The Effects of Agency Within an Interactive Digital Narrative Health Intervention on Cognitive and Transformative Learning

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Contents

Abstract

Depression is a prevalent problem for young adults worldwide (James et al., 2018). However, there are knowledge deficiencies regarding mental health issues (Jorm, 2012). Interactive digital narratives (IDNs) can be used to alleviate this problem. The present study follows up on previous research conducted by Scholl (2020). The aim was to investigate the effects of agency on cognitive and transformative learning within a digital narrative about depression, including the mediating role of identification, transportation, and intrinsic motivation. For this purpose, a between-subjects survey design was employed with 155 participants between the age of 18 and 34 who were randomly assigned to one of the three conditions (control, narrative with/without agency). An educational, text-based IDN was used as a stimulus that improves on flaws by the original version of Scholl (2020). The study's findings suggest that agency within narratives about depression does not support cognitive learning. However, a positive effect on transformative learning was found, i.e., a change of one's frame of reference (Mezirow, 2000). This effect is mediated by identification with a character (Cohen, 2001). Hereby, transformative learning is facilitated by empathizing and taking on a different perspective, leading to the critical reflection and change of one's frame of reference regarding depression. The insights of the present study can be of value to designers of narrative mental health interventions. They can be used to improve their effectiveness in terms of transformative learning by emphasizing the identification with characters.

Keywords: interactive digital narratives, agency, cognitive learning, transformative learning, identification, transportation, intrinsic motivation, mental health intervention

The Effects of Agency Within an Interactive Digital Narrative Health Intervention on Cognitive and Transformative Learning

Depression is a widespread problem, with over 264 million people suffering from it worldwide (James et al., 2018). Young people are especially affected. According to the Substance Abuse and Mental Health Services Association (2019), 12- to 17-year-olds have the highest rate of major depressive episodes, followed by 18- to 25-year-olds. This problem seems to be exacerbated by the COVID-19 outbreak, with the prevalence of depression being seven times higher in 2020 compared to 2017 (Bueno-Notivol et al., 2021). Depression can have far-reaching effects on a person's life resulting in the inability to work and partake in social activities or even suicide (WHO, 2021). This shows the importance of educating people about mental disorders such as depression. Studies in different countries point to knowledge deficiencies regarding the prevention and recognition of mental disorders, help-seeking and treatment options, and how to help others suffering from mental health issues (Jorm, 2012).

Narratives can be used in this context as they can have positive effects on learning. Information presented in the form of a narrative can be comprehended and retained more easily than information within expository texts (Browning & Hohenstein, 2015; Wolfe, 2005; Williams, 2000) and is retained for longer (Negrete, 2003; Negrete & Lartigue, 2012). These benefits can be further enhanced through interactivity. Interactive digital narratives (IDNs) can be defined as "an expressive form in the digital medium, that affords dramatic agency for interactors, and the ability to intentionally influence salient aspects (character development, sequencing, outcome, etc.) of a narrative" (Roth & Koenitz, 2016, p. 31). This participatory aspect of IDNs can facilitate active learning by involving students in the learning process through meaningful activities (Prince, 2014). This has been shown to have positive effects on cognitive learning (Freeman, 2014).

IDNs can also have a transformative learning effect. Transformative learning occurs when a person's frame of reference is changed as a result of an experience (Mezirow, 2000). The frame of reference includes one's values, feelings, and learned behaviors. Experiencing a

disorienting dilemma can trigger this change. IDNs can be used in this context by allowing learners to experience new perspectives, which can trigger a critical reflection and a subsequent change of their frames of reference (Mezirow, 2003). By giving interactors agency, they can actively learn from the perspective of characters of the narrative, which supports the transformative learning process.

As discussed in the previous sections, IDNs have the potential to support learning. The present study assesses the learning outcomes in terms of cognitive learning (Bloom, 1956) and transformative learning (King, 2009). Additionally, multiple variables are measured that could mediate the effect of agency within IDNs on learning outcomes. One of these constructs is the narrative experience of identification. Identification refers to the phenomenon of experiencing media from the inside by taking on the perspective of a character (Cohen, 2001). Therefore, readers have the feeling that the events within a narrative are happening directly to them. Subsequently, more attention is paid to events surrounding the character (Cohen, 2006). This represents a potential for learning if educational content is relevant from the character's perspective. The second narrative experience relevant to the present study is transportation. It refers to the feeling of being transported into a narrative world (Green & Brock, 2000). This means that all cognitive resources are focused solely on the narrative. Therefore, if educational content is integrated into a narrative, full attention and cognitive processes are focused on its comprehension, possibly resulting in increased learning outcomes.

Another way in which narratives can facilitate learning is through intrinsic motivation, which can be explained through the Self-Determination Theory (SDT). According to the SDT, there are three basic psychological needs (i.e., competence, autonomy, and relatedness) that drive human behavior (Rigby & Ryan, 2016). Autonomy is the need to feel in control and to have agency. Competence is the need for personal growth and to experience efficacy. Relatedness is the need to feel meaningful connections with others. IDNs can satisfy all three of these needs increasing intrinsic motivation. Previous research has

shown that a higher level of intrinsic motivation can indeed result in better learning outcomes (Jang et al., 2009).

A previous study by Scholl (2020) investigated the discussed effects of IDNs about depression on cognitive learning and the mediating role of identification, transportation, and intrinsic motivation. The IDN is mainly targeted at people who are not struggling with depression themselves but have loved one's that might be. The goal of the IDN was to educate young adults on how to detect signs of depression, how to start and have conversations about depression, and to raise awareness about the internal experiences of people suffering from depression. The findings indicate no difference concerning cognitive learning outcomes between the narrative with and without agency. This can be explained by potential flaws of the design of the IDN, *Cloudy*, which served as the experimental stimulus. Firstly, the educational content was not seamlessly integrated into the narrative. Secondly, the educational content within the narrative was not relevant to the plot or the choices provided to the interactors. Thirdly, there was a lack of choice effectance, i.e., observing the impact of one's action (Klimmt et al., 2007). Therefore, the present study is being conducted with a newly created version of *Cloudy* based on information provided by or medically reviewed by mental health professionals (see Appendix A), which aims to improve the shortcomings mentioned above. Moreover, transformative learning is being added as an outcome variable.

The findings could provide new theoretical insights concerning the design and use of IDNs in educational contexts, specifically to increase cognitive and transformative learning. Furthermore, the relationship between agency, identification, transportation, and intrinsic motivation will be explored. The sample age ranges from 18 to 34 as this age group is especially susceptible to depressive episodes (Substance Abuse and Mental Health Services Association, 2019). The findings of this study may inform the design of narrative mental health interventions and improve their effectiveness.

RQ: *To what extent does agency within narratives about depression affect cognitive and transformative learning, and to what extent is this effect mediated by identification, transportation, and intrinsic motivation?*

The following chapters give an overview of relevant concepts and the theoretical background regarding the research question and relate them to the new version of *Cloudy*. As the present study follows up on the experimental research performed by Scholl (2020), potential shortcomings in the stimulus design are identified, which may explain the insignificant results. These serve as points of improvement for the creation of the new stimulus.

Theoretical Framework

2.1 Narratives

2.1.1 Traditional Narratives

Abbott (2020) distinguishes between two components of narratives: story and narrative discourse. Firstly, the story pertains to a sequence of events or the plot of the narrative. Toolan (2013) defines a story as "a perceived sequence of non-randomly connected events, typically involving, as the experiencing agonist, humans or quasi-humans, or other sentient beings, from whose experience we humans can learn" (Toolan, 2013, p.8). According to Kinnebrock and Bilandzic (2006), these events must also have a particular chronological order and be causally connected.

Secondly, the narrative discourse pertains to the presentation of the events of the story. Typically, a narrative consists of a beginning, a middle, and an end (van Peer & Chatman, 2001). The beginning sets up a conflict that the protagonist is trying to resolve. Subsequently, this may lead to complications in the middle and eventually ends in failure or success. Furthermore, Avraamidou and Osborne (2009) emphasize the role of a narrator who forms a whole out of the sequence of events. This construction requires interpretation which manifests itself through the point of view and focalization (Martinez & Scheffel, 2003). The point of view refers to the perspective from which the narrative is being told. Focalization can be defined as the "restriction of narrative information in relation to the experience and knowledge of the narrator" (Niederhoff, 2014, p.115).

The new version of *Cloudy* incorporates the narrative characteristics mentioned above (see Appendix B). Specifically, it adheres to a clear narrative format with causally connected events: A conflict is introduced in the beginning (i.e., noticing a friend's struggles with depression), leading to complications in the middle (i.e., addressing concerns and learning how to help) and ending in a resolution of the conflict (i.e., failing/succeeding in convincing her to get help). The original version of *Cloudy* was written from Sofie's perspective, a person struggling with depression. In the new version, the perspective was

changed to that of Mark, Sofie's friend, who is trying to help her. One reason for this decision is that experiencing the narrative as a friend of a depressed person might be more relevant to the goal of the narrative to teach interactors how to handle conversations about depression. Furthermore, the narrative is being told with a second-person point of view (Jahn, 2005), addressing the reader directly as if they were Mark. Internal focalization is used, meaning that the narrator knows as much as Mark.

2.1.2 Interactive Narratives

Interactive digital narratives (IDNs) are narratives with specific affordances (Murray, 2012). Roth and Koenitz (2016) define IDNs as "an expressive form in the digital medium, that affords dramatic agency for interactors, and the ability to intentionally influence salient aspects (character development, sequencing, outcome, etc.) of a narrative" (Roth & Koenitz, 2016, p. 31). Therefore, agency is a central part of IDNs. It can be divided into three dimensions: usability, effectance, and autonomy (Roth & Koenitz, 2016). Usability refers to a user's interaction with the hardware and software interface of a system (Shackel, 2009). Effectance is related to observing the impact of one's action (Klimmt et al., 2007) and can be subdivided according to its scope. Local effectance describes an instant effect on a specific section of the plot. Global effectance describes a delayed effect that can impact later parts of the plot. This can have consequences for the overall narrative structure and can result in different endings (Roth & Koenitz, 2016). Lastly, autonomy refers to the ability of interactors to choose freely from a set of options.

In the new version of *Cloudy*, agency is afforded on a narrative level. Interactors are prompted to make choices that influence the progression of the plot. For each choice, the interactor is given two options: one that is beneficial for Sofie (positive option) and one that is not (negative option). For example, Mark asks a mutual friend how to best express empathy for Sofie. In a later choice, the interactor has the option to acknowledge her struggle (positive option) or to try to cheer her up (negative option). The number of choice options in IDNs should correspond to the number of possibilities the interactor can imagine (Crawford,

2012). However, this is not realistically implementable. Therefore, interactors are only given a positive and a negative option covering both ends of the range of possibilities. This keeps the branching structure manageable and increases experimental control as the number of possible narratives resulting from participants' choices is decreased. Lastly, limiting the number of options to two can still result in a high level of perceived autonomy, as seen in the study by Scholl (2020). How effectance is being implemented into the new version of *Cloudy* is being discussed in more detail in Chapter 3.2.1.

2.2 Narratives and Learning

2.2.1 Traditional Narratives and Learning

As the goal of *Cloudy* is to teach people about depression, the potential of narratives in learning contexts will be discussed. Norris et al. (2005) speak of a narrative effect which "enhances memory, interest, and understanding" (p. 356). Indeed, there is evidence that narrative information is retained and comprehended more easily (Browning & Hohenstein, 2015; Wolfe, 2005; Williams, 2000) and for longer (Negrete, 2003; Negrete & Lartigue, 2012) than expository information.

One explanation for this can be provided through the Dual Coding Theory (Paivio & Clark, 2006). The theory suggests that information is mentally processed and stored through two mental codes: verbal representations and mental images. Narratives can be used to simultaneously prompt verbal as well as visual coding resulting in information being more easily remembered. This can be accomplished by eliciting vivid mental imagery through concrete language, which is emotionally interesting and relates to sensory aspects, time, or space (Green & Brock, 2002). Similarly, narratives can evoke emotions which can be beneficial for learning. Firstly, people can better maintain attentional focus on material that has emotional meaning (Dolan & Vuilleumier, 2003). Secondly, emotions positively impact memory (Kensinger & Schacter, 2008).

The new version of *Cloudy* incorporates the aforementioned narrative aspects which support learning. Firstly, it includes imagery-evoking language (e.g., "Once she notices you,

her facial expression immediately changes from a blank stare to a forced smile."). Secondly, it evokes emotions by depicting the struggle with depression and the strain it puts on the characters' relationship (e.g., „Mark could tell that something had changed. […] The few times they did meet, Mark noticed that Sofie was different.").

2.2.1 Active Learning

The participatory nature of IDNs represents an added potential to facilitate learning. Specifically, the theory of active learning is relevant in this context as it positively affects cognitive learning outcomes (Fayombo, 2013; Freeman et al., 2014; Markant et al., 2016; Ruhl et al.,1987). There is no one generally accepted definition of active learning. However, there are two core principles: 1) adding activities to the teaching and 2) promoting student engagement (Bonwell & Eison, 2012; Prince, 2004).

To fulfill the first principle of active learning, different types of activities can be incorporated into IDNs. Letting learners make choices based on information obtained through the narrative may combine different types of activities (Brame, 2016) such as The Pause Procedure (i.e., interrupting the narrative to reflect on the material), retrieval practice (i.e., retrieving choice-relevant information), decision-making activities (i.e., making a decision based on relevant information), and case-based learning (i.e., applying obtained knowledge to a specific narrative scenario).

To fulfill the second principle of active learning, it is not enough to add any activity. According to Wiggins and McTighe (2005), the activity should be built around essential learning outcomes to promote thoughtful engagement. In the case of IDNs, the educational content should be fully integrated into the narrative, making it relevant for the activity. This also has a direct effect on the comprehension of the educational content. According to the capacity model (Fisch, 2000), comprehension of educational narratives takes place through two processes: processing of the narrative content and processing of the educational content. Because working memory capacity is limited (Mayer, 2012; Thomas, 2000), there is a finite quantity and depth of processing that can occur at a given time resulting in competition over

its resources. However, when educational content is closely integrated into the narrative, the two comprehension processes become complementary, leading to a deeper understanding of both domains.

An empirical study investigating the effects of agency within IDNs on cognitive learning is that of Scholl (2020). For his experiment he created the interactive text-based narrative *Cloudy*. The experiment results suggest that there is no significant difference in the cognitive learning outcomes between a narrative with and without agency. This could be explained by shortcomings in the stimulus design, which will be improved upon in the new version of *Cloudy*.

Firstly, the learning material was not fully integrated into the narrative of the original IDN. It consisted of separate narrative and educational segments. The expository segments were also presented in italic font, making them easily identifiable. Thus, interactors might have been inclined to skip over the expository segments and focus solely on the narrative segments. Therefore, the educational content within the new version of *Cloudy* is fully integrated into the narrative.

Secondly, the relevance of the learning material for the choices represents another point of improvement. The educational content in the original IDN did not relate to the choices. Thus, the learning material was not applied to the learning activity, which might have resulted in decreased cognitive learning outcomes. In the new version of *Cloudy*, interactors are incited to base their decisions on knowledge they obtained throughout the narrative as it is relevant for each choice.

Thirdly, the lack of effectance for the choices made by interactors is another shortcoming of the original stimulus. For example, when interactors choose not to open a door, Sofie proceeds to open it anyway. This can be categorized as a false choice where all options result in the same consequence (Mawhorter et al., 2014). Therefore, each choice in the new version of *Cloudy* has a meaningful impact on the narrative through local and global effectance. How the integration of learning material, choice relevance, and choice effectance

are implemented in the new version of *Cloudy* will be discussed in more detail in Chapter 3.2.1.

Based on these theory-based improvements to the experiment stimulus, the following hypothesis is being proposed.

H1: Narratives with agency lead to a higher level of cognitive learning than narratives without agency.

2.2.2 Transformative Learning

Narratives have previously been used in educational contexts because of their transformative potential (Brooks, 2000; Hansman & Wright, 2009; Willis, 2012). This can be attributed to the ability of narratives to vicariously facilitate the experience of other perspectives (Murray, 2017). Therefore, transformative learning will be assessed in the experiment of the present study in addition to cognitive learning.

The transformative learning theory was first introduced by Mezirow and Marsick (1978) and has resulted in various alternative interpretations since its conception (Collard & Law, 1989; Merriam, 2004; Snyder, 2010). In essence, transformative learning occurs when a person's frame of reference is changed through an experience (Mezirow, 2000). Frames of reference refer to one's collective experiences, including values, feelings, and learned behaviors which define one's worldview. A person's frame of reference represents the starting point for a transformation. Transformative learning can then take place through critical reflection on one's frame of reference (Taylor, 2009). Consequently, facilitating transformative learning means providing learners with an experience that makes them reevaluate their frames of reference and changes them due to this reflection (Mezirow, 2003). The frame of reference which is addressed in *Cloudy* refers to the topic of depression. Specifically, it gives a perspective on how to deal with a loved one struggling with depression, how to start a conversation about depression, and how to help them.

The frame of reference can be changed in two ways. On the one hand, a transformation can be accomplished by letting learners experience a perspective which clashes with their own. Mezirow and Marsick (1978) refer to this discrepancy as a disorienting dilemma. On the other hand, letting learners experience a situation that is similar to their own can also result in a transformation. This is what Jarvis (2012) calls resonance. He argues that resonance can be accomplished by exploring new solutions to the same struggles (Wright, 2007). In the context of *Cloudy* transformative learning might therefore be facilitated for people who do not have experienced depression themselves or do not know how to deal with it (i.e., disorienting dilemma) as well as people who do have experienced it but might get a new perspective on this familiar situation (i.e., resonance).

Apart from the frame of reference and critical reflection, Taylor and Cranton (2013) emphasize the importance of empathy for transformative learning. Empathy can be defined as "understanding another person's experience by imagining oneself in that other person's situation" (Baumeister & Vohs, 2007, p. 296). Empathy can support a necessary perspective shift as it allows interactors to identify with characters' perspectives, leading to the critical reflection of their own frames of reference.

The active and participatory nature of IDNs (Murray, 2017) can further increase the transformative effects of narratives. Specifically, agency within IDNs can connect interactors more directly to the narrative helping them to deriving personal meaning from the narrative and connecting it to their own experience. In *Cloudy*, interactors make choices on behalf of the main character, possibly triggering a critical reflection of their frame of reference concerning depression. Firstly, this could be enabled by inviting interactors to enter the perspective of the protagonist. Secondly, the choices represent a break from the narrative (i.e., Pause Procedure), which may encourage reflection. Furthermore, interactors have to retrieve choice-relevant information (i.e., retrieval practice) and subsequently decide which option to choose based on that information (i.e., decision-making activity).

In summary, narratives are a promising tool to trigger critical reflection through empathy and choice-relevant learning material leading to a possible change of frame of

reference facilitating transformative learning. Based on this notion, the following hypothesis was formulated.

H2: Narratives with agency lead to a higher level of transformative learning than narratives without agency.

As illustrated in the previous sections, agency within IDNs has the potential to increase cognitive and transformative learning outcomes. This effect may be mediated by various constructs which will be discussed in the following chapters.

2.3 Narrative Experience and Learning

2.3.1 Identification

Identification is a construct that has been investigated by numerous scholars (Busselle & Bilandzic, 2008; de Graaf et al., 2012; Oatley, 1999; Tan, 1994). According to Cohen (2001), identification consists of emotional and cognitive empathy. Emotional empathy refers to the ability to share the same feelings as a character. Cognitive empathy refers to the phenomena of taking on a character's perspective and subsequently adapting the same beliefs and goals or even feeling like becoming one with the character. Therefore, readers experience a narrative from the inside and feel like the events are happening directly to them. As a result, attention to events surrounding the character of the narrative can be increased (Cohen, 2006). This can be advantageous in the context of cognitive learning when educational content is presented from the perspective of a character.

A prerequisite for this process of perspective-taking is the occurrence of a deictic shift (Busselle & Bilandzic, 2009). The Deictic Shift Theory (Hewitt, 2012) states that consumers of a narrative enter the characters' subjective world, resulting in a biased perception of the narrative events. Such a deictic shift can be supported by using deictic expressions, which refer to a person, time, or location and are only comprehendible from the

character's perspective (Galbraith, 1995). IDNs can further support a deictic shift and identification by directly assigning a role to interactors and enabling them to make choices on behalf of a character (Green & Jenkins, 2014; Roth & Koenitz, 2016).

In the new version of *Cloudy*, the interactor takes on the role of Mark which is further supported by employing a second-person point of view (e.g., "You feel the urge to check in with Sofie and send her a message to ask what she's up to.") and making choices on his behalf. In addition, the internal focalization gives insights into Mark's thoughts and feelings (e.g., "Your heart sinks as you hear her response. 'I really didn't handle this the right way,' you think."). These aspects support the process of identification by facilitating a deictic shift. Cognitive empathy is stimulated by taking on the main character's role; emotional empathy is stimulated by the insights of the internal focalization.

Identification can also be used in the context of transformative learning. Specifically, enabling the adoption of different points of view can shape attitudes and expand perspectives (Cohen, 2001). Indeed, narratives can affect real-life opinions, attitudes, and behaviors through identification (de Graaf et al., 2009; Hoeken & Fikkers, 2014; Iguarta, 2010). An experiment by Hoeken and Fikkers (2014) showed that identifying with a character will result in adopting attitudes towards certain issues that are consistent with those of the character by making them more appealing. In the context of *Cloudy*, this means that interactors actively experience a new perspective regarding depression by taking on the role of the main character and thus may adopt narrative-consistent attitudes and behaviors.

2.3.2 Transportation

A narrative experience related to identification is transportation (Gerrig, 1993; Green et al. 2004, Green & Brock, 2002; Slater & Rouner, 2002). It refers to the feeling of being transported into a narrative world and includes the immersion into a narrative through cognitive, emotional, and imagery aspects (Green & Brock, 2000). As with identification, a deictic shift is a prerequisite for transportation (Busselle & Bilandzic, 2008). Subsequently, the narrative and its events are experienced from within. Transportation facilitates the

maintenance of focus on the information provided in the narrative, i.e., the ease of cognitive access (Appel et al., 2002), which is beneficial for cognitive learning. Additionally, feeling transported results in cognitive capacities and attention being completely focused on the narrative, particularly on the comprehension of the narrative (Busselle & Bilandzic, 2008). This presents a potential for cognitive learning when educational content is seamlessly integrated into narratives resulting in full attention and cognitive focus being devoted to its comprehension. Green and Brock (2002) identify different aspects facilitating transportation that are implemented in the new version of *Cloudy*. Attributes of a narrative that affect transportation include the potential to evoke vivid mental imagery (see Chapter 2.2.1) and the adherence to a narrative format (see Chapter 2.1.1).

Lastly, transportation (like identification) can lead to adopting beliefs and attitudes congruent with the narrative (Green & Brock, 2000; Green et al., 2004). This effect can be explained by the fact that all cognitive capacities are occupied by narrative comprehension processes resulting in the inability to counterargue (Green & Brock, 2000). This represents the potential of transformative learning to occur. Moreover, Green et al. (2004) attribute the transformative nature of transportation to expanding one's perspective by entering alternative realities. In addition, they argue that interactivity may increase the transformative potential of narratives. This results from an increase in immersion by enabling the interactor to actively participate in the narrative world.

As demonstrated in the previous chapter, there is a partial overlap between identification and transportation (Bilandzic & Busselle, 2017; Brown, 2015; Cohen et al. (2015); Moyer-Gusé, 2008). Both narrative experiences need to be preceded by a deictic shift resulting in the spatial and temporal relocation to the narrative and the adoption of a character's perspective (Busselle & Bilandzic, 2009). Due to this conceptual overlap, both identification and transportation are combined in the following hypotheses.

H3: Agency within narratives leads to increased cognitive learning outcomes through a higher level of identification and transportation by increasing the attention to educational content embedded in the narrative.

H4: Agency within narratives leads to increased transformative learning outcomes through a higher level of identification and transportation by facilitating the adoption of narrative-consistent beliefs and attitudes.

2.3 Intrinsic Motivation and Learning

In addition to the narrative experience of identification and transportation, the construct of intrinsic motivation might increase the positive effects of agency on learning. Intrinsic motivation refers to a person's self-motivation and the innate human propensity towards the extension of abilities, exploration, and learning (Ryan & Deci, 2000). The Self-Determination Theory (SDT) gives insight into how to evoke and maintain intrinsic motivation. The theory states that there are three inherent human psychological needs that drive intrinsic motivation: autonomy, competence, and relatedness. Autonomy pertains to the need to feel in control and to have agency. Competence pertains to the need for personal growth and experiencing efficacy. Lastly, relatedness pertains to the need to feel meaningful connections with others (Ryan & Deci, 2000).

IDNs can facilitate a direct satisfaction of these needs. Giving interactors the agency to freely make choices can satisfy the need for autonomy. Observing the effectance of these choices can satisfy the need for competence (Roth & Koenitz, 2016). Lastly, interacting with characters and subsequently feeling connected to them can satisfy the need for relatedness. The new version of *Cloudy* stimulates intrinsic motivation in multiple ways. The need for autonomy is satisfied by enabling interactors to freely make choices. The need for competence can be satisfied by observing the consequences of these choices. As previously discussed, the choices in the original version of *Cloudy* lacked effectance, impeding the satisfaction of competence, leading to a lower degree of intrinsic motivation. Indeed, the

non-linear version of the original narrative did not lead to a higher degree of intrinsic motivation than the linear version (Scholl, 2020). By adding effectance to the choices in the new version of *Cloudy*, the need for competence might be satisfied to a higher degree leading to an increase in intrinsic motivation.

The SDT can not only be applied to narratives but is also directly connected to learning. The innate human propensity towards learning (Ryan & Deci, 2000) can be supported by increasing intrinsic motivation. Indeed, there is evidence that the satisfaction of autonomy, competence, and relatedness leads to a higher level of intrinsic motivation, which results in better cognitive learning outcomes (Jang et al., 2009). The preceding connection between agency, intrinsic motivation, and cognitive learning leads to the following hypothesis.

H5: Agency within narratives leads to increased cognitive learning outcomes through a higher level of intrinsic motivation by satisfying the needs for autonomy, competence, and relatedness.

The SDT can also be linked to positive effects on transformative learning, specifically the process of internalization. Internalization refers to the process of incorporating values, beliefs, and behaviors within oneself (Ryan & Deci, 2003). The SDT suggests that internalization is a motivated process rooted in the satisfaction of the basic human needs. Firstly, Ryan and Deci (2003) argue that a higher level of autonomy support increases internalization. Thus, the more controlling an environment is, the poorer the resulting internalization (Gagné et al., 2003; Roth et al., 2009). In *Cloudy*, autonomy is supported by letting interactors freely make choices without being pushed in any direction. Secondly, internalization can occur when the need for relatedness is supported (Niemiec & Ryan, 2009). This means that people are more likely to adopt the same values, beliefs, and behaviors of a person they feel connected to or in environments where they feel a sense of belonging. The new version of *Cloudy* centers around the relationship between Mark and

Sofie. Furthermore, the choices pertain to reactions and replies to other characters making the IDN interaction focused. This connects agency directly to the interpersonal relationship between the characters, further supporting the need for relatedness.

In summary, intrinsic motivation can facilitate transformative learning by supporting the process of internalization. The internalization of beliefs, values, and behaviors exhibited by the characters may subsequently lead to a change of frame of reference in interactors. Therefore, the following hypothesis is proposed.

H6: Agency within narratives leads to increased transformative learning outcomes through a higher level of intrinsic motivation by supporting internalization.

2.5 The Relationship Between Agency, Identification, Transportation and Intrinsic Motivation

The constructs agency, identification, transportation, and intrinsic motivation not only affect cognitive and transformative learning in isolation but also influence each other. Therefore, the present study will discuss and analyze the relationship between these concepts. As mentioned in the preceding chapter, there is a partial overlap between identification and transportation. Additionally, they both can be connected to intrinsic motivation. Intrinsic motivation is operationalized through the concept of enjoyment and interest (Self-Determination Theory, n.d.) (i.e., *I found this way of taking in information about depression to be enjoyable/fun/interesting)*. Transportation can predict enjoyment (Bilandzic & Busselle, 2006; Johnson & Rosenbaum, 2015) by enabling escapism into alternative realities leaving behind real-world problems and worries (Green et al., 2004). Identification can predict enjoyment by providing the possibility to safely experiment with other identities (Radway, 2002) and alternative realities (Nell, 2002). Lastly, enjoyment can also be linked to narrative agency. Lee et al. (2010) found that participants who were able to make choices that impact the direction of a plot resulted in more enjoyment than

experiencing a traditional narrative. One explanation for this might be that giving interactors narrative agency results in a plot that is more interesting to them (Moser & Fang, 2015).

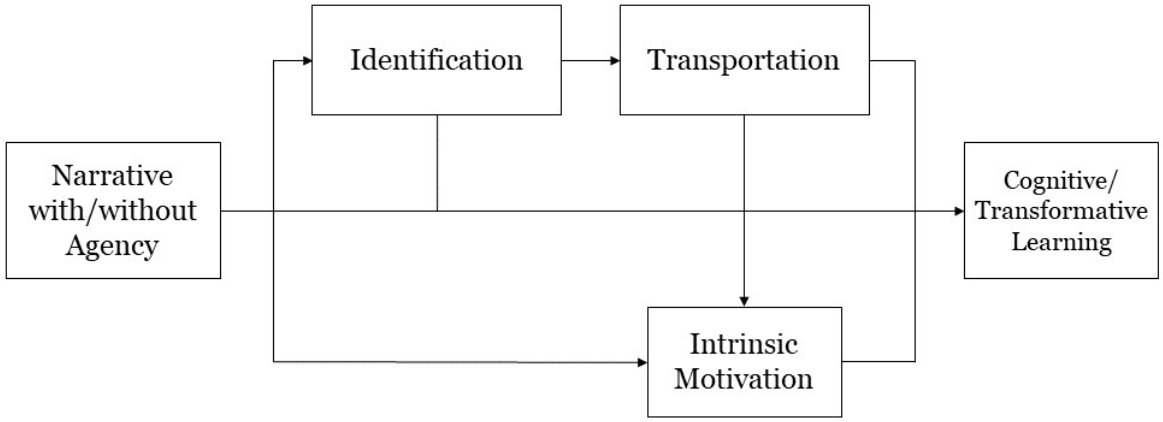
The preceding chapter illustrates how the constructs of agency, identification, transportation, and intrinsic motivation are interconnected. Subsequently, it is hypothesized that all three constructs can increase intrinsic motivation through the concepts of enjoyment.

H7: Agency within narratives leads to increased intrinsic motivation through a higher level of identification and transportation by eliciting enjoyment.

The following conceptual model is proposed based on the concepts discussed in the theoretical framework and the connections between them (see Figure 1).

Figure 1

The Conceptual Model



Method

A between-subjects survey design was used to investigate whether agency in narratives about depression affects cognitive and transformative learning and to what extent this effect is mediated by identification, transportation, intrinsic motivation. In addition, a control group was included to assess the baseline knowledge regarding depression. Participants were randomly assigned to one of the three conditions.

3.1 Participants

Participants were recruited through convenience sampling of the researcher's personal network as well as the Human Subject Pool of the Tilburg School for Humanities and Digital Sciences and the survey exchange sites SurveyCircle and SurveySwap. According to a power analysis (G*power3, Faul et al., 2007), a statistical power of 0.8, with a medium-sized effect (d = 0.25) and an alpha of 0.5 requires a sample of 156 participants with 52 participants per condition. This sample size was almost achieved. The final sample consisted of 155 participants who were randomly assigned to the control (n = 53), linear (n = 51), and non-linear condition (n = 51). The participants' age ranged from 18 to 34 as this age group is especially susceptible to depressive episodes (Substance Abuse and Mental Health Services Association, 2019). The 18-to-24-year group consisted of 86 (55.48%) participants; the 25-to-34-year group consisted of 69 (44.52%) participants. Most participants were female (n = 94, 60.65%), followed by male (n = 60, 38.71%), and non-binary/third-gender (n = 1, 0.65%). Most participants completed a bachelor's degree (n = 81, 52.26%), followed by a high school diploma (n = 34.84%), master's degree (n = 17, 10.97%), and vocational training (n = 3, 8.39%). Lastly, most participants had experience with depression themselves or experienced it up close (n = 123, 79.35%), followed by participants who had no prior experience (n = 26, 16.77%) and participants who did not want to disclose that information (n = 6, 3.87%).

From the initial sample of completed surveys (n = 205), 55 were excluded. Participants were excluded from the data set if they did not give consent (n = 4), were

outside of the age range (n = 9), failed one or more of the attention checks (n = 18), exceeded 1 h on the survey (n = 9), or took less than 3 min on the survey for the control group (n = 4), or 10 min for the narrative conditions (n = 6).

3.2 Stimulus

The stimulus used in the present study is a new version of *Cloudy*, an IDN used in the study by Scholl (2020). The original version was based on an IDN, which was created for the master's course 'Interactive Storytelling'. *Cloudy* is an interactive text-based narrative addressing the topic of depression. The narrative has the goal of educating young adults on how to detect signs of depression, how to start and have conversations about depression, and to raise awareness about the experiences of people suffering from depression. The IDN is mainly addressing people who are not struggling with depression themselves but have loved one's that might be suffering. The original version of *Cloudy* was written in Dutch, whereas the new version was written in English (see Appendix B). An interactive version of the IDN can be accessed through the following link: https://tilburghumanities.eu.qualtrics.com/jfe/form/SV_2i3XSDK2qv3QO0e

3.2.1 Improvements in the New Version of Cloudy

In the original study, Scholl (2020) did not find a significant difference concerning the cognitive learning outcomes between the linear and non-linear version of the narrative. This finding might have resulted from potential shortcomings in the IDN. Therefore, several revisions were made for the present study.

Integration of Learning Materials. The insignificant findings in the study by Scholl (2020) could have resulted from the lack of integration of the learning material into the narrative. In the original version of *Cloudy*, educational content was presented separately from the narrative. This could have resulted in the participants focusing primarily on plot comprehension rather than comprehension of the educational content, which might have

caused a negative effect on the learning outcome (Fisch, 2000). In the new version, the learning material is fully integrated into the narrative. In an effort to educate himself about depression, Mark gathers information at different points of the narrative by researching online or consulting a mutual friend who is a clinical psychologist specialized in depression. The learning material is identical for all possible paths and covers three main aspects when dealing with someone with depression: detection of depression, communication (addressing concerns, empathizing), behavior (reacting to rejection, giving advice). All learning material was based on information provided by or medically reviewed by mental health professionals (see Appendix A).

Choice Relevance. The cognitive learning outcomes might also have been decreased because the learning content was not relevant for the choices. In the original version of *Cloudy*, the choices solely pertained to the narrative and were not related to the educational content. However, according to the second principle of active learning, activities should be built around learning outcomes (Wiggins & McTighe, 2015). Therefore, the new version of *Cloudy* was adjusted so that the educational content is more relevant to the choices within the narrative. Each choice in the new IDN is based on learning material that the interactor encounters earlier in the narrative. For example, Mark reads that one should never disregard comments about suicide. Later, Sofie makes a suicide joke, after which the interactor has the choice to either ignore her remark or point it out.

Choice Effectance. Lastly, the lack of choice effectance in the original version of *Cloudy* might have caused a lower level of intrinsic motivation through a decreased sense of competence (Roth & Koenitz, 2016) which could, in turn, have decreased the learning effect. Therefore, the choices within the new version were adjusted to have narrative impact. Each choice an interactor makes has an immediate positive or negative consequence in the narrative (local effectance) and results in a different narrative branch. For example, the interactor has the option to choose the location for a meeting with Sofie. Depending on the

choice, they will meet at a bar or park. Furthermore, the interactor can reach four different possible endings. Firstly, they differ on the location based on the choice mentioned above. Secondly, they differ on whether Sofie feels understood by Mark and agrees to seek professional help (positive ending) or does not feel understood and refuses to seek professional help (negative ending). This aspect depends on a previous choice where the interactor must decide how to address his concerns to Sofie (global effectance). To maintain the narrative structure, a partial foldback structure (Carstensdottir et al., 2019) was used to convene the narrative branches at different points. Therefore, the effectance of choices is added without compromising the narrative integrity. The branching structure with descriptions of the main plot points, learning materials, and choices can be seen in Appendix C.

3.3 Procedure

The survey was exclusively distributed online due to the COVID-19 pandemic. The data collection was divided into two phases. In the first phase, participants were randomly assigned to the control or non-linear condition. At the beginning of the survey, participants were informed about the study and were asked for their informed consent. In the control condition, participants were asked knowledge questions regarding depression without being exposed to the narrative.

In the non-linear condition, participants got to experience the non-linear version of *Cloudy*. To make sure that they focused on the narrative, they were asked attention check questions. Afterward, participants answered questions that measure their cognitive and transformative learning outcomes, identification, transportation, and intrinsic motivation. Additionally, the survey included two manipulation checks concerning the perceived autonomy and perceived effectance. In the last section of the survey, participants were asked about their demographic data and their personal experience with depression. Lastly, the participants were debriefed and informed about the intention of the study.

For the second phase, an analysis was done of the choices made by the participants in the non-linear condition and the resulting paths. The analysis showed that the data collection resulted in seven different paths. Each path within the sample resulted in the same (positive) ending. Most participants (75.66 %) solely chose the positive options. The other paths only differed by one choice resulting in mostly identical narratives. Therefore, one linear version of *Cloudy* was created based on the most chosen path. Apart from the stimulus, the procedure for the linear condition was the same as the non-linear one.

3.4 Measures

To ensure that the results of the present study are comparable, the same scales as the original experiment by Scholl (2020) were used to measure intrinsic motivation (MED1), identification (MED2), and transportation (MED3). The questions measuring cognitive learning (DV1) were created based on the learning material of the new version of *Cloudy*. Additionally, transformative learning (DV2) was assessed. All items can be seen in Appendix D.

3.4.1 Cognitive Learning

The Taxonomy of Educational Objectives by Bloom (1956) relating to the cognitive domain was used to measure the participants' cognitive learning outcomes. The taxonomy has a hierarchical structure to capture different levels of expertise. For this study, the three levels knowledge, comprehension, and application were measured. The difficulty and abstraction increase from level to level. Participants were given four questions per level with four possible answers, only one of which was correct. The questions were based on the learning material within the IDN, which covers the three aspects: detection of depression, communication (addressing concerns, empathizing), and behavior (reacting to rejection, giving advice). The questions did not directly refer to the narrative but were abstracted and pertained to general concepts. This way, they could be answered in the control condition without having experienced the narrative.

As an example, one of the knowledge questions was: *The person you are trying to help is rejecting your efforts. What is likely the reason?* One of the comprehension questions was: *When it is dysregulated, which of the following can cause physical pain in people with depression*? Lastly, one of the application questions was: *Which of the following statements should best be used to address your concerns regarding someone with depression?*

3.4.2 Transformative Learning

To assess the transformative potential of narratives, transformative learning was added as a measure. For this, the Learning Activities Survey (LAS) by King (2009) was used. The scale is specifically designed to measure transformative learning, making it suitable for the present study. Five items were used and adapted (e.g., W*hile reading the story, I had an experience that caused me to question the way I normally act.*) All items were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

3.4.3 Identification

To measure the participants' level of identification, a scale by de Graaf et al. (2012) was used. The items were adapted to fit the present study. They cover the following three aspects: imagining events from the position of the characters, experiencing empathy with the characters, and the illusion of being the characters. The scale is especially suitable for the present study as it incorporates perspective-taking and empathy, both of which are integral for the process of transformative learning (Jarvis, 2012; Taylor & Cranton, 2013). Identification was measured for the main character Mark. An example of an item is: *While reading the story, I imagined what it would be like to be in the position of Mark.* All items were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

3.4.4 Transportation

To measure the participants' level of transportation, a scale by de Graaf et al. (2012) was used. The scale was chosen as it incorporates aspects of different transportation scales, making it more comprehensive. The following three aspects are covered: attention, imagery,

feeling of going into the narrative world. The items were adapted to fit the present study. An example of an item is: *While reading the story, I had the feeling as if I was present at the events in the story*. All items were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

3.4.5 Intrinsic Motivation

To measure participants' intrinsic motivation, the intrinsic motivation inventory (IMI) was used as it is a valid and reliable scale which can be adapted to various contexts (Self-Determination Theory, n.d.). Specifically, the interest/enjoyment subscale within the IMI was used as it assesses self-reported intrinsic motivation. The items of the scale were rephrased to measure intrinsic motivation concerning the overall learning experience rather than just the narrative. An example of an item is: *I found this way of taking in information about depression to be enjoyable*. All items were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

3.5 Manipulation Checks

To check whether the manipulations within the IDN were successful, participants were asked to rate the level of perceived autonomy in the narrative conditions (i.e., *While reading the story, I felt like I was able to make choices that could influence the development of the story.)*. This item was adapted from the autonomy scale by Roth (2015). Secondly, they had to rate the level of perceived effectance (i.e., *While reading the story, I felt like my choices had considerable impact on the events in the story*.) to check how high participants perceived the impact of their choices to be in the new version of *Cloudy*. This item was adapted from the effectance scale by Roth (2015). All manipulation check questions were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

3.7 Pretests

Before conducting the main experiment, the narrative and the cognitive learning questions were evaluated. The IDN was assessed by dr. Renske van Enschot, an expert in interactive narratives, and Jasper Scholl, the creator of the original version of *Cloudy*, in terms of its narrative quality (e.g., plot consistency, character development). Furthermore, dr. van Enschot assessed if the learning questions could be answered based on the learning material within the narrative and if there was only one definite correct answer. In addition, the learning questions were evaluated by dr. Amy Hsiao, an expert in educational assessment. This ensured that each question measured the right learning level according to the Taxonomy of Educational Objectives by Bloom (1956) and posed an adequate difficulty. The IDN, as well as the learning questions, were revised based on the advice of the two specialists resulting in expert validity.

Furthermore, the comprehension of the narrative, as well as the comprehension of the questions within the survey, were checked by conducting a qualitative pretest. Participants of the pretest read the narrative, answered the preliminary questions, and gave detailed feedback. The narrative was positively received and thought to be understandable and of adequate quality. The IDN and survey questions were adapted based on the participants' feedback.

3.6 Data Analysis

The statistical software SPSS was used to analyze the data. Firstly, two independent *t* tests were performed to test whether the manipulations of perceived autonomy and perceived effectance were successful. Secondly, an independent *t* test was performed to compare the cognitive learning outcomes of the control condition to those of the narrative conditions. Thirdly, two Hayes PROCESS mediation analyses were performed to assess the main effect of agency on cognitive and transformative learning and the mediating effect identification, transportation, and intrinsic motivation. An additional mediation analysis was used to test the effect of agency on intrinsic motivation with identification and

transportation as mediating variables. Lastly, two exploratory analyses were performed. An independent *t* test was used to test whether prior experience with depression influenced cognitive and transformative learning. An ANOVA was used to test whether there is an interaction effect between prior experience with depression and agency on cognitive learning.

Results

4.1 Manipulation Checks

Two independent *t* tests were performed to test whether the manipulations of autonomy and effectance were successful. The first independent sample *t* test was used to compare the perceived autonomy of the non-linear narrative with the perceived autonomy of the linear narrative. The data for the non-linear condition was not normally distributed ($z_{skewness}$ = -3.73, $z_{kurtosis}$ = 4.12). Therefore, bootstrapping was performed to get a better estimate of the confidence intervals of the mean difference. Variance ratio was 3.01, thus equal variances cannot be assumed. On average, participants in the non-linear condition (*M* = 4.31, *SD* = 0.71) scored higher on perceived autonomy than participants in the linear condition (*M* = 2.33, *SD* = 1.23). The difference of 1.98 BCa 95% CI [-2.33, -1.60], was statistically significant, $t(79.88) = -9.99$, $p < .001$, and represents a large-sized effect, $d = 1.99$.

The second independent sample *t* test was used to compare the perceived effectance of the non-linear narrative with the perceived effectance of the linear narrative. The data for the non-linear condition was not normally distributed ($z_{skewness}$ = -4.79, $z_{kurtosis}$ = 4.88). Therefore, bootstrapping was performed to get a better estimate of the confidence intervals of the mean difference. Variance ratio was 1.97, thus equal variances can be assumed. On average, participants in the non-linear condition (*M* = 4.25, *SD* = 0.79) scored higher on perceived effectance than participants in the linear condition (*M* = 2.2, *SD* = 1.25). The difference of 2.01 BCa 95% CI [-2.47, -1.63], was statistically significant, $t(100) = -9.58$, $p < .001$, and represents a large-sized effect, $d = 1.98$.

In summary, the analyses showed that the manipulation of autonomy and effectance was successful as the respective scores were on the high end of the scale for the non-linear condition and on the low end of the scale for the linear condition.

4.2 Cognitive Learning Control Group vs Narrative Conditions

An independent *t* test was performed to test whether cognitive learning outcomes were higher in the narrative conditions than the control condition. The data for the narrative conditions was not normally distributed ($z_{skewness}$ = -4.7; $z_{kurtosis}$ = 1.97). Therefore, bootstrapping was performed to get a better estimate of the confidence intervals of the mean difference. The variance ratio was 1.25, thus equal variances can be assumed. On average, participants in the narrative conditions (M = 10.23, SD = 1.78) scored higher on cognitive learning than participants in the control condition (M = 7.3, SD = 1.99). The difference of 2.92 BCa 95% CI [-3.58, -2.28], was statistically significant, $t(153) = -9.32$, $p < .001$, and represents a large-sized effect, d = 1.59.

4.3 Overall Results

Table 1 shows the overall results of cognitive learning (divided by knowledge, comprehension, and application), transformative learning, identification, transportation, and intrinsic motivation for the linear and non-linear narrative conditions. The cognitive learning scores represent the number of correct answers out of 12, four per subcategory. All other variables were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

Table 1

Overall Results of Cognitive Learning, Transformative Learning, Identification, Transportation, and Intrinsic Motivation

Variable	Linear (*n* = 51)	Non-linear (*n* = 51)	
	M (*SD*)	*M* (*SD*)	*t* test
Cognitive Learning	10.33 (1.93)	10.12 (1.63)	0.61
Knowledge	3.31 (0.95)	3.29 (0.73)	0.12
Comprehension	3.29 (0.88)	3.14 (0.98)	0.85
Application	3.73 (0.57)	3.69 (0.58)	0.34
Transformative Learning	2.86 (0.96)	3.23 (0.69)	-2.26*
Identification	3.59 (0.84)	3.92 (0.66)	-2.2*
Transportation	3.57 (0.64)	3.81 (0.55)	-2.09*
Intrinsic Motivation	3.77 (0.7)	3.96 (0.81)	-1.24

*$p < 0.05$

4.4 The Effect of Identification, Transportation, and Intrinsic Motivation on Cognitive and Transformative Learning

4.4.1 Mediation Analysis 1: Cognitive Learning

A PROCESS model 6 mediation analysis (Hayes, 2017) was performed to test the hypotheses H1, H3, H5 (see Figure 2). The analysis indicated that there is no significant total effect (b = -0.22, $t(100)$ = -0.61, BCa 95% CI [-0.92, 0.49]) of agency on cognitive learning leading to the rejection of H1. In addition, there was no significant direct effect of agency on cognitive learning (b = -0.22, $t(97)$ = -0.56, BCa 95% CI [-0.95, 0.52]).

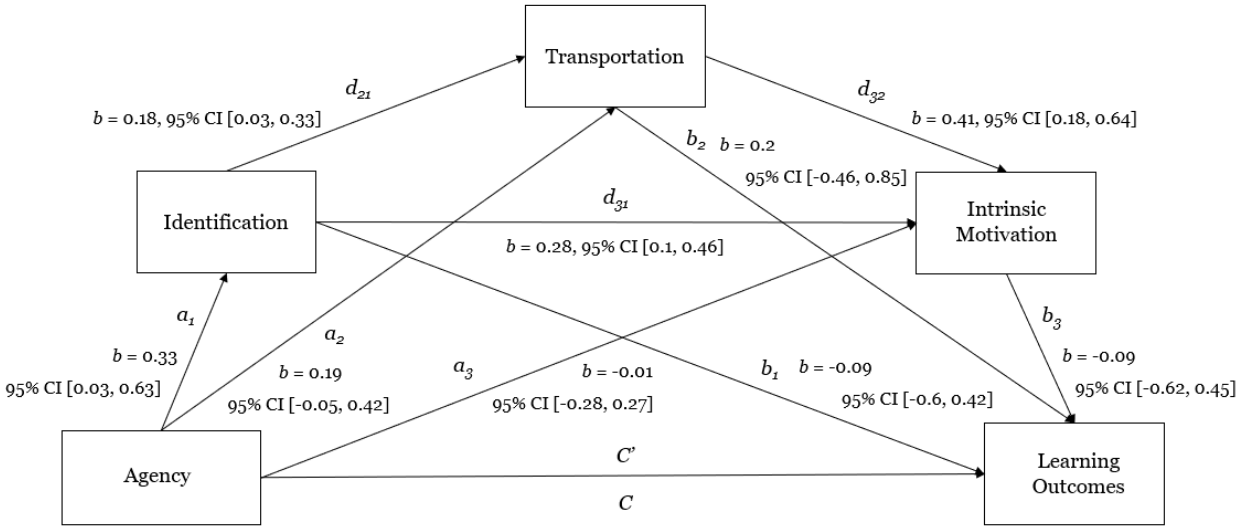
There was no indirect effect of agency on cognitive learning through identification and transportation (b = 0.01, BCa 95% CI [-0.03, 0.06]), leading to the rejection of H3. Furthermore, there was no indirect effect of agency on cognitive learning through intrinsic motivation (b = 0.005, BCa 95% CI [-0.05, 0.12]), leading to the rejection of H5. Lastly, there

was no effect of agency on cognitive learning through identification, transportation, and intrinsic motivation (b = -0.002, BCa 95% CI [-0.02, 0.01]).

In summary, it can be concluded that the data does not support H1, H3, and H5.

Figure 2

Mediation Analysis: Effects of Agency on Cognitive Learning Through Identification, Transportation, and Intrinsic Motivation



Total effect (c):	b = -0.22, BCa 95% CI [-0.92, 0.49]
Direct effect (c'):	b = -0.22, BCa 95% CI [-0.95, 0.52]
Indirect effect(a_1b_1):	b = -0.03, BCa 95% CI [-0.24, 0.16]
Indirect effect(a_2b_2):	b = 0.04, BCa 95% CI [-0.09, 0.21]
Indirect effect(a_3b_3):	b = 0.005, BCa 95% CI [-0.05, 0.12]
Indirect effect (a_1d_{31}):	b =0.09, BCa 95% CI [0.01, 0.22]
Indirect effect ($a_1d_{21}b_2$):	b = 0.01, BCa 95% CI [-0.03, 0.06]
Indirect effect ($a_1d_{31}b_3$):	b = -0.01, BCa 95% CI [-0.07, 0.06]
Indirect effect ($a_2d_{32}b_3$):	b = -0.01, BCa 95% CI [-0.06, 0.04]
Indirect effect ($a_1d_{21}d_{32}b_3$):	b = -0.002, BCa 95% CI [-0.02, 0.01]

4.4.2 Mediation Analysis 2: Transformative Learning

A PROCESS model 6 mediation analysis (Hayes, 2017) was performed to test H2, H4, H6 (see Figure 3). The analysis indicated that there is a significant total effect of agency on transformative learning (b = 0.37, t(100) = 2.26, BCa 95% CI [0.05, 0.7], R^2 = 0.05). Therefore, H2 is supported. There was no significant direct effect of agency on transformative learning (b = 0.28, t(97) = 1.69, BCa 95% CI [-0.05, 0.61]).

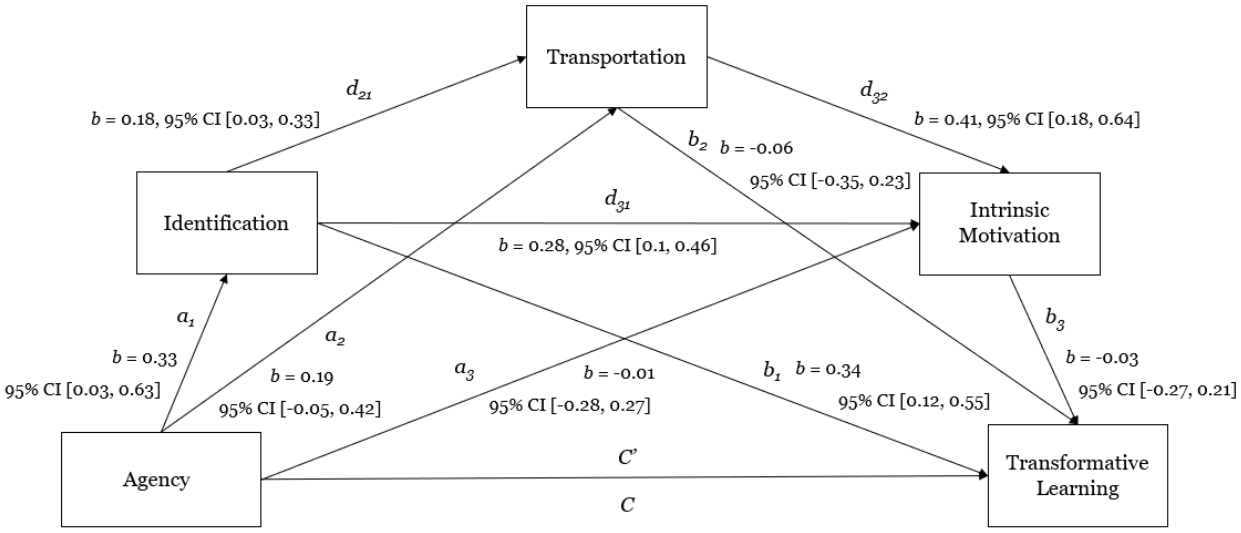
Moreover, there was no indirect effect of agency on transformative learning through identification and transportation (b = -0.004, BCa 95% CI [-0.03, 0.02]). However, there was a significant effect of identification on transformative learning (b = 0.34, t(98) = 3.09, BCa 95% CI [0.12, 0.55], R^2 = 0.13), as well as a significant indirect effect of agency on transformative learning through identification (b = 0.11, BCa 95% CI [0.01, 0.26], R^2 = 0.13). Therefore, the data partially supports H6. Agency does lead to a higher level of transformative learning, but this effect is only mediated by identification, not transportation.

Furthermore, there was no indirect effect of agency on transformative learning through intrinsic motivation (b < .001, BCa 95% CI [-0.04, 0.03]), leading to the rejection of H6. Lastly, there was no effect of agency on transformative learning through identification, transportation, and intrinsic motivation (b = -0.007, BCa 95% CI [-0.01, 0.01]).

In summary, it can be concluded that the data supports H1 but not H6. However, H4 is partially supported as agency does affect transformative learning through identification but not transportation.

Figure 3

Mediation Analysis: Effects of Agency on Transformative Learning Through Identification, Transportation, and Intrinsic Motivation



Total effect (*c*):	*b* = 0.37, BCa 95% CI [0.05, 0.7]
Direct effect (*c'*):	*b* = 0.28, BCa 95% CI [-0.05, 0.61]
Indirect effect(a_1b_1):	*b* = 0.11, BCa 95% CI [0.01, 0.26]
Indirect effect(a_2b_2):	*b* = -0.01, BCa 95% CI [-0.09, 0.04]
Indirect effect(a_3b_3):	*b* < .001, BCa 95% CI [-0.04, 0.03]
Indirect effect (a_1d_{31}):	*b* =0.09, BCa 95% CI [0.01, 0.22]
Indirect effect ($a_1d_{21}b_2$):	*b* = -0.004, BCa 95% CI [-0.03, 0.02]
Indirect effect ($a_1d_{31}b_3$):	*b* = -0.003, BCa 95% CI [-0.03, 0.02]
Indirect effect ($a_2d_{32}b_3$):	*b* = -0.002, BCa 95% CI [-0.02, 0.02]
Indirect effect ($a_1d_{21}d_{32}b_3$):	*b* = -0.007, BCa 95% CI [-0.01, 0.01]

4.4.3 Mediation Analysis 3: The Effect of Identification and Transportation on Intrinsic Motivation

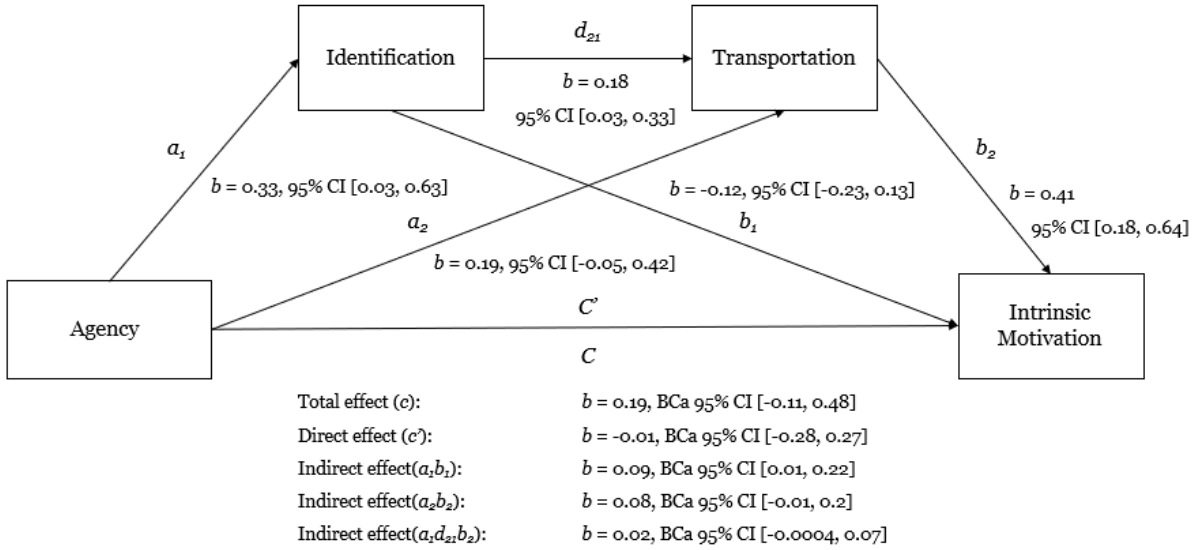
A PROCESS model 4 mediation analysis (Hayes, 2017) was performed to test H7 (see Figure 4). The analysis indicated that there was neither a significant total (*b* = 0.19, BCa 95% CI [-0.11, 0.48]), nor a significant direct effect of agency on intrinsic motivation (*b* = -0.01, BCa 95% CI [-0.28, 0.27]).

However, there was a significant direct effect of identification on intrinsic motivation (b = 0.28, t(98) = 3.04, 95% CI [0.1, 0.46], R^2 = 0.23), as well as of transportation on intrinsic motivation (b = 0.41, t(98) = 3.45, BCa 95% CI [0.18, 0.64], R^2 = 0.23). Furthermore, there was a significant indirect effect of agency on intrinsic motivation through identification (b =0.09, BCa 95% CI [0.01, 0.22], R^2 = 0.23). Lastly, there was a significant effect of agency on identification (b = 0.33, t(100) = 2.2, BCa 95% CI [0.03, 0.63], R^2 = 0.05) and of identification on transportation (b = 0.18, t(99) = 2.31, BCa 95% CI [0.03, 0.33], R^2 = 0.09).

Subsequently, the data partially supports H7. Agency has a positive effect on intrinsic motivation through identification. Moreover, a higher level of identification, as well as transportation, leads to an increased level of intrinsic motivation. Lastly, agency has a positive effect on identification, and identification has a positive effect on transportation. However, there was no significant total effect of agency on intrinsic motivation through identification and transportation.

Figure 4

Mediation Analysis: Effects of Agency on Intrinsic Motivation Through Identification and Transportation



4.5 Additional Exploratory Analyses

4.5.1 The Effect of Prior Experience on Cognitive and Transformative Learning

The fact that there was no significant difference between cognitive learning in the linear (M = 10.33, SD = 1.93) and non-linear condition (M = 10.12, SD = 1.63) could be explained by a ceiling effect. This ceiling effect might be caused by most participants having prior experience with depression themselves or having experienced it up close (n = 85, 83.33%) and therefore already being knowledgeable about the topic of depression.

Therefore, an independent sample t test was used to compare participants' scores on cognitive learning who had prior experience with depression with those who had no prior experience. The scores for participants who did not want to disclose this information were excluded (n = 4). The data for participants with prior experience was not normally distributed ($z_{skewness}$ = -4.03). Therefore, bootstrapping was performed to get a better estimate of the confidence intervals of the mean difference. The variance ratio was 2, thus equal variances can be assumed. On average participants with prior experience (M = 10.4, SD = 1.66) scored higher on cognitive learning, than participants without prior experience (M = 9.15, SD = 2.34). The difference 1.25 BCa 95% CI [0.09, 2.66], was statistically significant, $t(96) = 2.38$, p = 0.02, and represents a large-sized effect, d = 0.72.

Another independent sample t test was used to compare participants scores on transformative learning who had prior experience with depression with participants who had no prior experience with depression. The data for participants with prior experience was not normally distributed ($z_{skewness}$ = -1.99). Therefore, bootstrapping was performed to get a better estimate of the confidence intervals of the mean difference. The variance ratio was 1.2, thus equal variances can be assumed. On average, participants with prior experience (M = 3.09, SD = 0.85) scored higher on transformative learning, than participants without prior experience (M = 2.69, SD = 0.93). The difference 0.4 BCa 95% CI [-0.14, 0.94], was not statistically significant, $t(96) = 1.56$, p = 0.12, and represents a medium-sized effect, d = 0.47.

Overall, it can be concluded that prior experience with depression has an effect on cognitive learning but not transformative learning. Given the effect of prior experience on cognitive learning, an additional analysis of the effect of agency on cognitive learning with prior experience as a second independent factor could yield further insights.

4.5.2 The Effect of Prior Experience and Agency on Cognitive Learning

A factorial ANOVA was used to investigate the effects of agency and prior experience with depression on cognitive learning. The data for the participants with prior experience in the linear condition ($z_{skewness}$ = -4.12, $z_{kurtosis}$ = 2.87) was not normally distributed. Therefore, the results of the ANOVA may not be fully reliable. However, given that the sample size in this group had more than 40 observations, the ANOVA is fairly robust against this violation. The variance ratio was 2.96, thus equal variances cannot be assumed. Since the ANOVA is not that robust against the violation of the assumption of homogeneity of variance, it should be noted that the *p*-value may be somewhat biased.

The ANOVA revealed no statistically significant main effect for agency, F (1, 94) = 0.1, p = 0.75, partial $\eta 2$ = 0.001, with participants in the linear condition (M = 10.38, SD = 1.95) scoring higher on cognitive learning than participants in the non-linear condition (M = 10.1, SD = 1.64). Additionally, there was a statistically significant main effect for prior experience with depression, F (1, 94) = 5.63, p = 0.02, partial $\eta 2$ = 0.06. The participants with prior experience (M = 10.4, SD = 1.66) scored significantly higher on cognitive learning than participants without prior experience (M = 9.15, SD = 2.34). Lastly, there was no statistically significant interaction effect, F (1, 94) = 0.13, p = 0.72, partial $\eta 2$ = 0.001.

In summary, the ANOVA supports the finding that agency does not have a significant effect on cognitive learning, whereas prior experience with depression does have a significant effect on cognitive learning. However, no interaction effect between agency and prior experience was found.

Discussion

The aim of the present study was to investigate whether agency in narratives about depression affects cognitive and transformational learning and to what extent these effects are mediated by identification, transportation, and intrinsic motivation. The following chapters discuss relevant findings and provide possible explanations.

5.1 The Effect of Agency on Cognitive Learning

The learning outcomes were measured using the taxonomy of educational objectives by Bloom (1956) using the three levels knowledge, comprehension, and application. The findings suggest that agency does not affect cognitive learning outcomes despite successfully manipulating perceived autonomy and effectance. This leads to the rejection of the hypothesis that narratives with agency lead to better cognitive learning outcomes than narratives without agency (H1). Furthermore, there was no effect of intrinsic motivation, identification, or transportation leading to the rejection of the hypothesis that the effect of agency within narratives on cognitive learning is mediated by identification and transportation (H3) and intrinsic motivation (H5). These findings reflect those of the original study conducted by Scholl (2020). A comparison of the overall results can be seen in Appendix E.

These findings contrast with other previous studies, which have suggested that agency in combination with narratives has a positive effect on cognitive learning (e.g., Lindgren and McDaniel, 2012). One possible explanation is that a ceiling effect might have occurred. The participants who experienced the linear version of *Cloudy* scored significantly higher on the cognitive learning questions than participants in the control group. However, adding agency to the narrative did not yield a significant difference. This indicates that the linear narrative already increased the learning outcome to a point where agency did not provide an added value. These results support previous findings concerning the effectiveness of traditional narratives in educational contexts in terms of comprehension and information retention (Browning & Hohenstein, 2015; Wolfe, 2005; Williams, 2000).

The present study further investigated the ceiling effect through an exploratory analysis of the effect of prior experience with depression on cognitive learning. The results showed that participants with prior experience scored significantly higher than participants without prior experience. These findings can be linked to the theory of educational constructivism, stating that new understanding is built based on prior experience and knowledge (Jonassen et al., 1995; Jones, M. G. & Brader-Araje, L., 2002). In the present study, participants who had prior experience with depression (n = 85, 83.33%) significantly outnumbered participants without prior experience with depression (n = 13, 12.75%), meaning that this ceiling effect would apply to the majority of participants.

In summary, the present study could not find evidence that agency within narratives affects cognitive learning. It may be that experiencing a traditional narrative already sufficiently increased cognitive learning effects by building on pre-existing knowledge. Therefore, a ceiling effect might have occurred, resulting in agency not having an added positive impact on learning outcomes.

5.2 The Effect of Agency on Transformative Learning

In addition to the cognitive learning outcomes, the effect of agency on transformative learning was assessed. The findings suggest that narratives with agency positively affect transformative learning and that this effect is mediated by identification. Therefore, the hypothesis that narratives with agency lead to a higher level of transformative learning than narratives without agency (H2) is supported. Moreover, the hypothesis that the effect of agency within narratives on transformative learning is mediated by identification and transportation (H4) is partially supporting. These findings are in accordance with theories about transformative learning, specifically regarding the importance of empathy (Taylor & Cranton, 2013) and perspective-taking (Jarvis, 2012), which are both components of identification (de Graaf et al., 2012).

To investigate the effect of prior experience on transformative learning, an exploratory analysis was performed, which yielded no significant difference. It should be

noted that the number of participants in the narrative conditions who had no prior experience was small (n = 13, 12.75%), resulting in low statistical power. Therefore, the results need to be interpreted with caution. Nonetheless, this finding is consistent with the assumption made by Jarvis (2012), stating that the transformative potential of narratives persists both when dealing with experiences that are different as well as similar to our own. On the one hand, identifying with a character who is in a situation that is different from our own can result in transformation by experiencing a new perspective. On the other hand, identifying with a character that is in a situation that is similar to one's own results can also trigger transformation. The latter is referred to by Jarvis (2012) as resonance. He argues that resonance can be elicited by exploring new solutions to the same struggles (Wright, 2007) or increasing self-confidence and confidence in one's abilities (Burr, 2010) by overcoming adversities vicariously through identifying with a character. The fact that most participants (n = 85, 83.33%) in the present sample had experience with depression suggests that transformative learning mostly took place through the process of resonance.

In contrast to H4, no effect of transportation on transformative learning was detected. Transportation was somewhat achieved both in the linear and non-linear version of *Cloudy*. However, unlike identification, transportation did not affect transformative learning despite the partial conceptual overlap with identification (Bilandzic & Busselle, 2017; Brown, 2015; Cohen et al., 2015). Even though the present study did find a correlation between identification and transportation (see Chapter 5.3), Tal-Or and Cohen (2010) argue that identification and transportation are two distinct processes. Whereas identification is solely focused on a character, transportation pertains to a more general experience resulting from experiencing a narrative in its entirety. This could explain the insignificance of transportation in the present study and why, unlike identification, transportation is not a required antecedent of transformative learning. Another possible explanation for the insignificance of transportation relates to the kind of educational content presented in the narrative. *Cloudy* mostly deals with interpersonal interactions (i.e., how to act and what to

say around someone struggling with depression). One could argue that identification is more relevant in this interaction-focused context than transportation.

Lastly, the hypothesis that the effect of agency within narratives on transformative learning is mediated by intrinsic motivation (H6) was not supported. Intrinsic motivation was elicited by the linear as well as the non-linear version of *Cloudy*. However, the present study's findings suggest that it had no impact on transformative learning. The operationalization of intrinsic motivation through enjoyment (Self-Determination Theory, n.d.) may serve as an explanation. In the context of learning, a transformation might indeed be triggered by a positive experience (Brookfield, 2012; Cranton, 2006). Tisdell (2006) argues that pleasure regarding narratives can support transformative learning by motivating people to engage with it. In contrast, other scholars emphasize negative feelings such as confusion, shame, or pain that might result from the critical reflection on one's own frames of reference (Dirkx, 2006; Mezirow, 1991). This shows that there can be various emotions involved in the process of transformative learning. Therefore, the one-dimensional operationalization of intrinsic motivation through enjoyment may not be suitable to predict transformative learning outcomes, explaining the present study's insignificant result.

In summary, the present study's findings suggest that agency within narratives impacts transformative learning and that this effect is mediated by identification. This can be attributed to the fact that empathy and perspective-taking are essential prerequisites of transformative learning. Transportation and intrinsic motivation had no effect indicating that these concepts might not be predictors of transformative learning.

5.3 The Relationship Between Intrinsic Motivation, Identification, and Transportation

Because agency, identification, transportation, and intrinsic motivation do not only affect learning outcomes in isolation, the relationship between these constructs was investigated. The hypothesis that narratives with agency lead to a higher level of intrinsic motivation through identification and transportation (H7) was partially supported.

Unsurprisingly, the analysis showed a direct effect of identification on transportation which was also found by Scholl (2020). This is in line with previous theories prescribing a supporting role to identification for transportation (Cohen et al., 2015). Furthermore, identification and transportation both affected intrinsic motivation. This observation can also be explained by the operationalization of intrinsic motivation through enjoyment, meaning that identifying with the main character of *Cloudy* and being transported into its narrative world was perceived to be enjoyable. Earlier findings also suggest this direction of the effect. Specifically, studies showed that identification (Nell, 2002; Radway, 2002; de Wied et al., 1994) and transportation (Bilandzic & Busselle, 2006; Green et al., 2004; Johnson & Rosenbaum, 2015) predict enjoyment.

Lastly, the present study's findings suggest that agency has a direct effect on identification. This can be explained by the fact that making choices on behalf of a character can facilitate a deictic shift (Busselle & Bilandzic, 2009), allowing the interactor to directly take on the character's perspective which can increase identification (Roth & Koenitz, 2016). Interestingly, most participants (75.66 %) exclusively chose the positive option. This serves as an indication of the interactors' motives. Motives for choosing a certain option include: (1) "desire to achieve the best outcome from the perspective of a specific character", (2) "desire to achieve a character's goal", (3) "sympathy for or empathy with a character", (4) "desire to select the most realistic option according to the character making the decision" (Mawhorter et al., 2014, p. 3). These motives could have resulted from interactors identifying with Mark and thus having his best interest at heart. In contrast, Scholl (2020) did not find a direct effect of agency on identification. This could be caused by the lack of choice effectance in the original IDN. One aspect of the identification scale measured the illusion of being the character (de Graaf et al., 2012). Not seeing the impact of their actions might have impeded interactors' ability to feel one with the protagonist.

Furthermore, an indirect effect of agency on intrinsic motivation through identification was found. This may result from making choices as Mark, which revolve around the relationship with his best friend. Moreover, the choices of the new version

pertain to interactions between the characters, directly connecting agency to relatedness. In turn, this might have resulted in a higher level of intrinsic motivation (Guay et al., 2019). This effect was not found in the original study (Scholl, 2020). This may be because the original version of *Cloudy* did not primarily focus on interpersonal relationships between characters.

In summary, the present study supports previous observations that state that identification predicts transportation and that identification and transportation positively impact intrinsic motivation. However, the findings only partially support hypothesis H7 as only identification mediated the effect of agency on intrinsic motivation, but not transportation.

5.4 Implications and Future Research

The findings of the present study have various theoretical and practical implications. There was no evidence found that supports the hypothesis that agency within narratives supports cognitive learning. However, experiencing the traditional narrative already led to a significant increase in cognitive learning outcomes, which might have resulted in a ceiling effect. Future research could compare the cognitive learning outcomes of expository texts to that of narrative texts with and without agency. This could yield insights into whether narrativity already sufficiently increases cognitive learning outcomes compared to expository texts and whether agency has added benefits in this regard.

The finding that agency affects transformative learning through identification confirms existing theoretical evidence. Specifically, it gives evidence to the importance of empathy (Taylor & Cranton, 2013) and perspective-taking (Jarvis, 2012), both of which are integral parts of identification (de Graaf et al., 2012). Therefore, the results support the notion that identification with a fictional character can provide readers with a new perspective leading to a transformative experience. Furthermore, most participants had prior experience with the topic of the IDN. This represents evidence that transformative learning can not only take place by experiencing an unfamiliar situation but can also occur through

resonance. Future research could specifically compare transformative learning effects triggered by experiencing a differing situation from one's own compared to experiencing a similar one. Moreover, it would be valuable to investigate which particular aspects of the frame of reference, like values, feelings, and learned behaviors (Mezirow, 2000), have been changed by the IDN.

The present study's findings concerning the relationship between agency, identification, transportation, and intrinsic motivation also have theoretical implications. The results support previous theories stating that identification with a character predicts transportation into a narrative (Cohen et al., 2015). In addition, further evidence was found for the positive influence of identification and transportation on intrinsic motivation.

The aforementioned theoretical implications can be used in practice to inform the design of narrative mental health interventions. The findings imply that IDNs are more suitable for the facilitation of transformative as opposed to cognitive learning. Furthermore, several guidelines can be deduced. Firstly, IDNs should emphasize the identification with characters to support their transformative potential. Secondly, the choices within the narratives should have effectance and should pertain to interpersonal interaction to support identification. Thirdly, the process of resonance can be used to trigger transformative learning by providing a new perspective on familiar situations. Lastly, agency, identification, and transportation can intentionally be used to increase the enjoyment of narrative learning material, encouraging its consumption (Griffin, 2006).

5.5 Limitations

Lastly, the limitations of the present study should be addressed. Due to the COVID-19 outbreak, the survey was exclusively distributed online, resulting in diminished experimental control. Possible distractions might have decreased participants' attentional focus, possibly influencing the results. However, this confound was circumvented by including attention checks and excluding responses that took unreasonably little or much time. The characteristics of the current sample represent another limitation. It consisted of mostly

highly educated people having obtained a bachelor's (n = 81, 52.26%) or master's degree (n = 17, 10.97%). Moreover, the fact that most participants had prior experience with depression (n = 85, 83.33%) might have skewed the results. Therefore, it would be beneficial to investigate the effects of IDNs about depression on people who did not have such prior experience. Alternatively, investigating the effects of IDNs dealing with other topics unfamiliar to participants could yield further insights into the applicability of the findings to different learning domains.

Conclusion

The aim of the present study was to examine the effects of agency within narratives about depression on cognitive and transformative learning outcomes and to what extent this effect is mediated by identification, transportation, and intrinsic motivation. The experiment follows up on a previous study by Scholl (2020) by identifying and improving potential flaws that might have led to insignificant results. A new version of the original IDN, *Cloudy*, was created, which improved the stimulus on several aspects. Firstly, the educational content was seamlessly integrated into the narrative. Secondly, the relevance of the educational content for the choices was enhanced. Thirdly, effectance was successfully added to the choices provided within the narrative, leading to a branching structure with multiple possible endings. Moreover, transformative learning was included as an added outcome variable alongside cognitive learning. Lastly, the relationship between agency, identification, transportation, and intrinsic motivation was investigated.

The study's findings suggest that agency within narratives about depression does not support cognitive learning. This could be because the effects of traditional narratives already sufficiently increase cognitive learning outcomes. However, the findings suggest that agency positively affects transformative learning and that this effect is mediated by identification. Therefore, the assumption is supported that identification is an integral part of transformative learning by empathizing and taking on a different perspective, leading to the critical reflection and change of one's frame of reference. This insight can inform the design

of narrative mental health interventions and improve their effectiveness by putting emphasis on the identification with characters. Lastly, the findings support evidence that identification increases transportation and that identification and transportation positively affect intrinsic motivation.

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Appendices

Appendix A: References of Learning Material in *Cloudy*

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Appendix B: *Cloudy* - Interactive Digital Narrative

An interactive version can be found under this link:
https://tilburghumanities.eu.qualtrics.com/jfe/form/SV_2i3XSDK2qv3QO0e

S: Section
L: Learning material
C: Choice

Introduction

For as long as she can remember, Sofie had a passion for drawing. It was never a question for her not to take her career into that direction. So, after high school, she decided to study graphic design and found the perfect program in Utrecht. This meant she had to move out of her little town for the first time in her life. Even though it was scary, Sofie was excited for the change. Because she didn't know anyone in Utrecht, she thought it would be a good idea to sign up for the orientation week organized by the university. It brought together new students of different programs. This is where Sofie first met Mark.

In the beginning, Sofie thought that Mark was a snobby wannabe lawyer - something that would later become their inside joke. But at the end of the orientation week, they had already formed a tight bond. Having moved out for the first time and not knowing anyone else, they were grateful to have found each other. Throughout their studies, they became close to the point where they considered each other best friends. Who knew that taking part in those cringy introduction games would result in something so valuable?

What Mark appreciated most about Sofie was her bubbly personality. She was always a fun person to be around. Her smile was so infectious, it could lift anyone's mood. Mark was never the type of person to spend a lot of time outside, but Sofie somehow had a way of motivating him to join her for walks, or bike rides. Their favorite spot was a small park which was conveniently located in the midway point between their houses. The two of them used to sit there almost every day on the same bench facing a pond which many ducks considered their home. It had become their tradition to meet there, feed the ducks, and talk about anything and everything.

Once their studies were nearing their end, it was time to look for jobs. Mark and Sofie would often talk about their worries concerning their future and would update each other on their job-hunting progresses. Mark was the first of the two to get a position at a small law firm. It didn't take too long for Sofie to also find her dream job as a graphic designer. As both jobs were located in Utrecht, they didn't have to move away which meant they could still see each other frequently. It all seemed to fall into place.

But that wasn't the case for Sofie. Even though drawing and designing was always her passion, being a professional graphic designer was a different thing. What used to come easy to her, turned into a struggle. The requirements of her job grew to be more and more intense, working overtime each day, having to be creative on command, dealing with difficult clients. It all became too much for her. At one point, Sofie told herself she just couldn't do it anymore. That's when she quit her job, telling her friends and family that it was too stressful

for her to endure. Being unemployed and feeling worthless, Sofie became increasingly unhappy with herself and it started affecting other parts of her life.

Mark could tell that something had changed. Their visits to the park became less frequent. The few times they did meet, Mark noticed that Sofie was different. She didn't joke around as much anymore and seemed tired all the time. She even stopped feeding the ducks, one of her favorite activities. But what worried Mark the most was that her infectious smile seemed to get increasingly less genuine as time went on. Is something serious going on? Is there more behind it than Sofie is ready to admit?

Find out as Mark tries to help his best friend.

S1: Signs of depression and how to address them

L1: Paying attention, signs of depression
L2.1: Addressing depression

The other day, Sofie declined to meet up again, which makes you grow more and more concerned about her. "She didn't used to be like this," you think. You decide to research what might be the cause for her change in behavior. After searching for a bit, you stumble upon an article about depression. There you find tips on how to help a loved one who might be struggling mentally.

Never disregard comments about death or suicide, even if they seem like a joke, the article reads, *Pay attention to changes in appearance as depression may result in decreased energy to maintain personal hygiene*. "I can't imagine Sofie not taking care of herself," you think, "She always seems so put together."

S2

As you're reading up on the topic of depression, you can't help but think about the bad days you had. Things didn't always go your way, and you were worrying about your future. "I don't think that I had depression then…" You stop yourself and turn your attention back to Sofie. "Her situation might be different. I should take this seriously."
You feel the urge to check in with Sofie, and send her a message to ask what she's up to. A few hours later, you finally get a response. "I did literally nothing productive all day. Just being useless, might as well end it all haha," she replies.

C1: How do you react to Sofie making a joke about suicide? (L1)

> **Branch 1.1** (Point it out)
>
> "Even if it was a joke, I should point it out," you think. So, you reply, "Sofie, this isn't funny. Don't joke about that." Sofie seems to think you are overreacting, answering, "Oh come on, Mister lawyer. You can't even take a joke. Lighten up."

Branch 1.2 (Ignore it)

You choose to ignore her remark, thinking, “Sofie was never a very serious person. It’s probably just a joke… but what if there really is more behind it?”

S3

You go back to the article you found earlier and continue reading about possible signs of depression. *Withdrawal from social activities, changes in communication, losing interest in activities they used to enjoy…* “Many of these signs are in line with what I noticed with Sofie”, you think to yourself. *Physical symptoms might include pain, which may result from a serotonin imbalance…* “Sofie complained a lot about shoulder pain lately,” you realize. Feeling like your concerns are confirmed, you decide to contact Emma, a mutual friend and clinical psychologist specialized in depression. She might be able to help guide you with possible next steps.

After explaining the situation, you ask Emma a few questions.

“What do you think might have caused her depression? She seemed quite happy a few months ago,” you contemplate.

“Depression can have different causes,” Emma explains. “It might be due to genetics, an imbalance in the brain chemistry, or due to lifestyle factors like stress, grief, or substance use. But those factors should be assessed by a professional.”

“I see. So, what should I do now?” you ask.

“It is important to not make the subject of depression a taboo. You should address it openly,” Emma continues. “And when you address it, make sure to use ‘I’ statements… like ‘I’m concerned’ or ‘I’ve noticed’. Even then, try to not trivialize their struggle by telling them to just shake it off, for example. Also, try to avoid any ‘you’ statements. These can seem like you’re pointing fingers and can make Sofie feel attacked.”

“Thank you very much! I will try to keep that in mind,” you reply.

S4: Empathizing with depression and dealing with rejection

L2.2: Empathizing with depression
L3.1: Dealing with rejection

The following days you can’t help but ponder about Sofie’s situation. You are still unsure how exactly to deal with it. Every time you tried to encourage her to open up, she seemed to deflect or shut down your efforts. “Maybe I should just leave her be,” you wonder. But just to be sure, you want to consult with Emma again.

“You shouldn’t be discouraged… be patient, maintain communication and keep checking in. She might act out of defense, realizing that you recognize her symptoms and that she didn’t hide them as well as she had hoped,” Emma continues. “And when she is ready to talk, thank

her for being open and reassure her that her mental struggle is real. Don't downplay it. You can do it, Mark."

This gives you the last bit of motivation to fully address your concerns with Sofie. "I really hope she won't take it the wrong way."

C2: How do you address your concerns? (L2.1)

Branch 2.1 (I'm worried about you.)

You text Sofie, saying, "I'm worried about you. Is everything ok? You know you can tell me anything." You see Sofie typing for a while. Finally, she answers, "That is very sweet of you. I have to admit, you're not wrong. Mentally, I've not been doing too well these last few weeks." Even though no one likes to hear their best friend utter those words, you still let out a sigh of relief. You remember reading that recognition is the first step to recovery. "I'm really glad she trusts me with this."

C3.1: How do you reply? (L2.2)

> Branch 3.1 (Acknowledge her struggle.)
>
> You reply, "Thank you for sharing this with me. That sounds tough. I'm really sorry you are going through this."
>
> "Thank you, Mark. I really appreciate it!", Sofie answers.
>
> *L2.3: Having a sensitive conversation*
> *L3.2: Giving advice*
>
> "I think that went well," you think. You're happy to report your progress to Emma.
>
> "Great job, Mark! You handled it really well. This way you showed her empathy without being judgmental," Emma says. "Her admitting to struggle is already a very important step. The best thing you can do now is to encourage her to get professional help. It is important to be there for her, but it's not your responsibility to fix her problems. Also, you should be careful about giving advice as it might cause more harm. Leave that to professionals."
>
> "Should I drop by her house?" you ask, eager to help.
>
> "I wouldn't do that… an unexpected visit might stress her out. Why not propose to meet somewhere? I'd suggest a place where you can both be relaxed and have some privacy. That works best for having a sensitive conversation with someone who may be in a fragile emotional state. Also try to involve her in the decision-making process."

Branch 3.2 (Try to cheer her up.)

You reply by saying, “I’m sorry to hear that. But it can’t be that bad! Think about all the people who have it worse than you. You have a home, family, friends. Soon you’ll also find a job again. You’ll see!” You see her going offline after that message. “Did I say something wrong?” you can’t help but wonder.

L2.3: Having a sensitive conversation
L3.2: Giving advice

Worried about having made a mistake, you report what happened to Emma.

“That wasn’t the best way to react to her opening up about her depression. Comparing her struggle to other people doesn’t show that you are empathetic,” Emma says. “It likely only made her feel ashamed.”

Hearing this makes you feel awful. “What should I do now?” you ask.

Emma replies, “Her admitting to struggle is already a very important step. The best thing you can do now is to encourage her to get professional help. It is important to be there for her, but it’s not your responsibility to fix her problems. Also, you should be careful about giving advice as it might cause more harm. Leave that to professionals.”

“Should I drop by her house?” you ask, eager to help.

“I wouldn’t do that. An unexpected visit might stress her out. Why not propose to meet somewhere? I’d suggest a place where you can be relaxed and have some privacy. That works best for having a sensitive conversation with someone who may be in a fragile emotional state. Also try to involve her in the decision-making process.”

S5.1

After talking with Emma again, you feel prepared to meet Sofie and help her as much as you can.

C4.1: How do you propose to meet with Sofie? (L2.3)

Branch 4.1 (I’d like to go outside if you want to join me.)

You send Sofie a text saying, “I’d like to go outside sometime this week and was wondering if you would want to join me. Would you rather go to the park or maybe to a bar?” After a while, Sofie replies and agrees to meet you at the park. “I’m glad she chose to meet at the park, we’ve made many happy memories there… and we will likely have more privacy,” you think.

On the day of your meeting, you are a little nervous to have this important conversation. But you remind yourself that it is important for you to help your friend. So, you pack your bag and head out.

You arrive early and sit down on the bench near the pond, your usual meeting spot. Watching the ducks swim around somehow makes you feel more at ease. After a few minutes you see Sofie approaching you. “She doesn’t look too well. Her situation might really be serious,” you can’t help but think. Once she notices you, her facial expression immediately changes from a blank stare to a forced smile. “Maybe she doesn’t want to show how she really feels…”

You stand up, hug her tightly and tell her how happy you are to see her. After some small talk, you decide to bring up the topic of depression. You take a deep breath and say, “As I texted you earlier, I am a little worried about you lately and I’m really happy that you trust me enough to admit that you are not doing so well. Thank you for that.”
Sofie almost seems embarrassed, looking down to the ground. “What should I say now?”, you think, trying to remember what Emma told you.

C5.1: What do you tell Sofie? (L3.2)

Ending 1 (Encourage her to get help.)

Sofie gets help (addressed concerns right)

“To be honest, your situation makes me think of depression. Have you considered seeking help? Maybe seeing a psychologist? Someone like that can help you better than I can. If you need me to look for information or if you want me to go with you to the appointment, let me know. You’re my best friend and I want to support you and be there for you, the same way I know you would be there for me.”

After a long pause, she turns her head towards you and says, “Hearing you say that means a lot. It seems like you do understand my situation…me… maybe it is more serious than I thought,” after a small break she continues, “You’re right, it might be a good idea to seek help. Can you remind me tomorrow to make a doctor's appointment? Just in case I change my mind… I would love for you to come with me as well. Thank you, I'm lucky to have a friend like you."

You feel a big wave of relief. Sofie opens her arms with that genuine and infectious smile that you haven’t seen in so long. While you embrace her, you think, “Everything is going to turn out fine.”

Ending 2 (Tell her to think positive.)

Sofie doesn’t get help (park)

“To be honest, your situation makes me think of depression. Have you maybe tried to focus more on the positive things in your life? There is so much to be grateful for. The sun is out, the birds are chirping. Life is not all bad! Sometimes it just takes time, but it will pass.”

Sofie's expression turns into a frown as she turns her gaze to you and says in an irritated tone, "I really don't think you understand my situation. It's not as easy as flipping a switch. Don't you think I tried to be more positive? You make it seem like it's my fault."

Your heart sinks as you hear her response. "I really didn't handle this the right way," you think. You apologize and reassure her that you just want her to be happy. "I will try to be more sensitive. Just know that I am always there for you." "Hopefully, in the future, she will recognize the seriousness of her situation and get professional help," you think wishfully.

Branch 4.2 (I think it would be good for you to get out of the house.)

You send Sofie a text saying, "I think it would be good for you to get out of the house. Let's go to a bar sometime this week!" After a while, Sofie replies and reluctantly agrees to meet. "I'm glad she decided to meet me after all," you think.

On the day of the meeting, you are a little nervous to have this important conversation. But you remind yourself that it is important to help your friend. So, you pack your bag and head out.

You arrive early and sit at a table while waiting for Sofie. After a few minutes you see her approaching you. "She doesn't look too well. I think her situation might really be serious," you can't help but think. Once she notices you, her facial expression changes immediately from a blank stare to a forced smile. "Maybe she doesn't want to show how she really feels…" You stand up, hug her tightly and tell her how happy you are to see her. You try to have some small talk, but it is quite loud at the bar. Sofie seems to be a little overwhelmed with the noise. "Maybe the bar wasn't the best place to meet", you think. Nonetheless, you decide to bring up the topic of depression. You take a deep breath and say, "As I texted you earlier, I am a little worried about you lately and I'm really happy that you trust me enough to admit that you are not doing so well. Thank you for that."

Sofie almost seems embarrassed, looking down to the ground. "What should I say now?", you think, trying to remember what Emma told you.

C5.2: What do you tell Sofie? (L3.2)

Ending 1 (Encourage her to get help.)

Sofie gets help (addressed concerns right)
See previous section (Ending 1)

Ending 3 (Tell her to think positive.)

Sofie doesn't get help (bar)

"To be honest, your situation makes me think of depression. Have you maybe tried to focus more on the positive things in your life? There is so much to be grateful for. Look outside of the window! The sun is out, the birds are chirping. It's not all bad! Sometimes it just takes some time, but it will pass."

Sofie's expression turns into a frown as she turns her head towards you and says in an irritated tone, "I really don't think you understand my situation. It's not as easy as flipping a switch. Don't you think I tried to be more positive? You make it seem like it's my fault."

Your heart sinks as you hear her response. "I really didn't handle this the right way," you think. You apologize and reassure her that you just want her to be happy. "I will try to be more sensitive. Just know that I am always there for you." "Hopefully, in the future, she will recognize the seriousness of her situation and get professional help," you think wishfully.

Branch 2.2 (You don't seem like yourself.)

You text Sofie, saying, "You don't seem like yourself. We don't talk that much anymore, and you keep cancelling on me. I miss spending time with you." After a while she answers, "Yes, everything's fine. Don't worry about it. I've just been busy, that's all."

"This is not the response I hoped for," you think. "Did I say something wrong? Maybe I should try to bring it up in a different way. But I don't want to make her uncomfortable."

C3.2: Do you address your concerns again? (L3.1)

Branch 2.1 (Yes, tell her that you're worried about her.)

See previous section (Branch 2.1)

Branch 3.3 (No, let it go.)

You decide to let it go. "I shouldn't keep pushing it."

L2.3: Having a sensitive conversation
L3.2: Giving advice

Nonetheless, you are worried about having handled the situation wrong. So, you report what happened to Emma.

"That… wasn't the best way to address your concerns, Mark. How you expressed your worries came off quite accusatory," Emma says. "It likely made her feel defensive. In general, you should also be careful about giving advice as it might cause more harm. Leave that to professionals."

Hearing this makes you feel awful. "What should I do now?" you ask.

Emma replies, "It may be better to have that sensitive conversation in person."

"Should I drop by her house?" you ask, eager to help.

"I wouldn't do that. An unexpected visit might stress her out. Why not propose to meet somewhere?" Emma replies. "I'd suggest a place where you can be relaxed and have some

privacy. That works best for having a conversation with someone who is might be in a fragile emotional state. When asking her, try to involve her in the decision-making process. Also, if she decides to open up about her struggle, the best thing you can do is to encourage her to get professional help. It is important to be there for her, but it's not your responsibility to fix her problems."

S5.2

After talking with Emma again, you feel prepared to meet Sofie and help her as much as you can.

C4.2: How do you propose to meet with Sofie? (L2.3)

Branch 4.3 (I'd like to go outside if you want to join me.)

You send Sofie a text saying, "I'd like to go outside sometime this week and was wondering if you would want to join me. Would you rather go to the park or maybe to a bar?" After a while, Sofie replies and agrees to meet you at the park. "I'm glad she chose to meet at the park, we've made many happy memories there… and we will likely have more privacy," you think.

On the day of your meeting, you are a little nervous to have this important conversation. But you remind yourself that it is important to help your friend. So, you pack your bag and head out.

You arrive early and sit down on the bench near the pond, your usual meeting spot. Watching the ducks swim around somehow makes you feel more at ease. After a few minutes you see Sofie approaching you. "She doesn't look too well. Her situation might really be serious," you can't help but think. Once she notices you, her facial expression immediately changes from a blank stare to a forced smile. "Maybe she doesn't want to show how she really feels…"

You stand up, hug her tightly and tell her how happy you are to see her. After some small talk, you decide to bring up your concerns again. You take a deep breath and say, "I wanted to apologize about earlier. I am a little worried about you lately, but I didn't say it in the right way. I didn't mean to make you feel bad. I'm sorry about that."

Sofie seems a little surprised by your apology. With an uncertain tone she says, "Thank you for saying that. What you said made me feel a little guilty. As if I did something wrong." She lets out a big sigh, "You're not wrong though. I have to admit that I am not doing too well mentally."

Sofie almost seems embarrassed, looking down to the ground. "What should I say now?", you think, trying to remember what Emma told you.

C5.3: What advice do you give Sofie? (L3.2)

Ending 4 (Encourage her to get help.)

Sofie gets help (addressed concerns right)

"To be honest, your situation makes me think of depression. Have you considered seeking help? Maybe seeing a psychologist? Someone like that can help you better than I can. If you need me to look for information or if you want me to go with you to the appointment, let me know. You're my best friend and I want to support you and be there for you, the same way I know you would be there for me."

After a long pause, she turns her head towards you and says, "Hearing that from you means a lot. I wasn't so sure in the beginning, but It seems like you do understand my situation…me… maybe it is more serious than I thought," after a small break she continues, "You're right, it might be a good idea to seek help. Can you remind me tomorrow to make a doctor's appointment? Just in case I change my mind… I would love for you to come with me as well. Thank you, I'm lucky to have a friend like you."

You feel a big wave of relief. Sofie opens her arms with that genuine and infectious smile that you haven't seen in so long. While you embrace her, you think, "Everything is going to turn out fine."

Ending 2 (Tell her to think positive.)

Sofie doesn't to get help (park)
See previous section (Ending 2)

Branch 4.4 (I think it would be good for you to get out of the house.)

You send Sofie a text saying, "I think it would be good for you to get out of the house. Let's go to a bar sometime this week!" After a while, Sofie replies and reluctantly agrees to meet. "I'm glad she decided to meet me after all," you think.

On the day of the meeting, you are a little nervous to have this important conversation. But you remind yourself that it is important to help your friend. So, you pack your bag and head out.

You arrive early and sit at a table while waiting for Sofie. After a few minutes you see her approaching you. "She doesn't look too well. I think her situation might really be serious," you can't help but think. Once she notices you, her facial expression changes immediately from a blank stare to a forced smile. "Maybe she doesn't want to show how she really feels…" You stand up, hug her tightly and tell her how happy you are to see her. You try to have some small talk, but it is quite loud at the bar. Sofie seems to be a little overwhelmed with the noise. "Maybe the bar wasn't the best place to meet", you think. Nonetheless, you decide to bring up the topic of depression. You take a deep breath and say, "I wanted to apologize about earlier. I am a little worried about you lately, but I didn't say it in the right way. I didn't mean to make you feel bad. I'm sorry about that."
Sofie seems a little surprised by your apology. With an uncertain tone she says, "Thank you for saying that. What you said made me feel a little guilty. As if I did something wrong." She

lets out a big sigh, “You’re not wrong though. I have to admit that I am not doing too well mentally.”

Sofie almost seems embarrassed, looking down to the ground. “What should I say now?”, you think, trying to remember what Emma told you.

C5.4: What advice do you give Sofie? (L3.2)

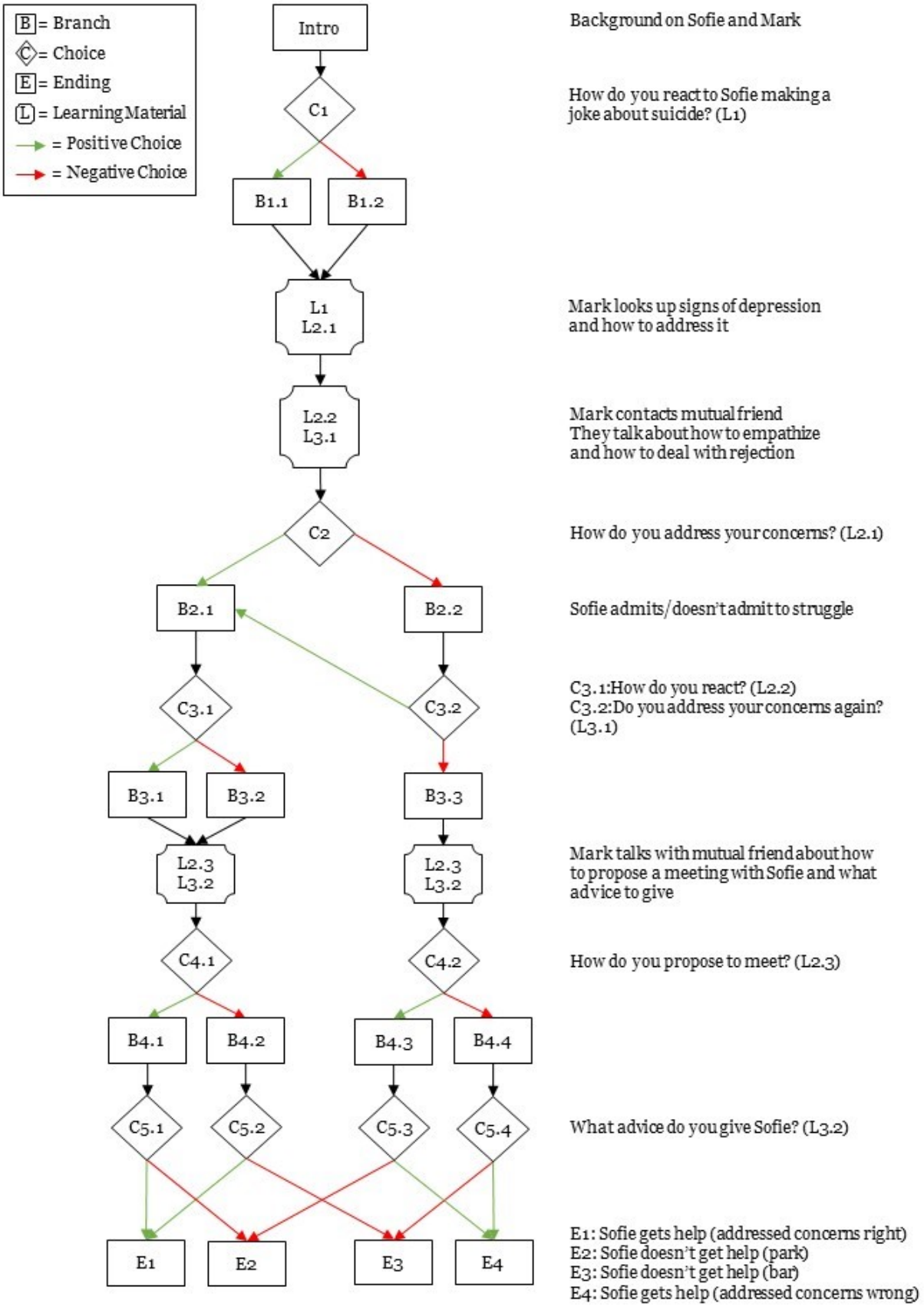
Ending 4 (Encourage her to get help.)

Sofie gets help (addressed concerns wrong)
See previous section (Ending 4)

Ending 3 (Tell her to think positive.)

Sofie doesn’t to get help (bar)
See previous section (Ending 3)

Appendix C: Branching Structure of *Cloudy*



Appendix D: Survey Items

Demographic Questions

What is your gender?

a. Male
b. Female
c. Non-binary / third gender
d. Other: _____
e. Prefer not to say

What is your age?

a. 18-24 years old
b. 25-34 years old
c. 35-44 years old
d. 45-54 years old
e. 55-64 years old
f. 65-74 years old
g. 75 years or older

What is the highest level of education you have completed?

a. No formal education
b. High school diploma
c. Vocational training
d. Bachelor's degree
e. Master's degree
f. Doctorate degree

Do you have experience with depression (had depression yourself, or experienced it up close?)

a. Yes
b. No
c. Prefer not to say

Attention Checks

Correct answers are presented in **bold**.

What is Mark and Sofie's relationship?

a. Brother and sister

b. Best friends

c. Romantic partners

Which subject did Mark study?

a. Law

b. Graphic design

c. Biology

What is the name of Mark and Sofie's mutual friend?

a. Lotte

b. Mila

c. Emma

Cognitive Learning Questions

Correct answers are presented in **bold**.

Knowledge

What is the best way to bring up the topic of depression to someone who might be struggling with it?

a. Use "You" statements to illustrate your point

b. Use "I" statements to not put blame on them

c. Organize an intervention with multiple close friends

d. Avoid the topic as much as possible

What should you keep in mind when dealing with someone with depression?

a. Giving advice might be harmful

b. It is best to distract them from their depression as much as possible

c. It should be your priority to help them

d. Distance yourself from them if they hurt you

The person you are trying to help is rejecting your efforts. What is likely the reason?

a. They act out of defense

b. They feel like they do not need any help

c. They are testing your commitment

d. They do not appreciate your effort

Which statement is true about the cause for depression?

a. It is only caused by traumatic events

b. It is only caused by genetics

c. It can have different causes like grief, a weakness of character, or brain chemistry

d. It can have different causes like genetics, brain chemistry, and lifestyle factors

Comprehension

Which of the following behavioral changes may indicate that someone has depression?

a. They care more about their appearance than usual

b. Their interests changed drastically

c. They seem to have more energy than usual

d. They do not hang out with others as much as they used to

When it is dysregulated, which of the following can cause physical pain in people with depression?

a. Glutamate

b. Serotonin

c. Oxytocin

d. Adrenaline

What is the rule of thumb for friends or family to offer their support for someone with depression?

a. Always be there for them; their well-being should be your priority

b. Advise them to seek out a mental health professional; it is not your duty to heal them

c. Slowly distance yourself from them when they keep rejecting your efforts

d. Try to ignore abusive behavior; they do not realize they are hurting you

What is the best way to get someone with depression to partake in an activity?

a. Surprise them with it

b. Involve them in the planning process

c. Stop asking them if they keep refusing

d. Explain the benefits of partaking in the activity

Application

Which of the following statements should best be used to address your concerns regarding someone with depression?

a. I would love to see you cheer up

b. I am worried about you

c. You seem different lately

d. You are concerning me

What is the best thing to say to someone with depression who keeps rejecting your efforts to help them?

a. Only contact me when you feel better

b. I won't keep bothering you

c. You are hurting my feelings

d. You can always talk to me

What is a good guideline when dealing with someone with depression?

a. Validate their feelings but be cautious about giving advice

b. Reassure them that you know how they feel and try to put their depressive thoughts into perspective

c. Keep inviting them to activities to distract them from their problems

d. Maintain communication and emphasize the positive things in their life

Which is the most suitable place to have a conversation with someone who struggling mentally?

a. At a quiet café

b. At a shopping mall

c. At their workplace

d. At a busy restaurant

Transformative Learning

This scale was adapted from the Learning Activities Survey taken from King (2009)

Please indicate below the extent to which you agree with these statements about the story.

While reading the story…

I had an experience that caused me to question the way I normally act.

I had an experience that caused me to question my ideas about social roles. (examples of social roles include what a mother or father should do or how an adult child should act)

I thought about acting in a different way from how I normally act.

I began to think about the reactions and feedback from my new behavior.

Transportation

This scale was adapted from De Graaf et al. (2012)

While reading the story…

Attention

my thoughts were only with the story.

I was distracted by the space around me. (R)

I did not really notice things that happened around me.

I kept thinking about the things that had been on my mind lately. (R)

Imagery

I had a vivid image of the events in the story.

I saw before me what was described in the story.

Feeling of Going into the Narrative World

I had the feeling as if I was present at the events in the story.

I was in the world of the story in my imagination.

Identification

This scale was adapted from De Graaf et al. (2012)

While reading the story…

Imagining Events from the Position of the Characters

I imagined what it would be like to be in the position of Mark.

I pictured what it would be like for Mark to deal with Sofie's depression.

Experiencing Empathy with the Characters

I empathized with Mark.

I felt for Mark.

Illusion of Being the Characters

In my imagination it was as if I was Mark.

I had the feeling I went through what Mark went through.

Intrinsic Motivation

This scale was adapted from the IMI (Self-Determination Theory, n.d.)

I found this way of taking in information about depression to be…

enjoyable.

fun.

boring. (R)

interesting.

Manipulation Checks

Perceived Autonomy

This item was adapted from the scale by Roth (2015).

> *While reading the story, I felt like I was able to make choices that could influence the development of the story.*

Perceived Effectance

This item was adapted from the scale by Roth (2015).

> *While reading the story, I felt like my choices had an impact on the events in the story.*

Appendix E: Comparison of Overall Results Between Scholl (2020) and Present Study

The cognitive learning scores of both studies represent the number of correct answers out of 12, four per subcategory. Identification, transportation, and intrinsic motivation of the present study were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The same variables in the study by Scholl (2020) were measured on a 7-point Likert scale (1 = *completely disagree*, 7 = *completely agree*). In order to enable a direct comparison, a simple proportional transformation (Colman et al., 1997) was used to convert the scores of the study by Scholl (2020) to 5-point scores. As the scores were transformed their validity should be interpreted with caution.

Variable	**Present Study Linear (*n* = 51)**	**Scholl (2020) Linear (*n* = 68)**	
	M (*SD*)	*M* (*SD*)	*t* test
Cognitive Learning	10.33 (1.93)	9.19 (1.72)	4.24*
Knowledge	3.31 (0.95)	3.38 (0.71)	-0.5
Comprehension	3.29 (0.88)	3.03 (0.91)	2.15*
Application	3.73 (0.57)	2.78 (0.97)	11.88*
Identification	3.59 (0.84)	3.26 (0.73)	2.79*
Transportation	3.57 (0.64)	3.76 (0.59)	-2.16*
Intrinsic Motivation	3.77 (0.7)	3.8 (0.7)	-0.31

*$p < 0.05$