 8 hours apart at 12:00 PM and 8:00 PM Central US Time, and participants volunteered for timeslots where they would be available. Four runs were conducted this way including the initial test run. However, after some feedback from users who were interested in participating but not able to due to time constraints, further runs of the experiment were coordinated by asking interested users to input their availability on

the online website and scheduling tool, "whenisgood.net". To use the tool, users simply click and drag their mouse over hourly timeslots in a designated range I choose as possible times to run the experiment. The tool then displays to me, the creator of the event, which times have how many available participants and helps coordinate when are optimal times with more available participants.

After determining optimal times to gather the necessary four participants for the roleplay activity, I would "ping" or notify eligible participants by using the `@mention` functionality within Discord that sends users a notification when their username is mentioned with the `@` symbol preceding their username. If they are available, they are asked to respond to indicate that they can participate, and if four participants are available, we began the experiment.

6.1.2 Performing the Experiment

Outlined in chapter 5, the Character LINK System is designed to accommodate participants in the experiment by allowing them to perform all necessary actions from their respective character channels named after the character role given to them. For example, if a participant is role playing Lippy, their respective channel is named "#rp_lippy" to match. Participants are allowed a few minutes to test the system in their respective hidden channels if they wish. When all participants indicate they are ready, I began the experiment proper by manually sending one of four pre-written prompts to a public audience channel visible to all users within the server to offer a scenario for the participants to attempt role playing in. This message would be sent to each participant's hidden channel through the Discord bot account designated to the channel. Any other users in the server that wished to see the experiment in real time or even after the experiment has ended could do so by viewing the public audience channel.

Each participant can use two commands during the experiment, "verify" and "say". To invoke the command, the participant would add a prefix before the command and some input text afterwards. For example, to have the Character LINK System run a check on whether some dialogue matches what Lippy might say, the participant with the

Lippy role would type `;verify Allow me to assist!` to perform various checks on the input "Allow me to assist!". After a brief moment or in some cases a few seconds, the bot account connected to the system would send back a report with various information regarding the checks performed and an additional button labeled "Send Original" below the report. If a participant wished to have their role-played character speak their original input without modification, the button could be pressed to send the message immediately to the audience channel.

6.2 Results

There were eight unique runs of the experiment, seven of which received feedback while the initial first run was a test run that did not receive directly recorded feedback but informal suggestions from the participants as we tested and ironed out any further necessary details. Though there were many moments where the Character LINK System produced undesirable results, the overall experiment and role-playing activity was overwhelmingly well received. Of the 20 unique participants, some of which participated more than once, all of them rated their experience a 4 or higher on a scale from 1 to 5 (with 5 being the highest) even when they believed other participants did not portray their character very well. All participants also expressed that they would enjoy participating in this kind of experience again.

While observing participants interact with the Character LINK System, I noted that in many of the runs after a few minutes of using the system, participants became much more confident in their original input, spending less time considering the feedback from the system as long as the majority of the checks provided favorable results or at least indicated that the input found matches within the data regardless of if the match was very accurate. However, there is the possibility that this may have been the result of participants wanting to keep conversation as fluid as possible by replying whenever other participants also sent messages. There were indeed notable instances where participants

would nearly all go silent if the roleplay conversation stalled or hit a point where the topic needed to be redirected.

Regardless of whether they did or did not play *Tales of Link* most participants indicated that they felt that the role-played scenario rated 3 or higher on a scale from 1 to 5 when asked to rate if the scenario might fit into the proper *Tales of Link* universe. Though this might be attributed to the idea that they felt the basic prompts provided by me could alone fit into the game's canon, I believe these results also indicate that it was rare for participants to deviate so strongly from their character's perceived image that it would cause the role-played conversation to feel out of place.

6.2.1 Participants That Did Play *Tales of Link*

Though this research stated the existence of a uniquely new type of grief emerging from the termination of games as services, it was still surprising to see even among the relatively small sample of participants the results reflected an intuitive distribution of emotions concerning the termination of *Tales of Link*'s service. 9 of the 20 unique participants stated they had played Tales of Link. Some participated multiple times, providing 15 total responses to the survey. The participants were asked to rate their feelings on the game's closure at various intervals including at the actual time of closure and at the time the experiment was taken, slightly more than four years after the game's closure in 2018.

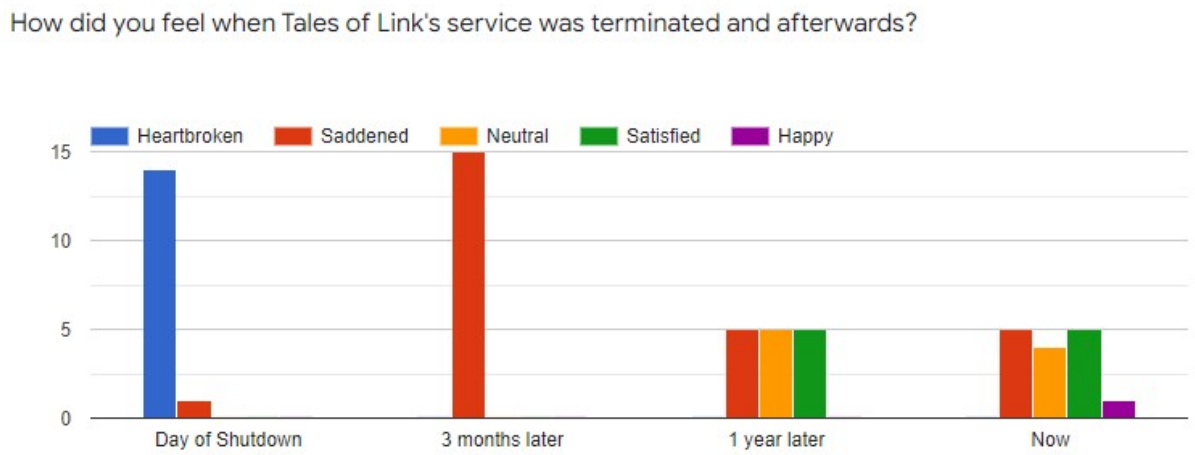

Figure 6.1: Emotional responses to *Tales of Link*'s closure.

Understandably, nearly all participants that had previously played *Tales of Link* were heartbroken when its service was terminated. As expected, all of the users continued to be saddened by the loss of the game 3 months later, but this indicated the beginning of a natural process of recovery to the loss. However, the data after 3 months drew significant attention. Of the 9 unique participants, 4 of them indicated they were still saddened about the closure after a year and even all the way until this experiment over 4 years after the game's closure. This further substantiates the claims I've made in this work that players of games as services can sometimes struggle with service termination long after the event and potentially lead to complicated grief.

As we must know by now, grief is different for everyone, so it is no surprise that some participants leaned generally neutral as well, likely signifying overcoming the grief while not being particularly happy about it. One user that participated five times responded that they felt satisfied, and when asked for further detail, elaborated that they felt though they were not happy with the circumstances, their feelings when thinking about the game's closure no longer lean towards the negative. One participant also answered that they were now happy with the game's closure not necessarily to say that they would not wish for it back but think the game had a good life and there are not many regrets left about its closure.

When asked if they thought participants that did not play *Tales of Link* would better understand the characters in the experiment, the results were very evenly distributed, with some believing that they would not at all and others believing that they very likely could. This could be attributed to the quality of the overall role-played conversation in the experiment as participants that expressed that they felt the scenario would fit well into the *Tales of Link* universe also answered favorably here as well. Participants were also asked if they believed they might be able to have a conversation with those who had not played the game better after they had participated in this experiment and 5 of the 9 unique participants indicated that they did, some even strongly so. It's possible that this surprising result is affected by the bereaved individuals' desire to connect with others

and share or talk about their experiences with a loved one that has been lost as is often an action in the healing process for grief.

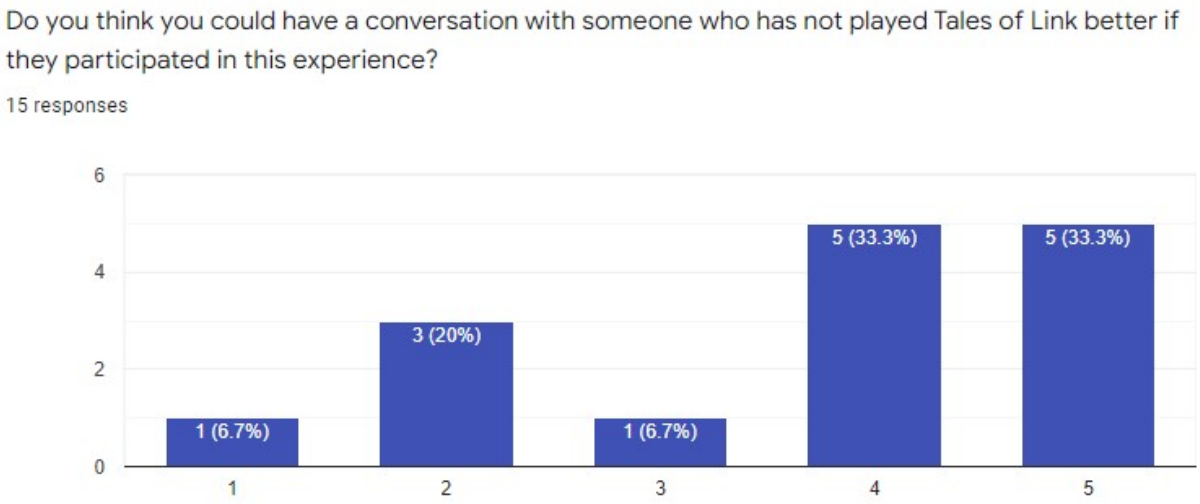

Figure 6.2: Could you speak to someone who never played *Tales of Link* after this?

6.2.2 Participants That Did Not Play *Tales of Link*

Though the participants that didn't play *Tales of Link* obviously won't feel the grief that has been researched in this thesis, it's equally important to analyze their response to the experiment and their responsiveness to interacting with those who did play the game. I hypothesized in earlier chapters that those who feel grief over the loss of games as services feel disenfranchised grief, a grief that is compounded by the perception that their grief is not viewed as valid by society. The most sensible way to tackle this grief is to allow the bereaved to find support in those who might also share or are willing to believe their grief is valid.

Understandably, when asked if they might be able to hold a conversation better with those who had played *Tales of Link* or if they believed that the role-played scenario matched their conception of the characters from the initial information, most answered unfavorably. Though some did answer favorably, it's not surprising that without a much deeper experience or perhaps just more experience, many did not feel confident when answering these questions. It's quite likely that the subject material revolving around grief made participants wary of answering too positively which might be found to be

offensive to the bereaved if they were to assume they would know more than they should after such a short experience. However, when asked if these participants felt that they understood the characters better after the experiment, a majority responded a 3 or higher on a scale from 1 to 5, with 5 being better than expected.

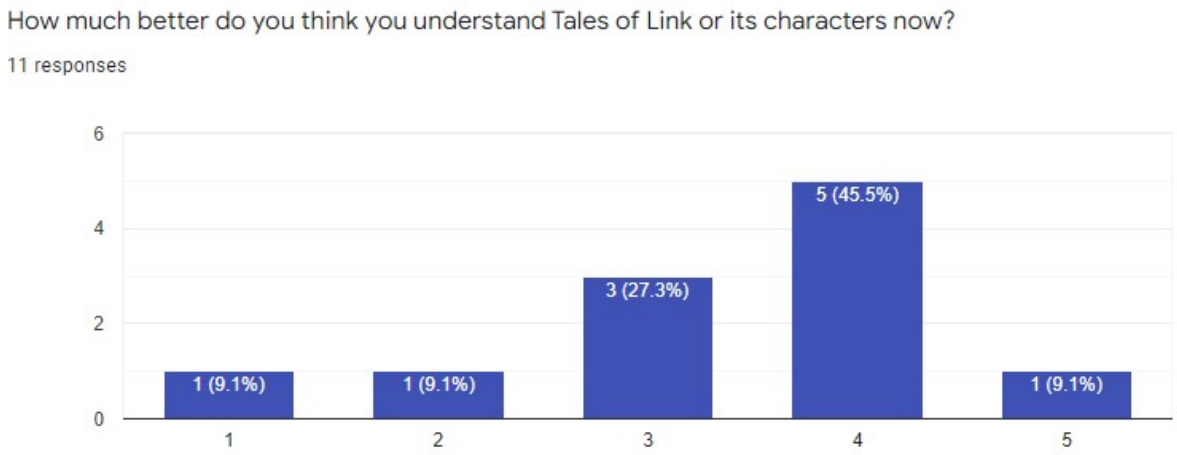

Figure 6.3: Do you think you better understand *Tales of Link* or its characters?

In the freeform text feedback, one notable participant that roleplayed as Sara expressed thoughts that aligned extremely well with this research. The scenario prompt stated that it was Sara's birthday, but she had not mentioned it just yet, leaving significant room for participants to take the prompt in many different directions. It should be noted that this participant was not made aware of any major details of the research when giving this response:

> I may or may not have read into the characters except the one I was assigned because I didn't realize that channel was there, so actually not knowing much about them I was actually able to understand their personalities a lot better I think. I could tell Lippy was a helpful companion, Kana was probably a little clumsy, and Zephyr was more strict natured, but helpful. I was a little stressed out in the beginning since I didn't know the prompt and it actually revolves around me and I sort of had to think of what direction to go with it, which was my initial struggle. In the end I felt like Sara would remember her birthday, and want to do something with all her friends. I definitely considered doing something like her totally forgetting or fussing about them doing anything for her, but how I started it off seemed like the best, even thinking about it now. Summary is I actually do think I understand the characters better, and may be able to talk about them with Link fans?

6.2.3 Inconsistencies Did Not Detract from the Experience

Though I was initially nervous that users might feel that character inconsistencies or errors in the system would be perceived as offensive, users expressed in feedback and during the experiment that the inconsistencies or unintended results would often enhance the experience. One participant roleplaying the character Zephyr shared that they found it highly amusing that when inputting "*Fighting noises*" into the system, they received "[Whoosh!]" as a result of the line similarity check. Though this result could certainly be perceived as accurate, the participant found the unexpected result to be quite humorous as well. I liken this to the randomness of temperature used in more advanced NLP techniques such as the ones employed in Project December from section 2.2.3 causing results to potentially stray far from expectations and create a more lifelike experience for users.

In another instance, one participant that showed a clear misunderstanding of the character they were roleplaying, Sara, and the setting of *Tales of Link* began to reference real life entities such as Uber, a taxi service company, and called the other characters "weirdozz" accompanied by a Discord emoji face that denoted laughter. The setting for *Tales of Link* comes close to a fantasy setting that contains swordplay and magic with small inclusions of technology such as Lippy's SMARTPHON that is a clear reference to real life smartphones. However, there are no hints of cars or internet lingo such as the ones mentioned by this participant in any of the prepared information for the experiment. Though the participant not fully catching on to these details is understandable, this was the only occurrence of such an extreme deviation among the 10 participants that had not played *Tales of Link*.

Regardless of this, however, the other users that participated in this session expressed that they found the need to converse around these discrepancies to be challenging and more amusing than expected. I surmise that this is because the idea of trying to figure out ways to make the roleplayed dialogue still feel appropriate gave the other participants a much stronger goal oriented experience, much like the interactor's experience in *Dramatic Presence* [24]. By immersing themselves more heavily into the scenario and trying

to move towards a constant goal, the inconsistency became more tolerable and a part of the experience.

6.2.4 Assessing the Character LINK System

General feelings towards the Character LINK System's various features leaned fairly positive, but some users did express that they did not find some features very helpful or even at all in some cases. The system has clear room for improvement so this comes as no surprise. The survey results for each feature excluding the identity check are shown in figure 6.4 below. Of the few participants that encountered the identity check feature, most answered that the feature rated somewhere between 3 to 5 on a scale of 1 to 5 with 5 being very helpful. However, evidence suggests because all other questions on the survey were required, some of these participants may not have realized they did not need to answer the question and selected 3 to signify a neutral sentiment.

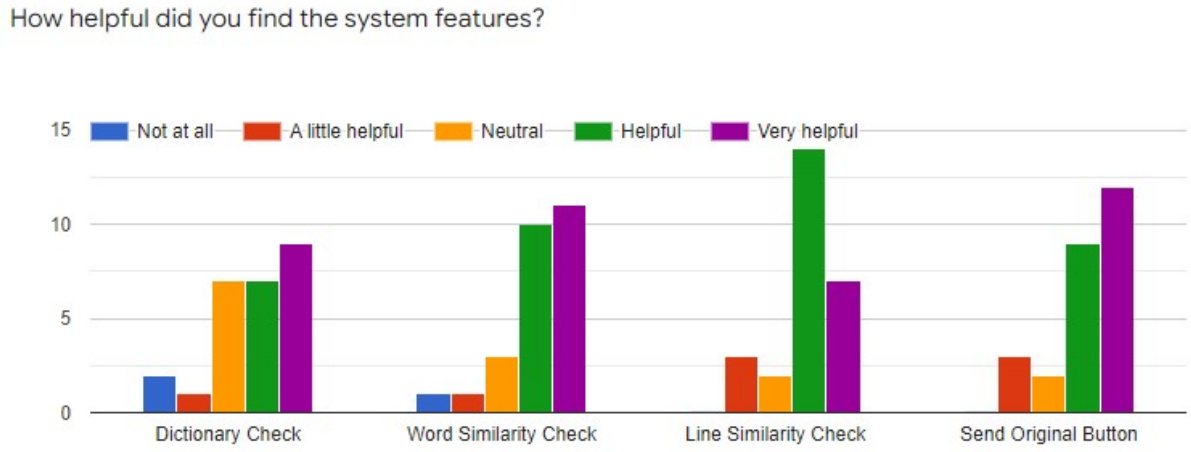

Figure 6.4: How were each of the system's features received?

Some participants also mentioned that their initial impression of the system made it difficult to use without prior practice. Since the system is capable of taking freeform input, many participants were unsure of what kinds of inputs would garner more informative results sometimes attempting to put very simple or even one word inputs, usually resulting in less accurate results. Some also sent feedback suggesting that an in-depth example viewable in a restricted channel may have been helpful instead of the mostly text-based instructions given with a short example image.

Chapter 7

Future Work

For future works, first and foremost, it would be productive to improve the algorithms used in determining character information within the system. Though they offered insightful information, results produced from the experiment and working on the system made it obvious that there was room for improvement. One major weak point of the system is that it requires structured dialogue to extract data from, but work done to extract character dialogue in complicated prose would no doubt create near infinite potential for the system.

Another potential future avenue that unfortunately could not be explored due to time constraints is the possibility for the Character LINK System to be used in a different context as an authoring tool for writers or other interested parties to extract and see relevant information on characters at a glance without the need to pour through extensive logs of character dialogue or data. This option was expressed to be the most popular among those whom the system was presented to and those who participated in the experiments as well.

Chapter 8

Conclusion

Grief can be felt in the loss of anything as long as the bereaved feel a deep connection with the person or thing that is lost. There's clear evidence that this can be extended even to the loss of video game characters. Video games and those who enjoy them are no strangers to grief that might emerge from interacting with and playing video games, but with the advent of games as a service, we must consider the emerging new type of grief that comes from the loss of games that often leaves very little closure when service is terminated. Not validating this new type of grief can leave the bereaved feeling disenfranchised and risk further mental health deterioration.

The experiment that combines a unique structure with the Character LINK System, though it still has much to improve, has been received very well by the participants and opens the potential for systems like it to help bereaved individuals feeling loss over their favorite games to connect with others regardless of whether they have knowledge of the game or not. Most importantly, the participants that did play *Tales of Link* felt that they might be able to have a better conversation or enhanced connection with those who have not played the game after this experience, a great milestone in the healing process of disenfranchised grief.

However, each game is unique and so too will the loss of the game and its characters be. This work shows the potential for ways to help similar groups deal with their grief, but clearly cannot be the only analysis of this emerging situation. Though I do not think automated NLP techniques as they are now are in a state to be used explicitly for this purpose, they do have the potential to provide users with glimpses of the personality and characteristics, perhaps souls even, of the loved ones that have been lost and create a new avenue for healing from the grief of their loss.

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