NARRATIVE MEDIA'S INFLUENCE ON EGOISTIC NEED SATISFACTION IN PREADOLESCENTS

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ABSTRACT

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Self-determination theory (SDT) states that humans are driven toward activities believed to satisfy a set of basic psychological needs (i.e., competence, autonomy, relatedness). The desire to satisfy these needs is thought to be essential throughout an individual's life span and their satisfaction is thought to produce feelings of overall well-being. The current study examines the potential for preadolescents to vicariously satisfy these needs through exposure to media emphasizing the satisfaction of these needs by a protagonist.

A total of 353 participants between the ages of 10 to 12 years completed an online experiment. Preadolescents randomly assigned to conditions were instructed to first watch an online comic book video and then complete a set of measures including the Children's Intrinsic Needs Satisfaction Scale (CINSS; Koestner & Véronneau, 2001), the Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999) designed to measure participant feeling of well-being, the moral measure of intuitively motivated behavior (M-MIMB; Hahn et al., 2019), the interest and enjoyment subscales of the Intrinsic Motivation Inventory (IMI; Ryan, 1982) to measure story enjoyment, and a one-item measure of character liking.

A 5 x 2 fixed-factor design varied exposure to one of five videos and one of two measurement-presentation orders. Participants were first exposed to a video emphasizing either one of two SDT intuitions (competence or relatedness) or one of three different controls, which emphasized either one of two altruistic intuitions (care or ingroup loyalty) or a pair of egoistic intuitions (hedonism/power). Participants then completed outcome measures presented in one of

two orders (CINSS, M-MIMB, PANAS/story enjoyment and character liking, and demographics, or CINSS, PANAS/story enjoyment and character liking, M-MIMB, and demographics). Although findings fail to provide support for clams that preadolescents can vicariously satisfy SDT needs by watching a protagonist satisfy these needs, exposure to comics showing a protagonist satisfy these needs increased feelings of well-being.

Findings fail to provide support for clams that viewing a character having their SDT needs satisfied could (a) vicariously satisfy those needs in preadolescent viewers or (b) increase story liking or character liking. However, viewing comics showing a protagonist satisfy these needs increased feelings of positive affect reported by preadolescent viewers along with their performance of prosocial sharing behaviors. The potential for future research examining these effects is discussed.

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INTRODUCTION

Mass communication's ability to satisfy intuitive needs has been an interest of media scholars since Katz et al.'s, (1973) seminal work on gratifications provided by media. From its beginning, research in this area has focused not only on the needs satisfied by media use, but on "other consequences, perhaps mostly unintended ones" that can result from exposure (p. 520, Katz et al., 1973). Echoing these interests, research on narrative media has argued that a story's ability to satisfy audiences' intuitive egoistic-needs can shape their enjoyment of the story as well as lead to other outcomes (Tamborini et al., 2010, 2011).

Building on self-determination theory (SDT; Ryan & Deci, 2000), Tamborini et al. reasoned that a narrative's ability to satisfy needs identified by SDT could heighten feelings of psychological well-being and through this increase a story's appeal. More recent work has suggested that the satisfaction of these needs can also increase prosocial behavior (Murnaghan et al., 2014). When considering the potential commercial and social implications of these outcomes, we might expect to see considerable research on related issues. However, both the ability of narratives to satisfy SDT needs and the impact of this need satisfaction on story appeal and prosocial behavior have received surprisingly little attention. The study presented here begins to address these shortcomings in research examining narrative media's effect on egoistic need satisfaction in preadolescents, a population where particularly strong effects might be expected.

This current paper begins with a brief review of SDT and an examination of research on media's relationship to need satisfaction in adults. It continues with a discussion of research examining children's fulfillment of SDT's needs, noting the shortage of work in this area. Finally, it presents an experiment that begins to address this deficit by examining the influence of narrative media on SDT need satisfaction and other outcomes in preadolescents.

SELF-DETERMINATION THEORY

Building on conceptions of human motivation found in positive psychology (Seligman & Csikszentmihalyi, 2000), self-determination theory (SDT; Ryan & Deci, 2000) examines the degree to which behaviors are enacted without outside influence, or in accordance with one's own free will (i.e., volitional). SDT posits that humans are driven towards activities believed to satisfy a set of basic psychological needs, or motivating forces defined as "innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Ryan & Deci, 2000, p. 229).

The theory states all humans have three essential psychological needs that contribute to well-being and psychological growth. SDT calls them competence, autonomy, and relatedness needs. Competence represents the feeling of mastery over one's environment. To satisfy competence needs, an individual must learn new skills, succeed in challenges, or feel mastery in a domain. Autonomy refers to feelings of initiative or having the ability to make one's own choices. Autonomy is satisfied when individuals feels like they have ownership of their own decisions. Relatedness corresponds to feelings of connectedness or closeness with other individuals. Relatedness needs are satisfied when one feels wanted and/or needed by others. When these intrinsic needs are met, individuals report greater interest in and enjoyment of the fulfilling activity. In essence, the satisfaction of these three needs leads people to experience feelings of overall well-being. Though all three needs are important to well-being, the stimuli used in the current study focus only on competence and relatedness needs, because autonomy's importance may be undeveloped through preadolescents (Goosens & Marcoen, 1999; Steinberg & Silverberg, 1986). A more detailed discussion of this issue is found in Methods.

Entertainment Media and Need Satisfaction

Though not directly testing SDT needs, media research on uses and gratifications (Katz et al., 1974), disposition theory (Zillmann & Cantor, 1976), and mood management (Zillmann & Bryant, 1985) have all examined the importance of need satisfaction in shaping audience response to entertainment. Early theoretical work in this area defined the enjoyment of entertainment simply as a pleasurable response to narrative media that was intended to enlighten or delight (Zillmann & Bryant, 1994). In an effort to increase conceptual clarity, more recent research in entertainment theory has defined enjoyment as the satisfaction of SDT needs (Tamborini et al., 2010). In research attempting to test this conception, entertainment scholars have recently begun to examine the potential of narrative media to satisfy these intrinsic needs in adults. Yet to date, few studies on the topic exist, and most of this research is in the context of video game play.

Video Games and SDT

Video game play is often distinguished from other forms of media entertainment along lines of audience activity. Whereas the benefits derived from traditional media such as television and film are often thought to be passively experienced through exposure to a narrative's message content, users take a more active role when they play a video game. SDT researchers have reasoned that the activities performed while playing a video game can be intrinsically rewarding (Ryan et al., 2006; Tamborini et al., 2010). Instead of reward from exposure to message content contained in the game, the reward is thought to come from activities involved in game play that inherently satisfy SDT needs. Evidence of this can be found in research beginning with Ryan et al. (2006).

In a four-experiment study using video games to examine the satisfaction of SDT needs, Ryan et al. (2006) provided evidence of a relationship between video game attributes and the satisfaction of needs, while also finding a relationship between need satisfaction and media enjoyment. The degree to which the game provided a player intuitive control was found to satisfy the need for competence and autonomy, while playing as a group (e.g., massive multiplayer online games; MMOs) satisfied relatedness needs.

Expanding on this work, Tamborini et al. (2010) manipulated video game controls and the social-play context of a game to examine their effect on perceived need satisfaction and the subsequent experience of enjoyment. In line with previous research, they found that playing with others satisfied relatedness needs, while greater game control satisfied both competence and autonomy needs. Media enjoyment was also predicted by the satisfaction of competence, autonomy, and relatedness needs.

Narrative Media and SDT

Building on research examining the inherently rewarding nature of different video game *activities*, several studies have demonstrated that reward from exposure to narrative message *content* can also satisfy SDT needs. Evidence that passive processing of a video game narrative (i.e., simply watching people play) can satisfy SDT needs was found in research by Tamborini et al. (2011). Similar results have been found in research examining television dramas. For example, in a series of studies by Adachi et al. (2018), exposure to nighttime dramas led viewers to experience feelings of relatedness with narrative characters and competence in their viewing ability. Moreover, the satisfaction of these relatedness and competence needs predicted motivations to view. Notably, while such findings are consistent with claims that an audience's intrinsic motivation for exposure to narrative media can be explained by the satisfaction of SDT

needs, research in this area is still in its infancy. Moreover, though initial findings suggest that narrative media can satisfy intrinsic needs in adults, very little research examines the ability of narratives to satisfy the SDT needs in preadolescent children (ages 8 to 12 years) or the subsequent effect of this experience.

Children and Self-Determination Theory

SDT proffers that the satisfaction of competence, autonomy and relatedness needs is a prerequisite to feelings of well-being, and the drive to satisfy these needs exists from birth. It is not something that develops or increases with age, as satisfying these needs is essential to well-being throughout an individual's lifespan (Ryan & Deci, 2000). In this regard, the satisfaction of SDT's three basic needs is deemed necessary for the natural psychological growth potential of a child (Ryan & Deci, 2000; Lynch & Salikhova, 2016).

Support for the inherent nature of these needs can be seen in research showing that all three are found in humans during early infancy. Leotti et al. (2010) argue that the need for autonomy is apparent from birth in the act of children crying to express what they want, impose their will, and control their environment (Leotti et al., 2010). Newborns display relatedness needs through their desire for physical contact (Butler & Walton, 2013). Babies show pride in their competence by smiling when they complete simple tasks such as successfully grasping an object (Dichter-Blancher et al., 1997). SDT argues that children have a natural tendency to develop their skills and knowledge, explore their world, and integrate new experiences into those they currently possess (Deci & Ryan, 1985; Ryan & Deci, 2000). This tendency is referred to as an intrinsic motivation (Lynch & Salikhova, 2016).

Play is a prototypical example of an intrinsically motivating activity, which notably is where children do much of their learning. During play, children satisfy psychological needs by

using and challenging their current set of skills, expanding on those skills, and developing new ones (Lynch & Salikhova, 2016). The needs they satisfy are the same as those found in adults (i.e., competence, autonomy, relatedness) and are essential for a child to realize their psychological potential. Existing research has examined the beneficial effect of satisfying SDT needs on a child's self-actualization (Lynch & Salikhova, 2016), healthy behaviors (Buttitta et al., 2017), mental health (Véronneau et al., 2005), and educational performance (Guay et al., 2008). Notably, the importance of the beneficial outcomes that result from satisfying these needs has led scholars to search for factors that provide this satisfaction.

SDT literature has identified several sources that can help children satisfy their needs, including parents, teachers, and peers. For example, studies show that parents can have a significant effect on the satisfaction of their child's SDT needs (Pomerantz et al., 2005; Soenens et al., 2017), and that different parenting characteristics align with need satisfaction (Grolnick et al., 1997; Joussemet et al., 2008). Other research shows a connection between teaching styles and students' SDT satisfaction (Vallerand et al., 1997). Moreover, preliminary inquiries have begun to examine the association of peer relationships to SDT need satisfaction (Lenhart et al., 2010; Murcia et al., 2008). Though research in this area has begun to identify several different sources for the satisfaction of children and preadolescents' SDT needs, one potential catalyst that has received little attention is mass media.

Media as a Source of Need Satisfaction

In a review of media research, Galpin (2016) suggests a developmental "needs" approach to organize lifespan media use. He argues that basing research on intrinsic human needs, such as those presented in SDT, could be used to create an overarching framework to organize the understanding of media-related need satisfaction throughout human development. Although SDT

suggests that these basic human needs are constant throughout a human's lifespan, satisfying these needs through media may change based on developmental stage.

The use of narrative media to satisfy SDT needs is thought to begin in early stages of life and increase throughout childhood, with changes occurring as children reach adolescence, often considered to be the phase of life somewhere between the ages of 11 to 19 years (Cramer, 2001). For example, research shows that adolescents and teenagers are less likely to receive relatedness satisfaction from narrative media, instead turning to social media for peer connection (Lenhart et al., 2010).

The present study focuses specifically on the ability of narrative media to satisfy the SDT needs of early or preadolescents (ages 8 to 12; Wood et al., 1996), a period when narrative media seem well suited to serving this function. Media scholars have suggested that the ability of preadolescent children to satisfy SDT needs through media develops as they advance though stages of cognitive development and acquire new skills. For example, according to some scholars, the cognitive skills of children reaching school age allows them to comprehend formal production features and more complex narratives (Anderson & Hanson, 2010; Kirkorian et al., 2012). By this age, children have also developed the cognitive skills necessary to satisfy SDT needs through reading (LaRusso et al., 2016), making them an appropriate target group for the present study's use of a (narrated) comic-book induction. Preadolescents do not rely on social media to fulfill SDT needs in the same manner as older adolescents (Cramer, 2001; Giles & Maltby, 2004). Moreover, preadolescents are better able to recognize and express their SDT needs than younger children (Koestner & Véronneau, 2001). As such, it should be easier to observe narrative media's influence on preadolescents than on infants, toddlers, or young children.

Evidence suggesting the ability of preadolescent children to use media to satisfy their needs exists for all three SDT needs. For example, Valkenburg (2004) found that the cognitive abilities to understand media content created for adult audiences develops in children by the time they reach preadolescence, and these abilities are correlated with greater feelings of competence when using media. Research on the satisfaction of autonomy needs has shown that children begin to use narrative media to help create a personal identity around the age of five, with preference for characters like themselves beginning around 8 years old (Hoffner, 1996). Similarly, the use of media to satisfy relatedness needs is thought to begin early in life (Demers et al., 2009), and as children age, they begin to satisfy relatedness needs both by viewing narrative media with friends or family and by developing feelings of connectedness to familiar on-screen actors (Hoffner, 1996).

Though no known research directly examines whether preadolescent children who engage with narrative media report increased satisfaction of SDT needs, related work exists. Experimental research by Valkenburg and Vroone (2004) showed that exposure to slow-paced, repetitive programs such as Teletubbies increased feelings of mastery among infants regarding their ability to follow storylines and predict character actions, suggesting that media exposure can satisfy competence needs in these children. The ability of media to satisfy this need is also consistent with survey research showing entertainment exposure is correlated with self-reported feelings of social competence (Heim et al., 2007). Additionally, boys who watched more televised sport programming in the Heim et al. study reported higher sports competence and self-esteem.

SDT Need Representation in Children's Narrative Media

The importance of media's potential to influence SDT need satisfaction is heightened by several recent content analyses showing the frequency with which these needs are depicted in various forms of children's media. Content analysis on popular children's television shows found that competence, autonomy, and relatedness were not only all frequently portrayed, but were more likely to be rewarded when characters acted on these needs (Hahn et al., 2017).

Similar research on children's songs and popular books found a particularly strong focus on relatedness needs (Hahn et al., 2019; Tamborini et al., 2017), while related work on children's educational media showed an emphasis on competence (Aley et al., 2021). Studies such as these suggest that understanding the effect of viewing characters satisfying their SDT needs may have important implications.

The Vicarious Satisfaction of SDT Needs and Narrative's Effect on Enjoyment

Though little research has examined the connection between media exposure and the vicarious satisfaction of SDT needs, the vicarious experience of narrative content has been a focus of mass communication research since media psychologists first started to consider the functions of entertainment. In his seminal work on the topic, Zillmann (1980) directed the attention of entertainment scholars to understanding how audiences are affected by the vicarious emotional experience of narrative events. Recent work on the modified affective disposition model (MADM; Tamborini, Grizzard et al., 2021) has focused on narrative appraisal in particular, suggesting that audience enjoyment is fostered by story outcomes that vicariously satisfy egoistic needs made dominantly or overridingly salient but leaves open questions about how this would affect social behavior. Notably, little empirical research has directly examined

the potential for media experience to vicariously satisfy different SDT needs or whether such vicarious need satisfaction can mediate narrative's effect on enjoyment and other outcomes.

Although not intentionally designed to test media's vicarious influence, evidence that media experience satisfies SDT needs can be seen in research on the tendency of sports fans to bask in reflected glory (BIRG; Cialdini et al., 1976). BIRGing research suggests that individuals like to express their connection to the success of other individuals or groups and through this share in the reward of that success. For example, research showing that college students wore school colors more often following a victory than a loss by their school's football team (Cialdini et al., 1976) was followed by research suggesting that students shared in their team's success (Hirt et al., 1992). Hirt et al. (1992) found that the effect of such victories went even further, leading students to not only consider themselves as more attractive to others, but also to rate themselves as more competent at performing different tasks.

Notably, this research applies only to competence needs and vicariously experiencing the success of a student's favorite sports team. Nevertheless, it is not difficult to imagine similar processes producing the vicarious satisfaction of other egoistic needs through the observation of favorite narrative characters. For example, if competence needs can be fulfilled by observing another's success, it stands to reason that another person's relatedness need satisfaction might also be vicariously experienced by audience observation. Moreover, in line with research suggesting that audience enjoyment is fostered by story outcomes that vicariously satisfy egoistic needs (Tamborini, Grizzard et al., 2021), the satisfaction of either competence or relatedness needs should lead to greater story enjoyment. In this manner, we should expect the vicarious satisfaction of competence or relatedness needs to mediate a narrative's effect on enjoyment.

Although scholarly discussion of this phenomenon to date has been limited to adults, extending the underlying logic to preadolescent children leads to the following hypotheses.

H1a: Preadolescent children exposed to a story featuring the satisfaction of a liked character's competence needs will report higher levels of competence need satisfaction than preadolescents exposed to a story that does not satisfy those needs.

H1b: Preadolescent children exposed to a story featuring the satisfaction of a liked character's relatedness needs will report higher levels of relatedness need satisfaction than preadolescents exposed to a story that does not satisfy those needs.

H2: Preadolescent children exposed to a story featuring the satisfaction of a liked character's (a) competence or (b) relatedness needs will report higher levels of story enjoyment than preadolescents exposed to a story satisfying care or ingroup loyalty needs.

H3: The effect of exposure to a story featuring the satisfaction of a liked character's competence needs on enjoyment of the story is mediated by a preadolescent's experience of competence need satisfaction.

H4: The effect of exposure to a story featuring the satisfaction of a liked character's relatedness needs on enjoyment of the story is mediated by a preadolescent's experience of relatedness need satisfaction.

The Vicarious Satisfaction of SDT Needs and Narrative's Effect on Well-Being

In addition to its effect on story enjoyment, logic associated with research on well-being suggests that a narrative's ability to vicariously satisfy SDT needs can increase feelings of well-being and influence other outcomes beyond media experience. Although many different definitions of well-being exist (see Dodge et al., 2012), the term well-being is used in the current

investigation to denote a child's subjective feeling of well-being, limiting its understanding to include positive emotions such as happiness and forms of pleasant affect ranging from serenity to joy.

Several studies have found a significant relationship between SDT need satisfaction and well-being outcomes for adults. For instance, research shows that the satisfaction SDT needs can contribute to lower levels of anxiety and depression (Baard, 2002; Deci et al., 2001) and greater life satisfaction (Kasser & Ryan, 1999). Feelings of autonomy have been shown to predict more positive affect while feelings of competence have predicted less negative affect (Sheldon et al., 1996). Similar evidence exists for younger audiences. For example, the satisfaction of all three SDT needs has been found to predict lower levels of childhood depression (Emery et al., 2015; Veronneau, 2005), higher levels of life satisfaction (Leversen et al., 2012; Quinlan et al., 2015), and higher positive affect (Milyavskaya et al., 2009; Murnaghan et al, 2014). If narrative media featuring the satisfaction of SDT needs can vicariously satisfy those needs in young audiences, and need satisfaction can increase feelings of well-being, the following stands to reason:

H5: Exposure to narrative media featuring (a) competence and (b) relatedness SDT need satisfaction will increase a preadolescent observer's feelings of well-being.

H6: The effect of narrative media featuring a liked character's (a) competence and (b) relatedness SDT need satisfaction on a preadolescent observer's feelings of well-being is mediated by the preadolescent's SDT need satisfaction.

The Vicarious Satisfaction of SDT Needs and Narrative's Effect on Behavior

Beyond research examining SDT need satisfaction's association with story enjoyment and feelings of well-being, considerable research has explored the relationship between need satisfaction and prosocial behavior. By comparison, questions concerning vicarious satisfaction

of SDT needs through narrative exposure and the potential for vicarious need satisfaction to mediate a narrative's influence on prosocial behavior is effectually unexamined. However, one study has provided evidence consistent with a model in which SDT need satisfaction is a precursor to children's pro-social behavior (Murnaghan et al., 2014). Although Murnaghan et al. did not explicate processes that would account for SDT need satisfaction's positive influence on prosocial behaviors, one explanation can be suggested. Recent research on children's media and prosocial behavior suggests that children, like all humans, are intrinsically motivated by altruistic intuitions, or the drive to benefit others (Hahn et al., 2021). Potentially, once one's egoistic needs are satisfied, the energy required to address those needs should be greatly reduced, increasing the energy available to for other needs – such as the drive to benefit others (i.e., prosocial behavior).

Murnaghan et al. (2014) showed that trait SDT need satisfaction was strongly associated with both positive affect and the likelihood to perform prosocial behaviors among children. Notably, Murnaghan et al. used a self-report survey design to observe need satisfaction, positive affect, and pro-social behavior. Their non-experimental study did not consider media exposure and was not designed to test causality. As a result, there is little empirical evidence examining the effect of narrative media featuring SDT need satisfaction on prosocial behavior. However, we can speculate about this relationship by combining logic from above suggesting that exposure to narrative media featuring a liked character's SDT need satisfaction can prompt the vicarious satisfaction of a child's SDT needs and, the vicarious satisfaction of SDT needs can prompt prosocial behavior. This logic can be combined to speculate that the effect of exposure to a narrative featuring the satisfaction of a liked character's SDT needs on a child's prosocial behavior is mediated by the child's SDT need satisfaction.

The current study examines this possibility with the following research questions.

RQ1: Will preadolescent children exposed to a story featuring the satisfaction of a liked character's (a) competence or (b) relatedness needs demonstrate higher levels of prosocial behavior than preadolescents not exposed to a story satisfying those needs?

RQ2: Will the ability of narrative media featuring a liked character's (a) competence or (b) relatedness SDT need satisfaction to affect a preadolescent observer's prosocial behavior be mediated by the preadolescent's SDT need satisfaction?

METHOD

Study Overview

Participants in the current study were exposed to one of five comic book conditions designed to emphasize the satisfaction of different intuitive needs. All five were either copies of or modified versions of a comic book induction developed by Hahn et al., (2021). The first two comic books were versions modified from Hahn et al. to highlight the satisfaction SDT's competence and relatedness needs. These serve as inductions for hypotheses and research questions related to the effect of narrative media featuring SDT's competence and relatedness needs. The remaining three comics were versions of the comic book induction by Hahn et al., (2021), and served as comparison conditions. Of these, two separately highlight the satisfaction of different altruistic intuitions (care and ingroup loyalty), while the third highlights two egoistic intuitions unrelated to SDT (hedonism and power). Following exposure, participants completed several outcome measures including the Children's Intrinsic Needs Satisfaction Scale (CINSS; Koestner & Véronneau, 2001), the Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999) designed to measure participant feeling of well-being, the moral measure of intuitively motivated behavior (M-MIMB; Hahn et al., 2019), the interest and enjoyment subscales of the Intrinsic Motivation Inventory (IMI; Ryan, 1982) to measure story enjoyment , and a one-item measure of character liking.

Participants

Participants were recruited online through Qualtrics. Qualtrics utilizes a participant panel to recruit for survey purposes. In order to recruit children under the age of 13, Qualtrics contacts parents who have reported having preadolescents (ages 8 to13) in their home. Participants receive compensation for their participation based on an amount set by Qualtrics. Legal

guardians were sent a link to the survey through email by Qualtrics. All guardians were asked to complete an online parental consent before the child begins. The preadolescent was then asked to complete the online child assent. Once parental consent and child assent were completed, the preadolescent began the study. Only children who obtain written parental consent and provide child assents were included in the study.

To obtain an estimate of the sample size required for statistical power, an a priori power analysis was conducted using G Power (1 - β) set at 0.80 and α = .05, two-tailed. Effect size estimates were based on Murnaghan et al.'s (2014) results (competence η^2 = .24 and relatedness η2 = .21) using the same measure as the present study on a similar population. The total sample size necessary for differences (among 10 groups) to reach statistical significance at the .05 level would be N = 350.

As stated above, the present study focuses on preadolescents, which is typically considered to be between the ages of 10 to 12 years but can include children as young as age 7 (Wood et al., 1996). Participants between the ages of 8 and 12 years were recruited through Qualtrics' participant panel. Research on preadolescents has determined the importance of SDT need satisfaction (Emery et al., 2015; Leversen et al., 2012; Milyavskaya et al., 2009; Murnaghan et al, 2014; Quinlan et al., 2015; Véronneau, 2005). Additionally, preadolescents have already begun to develop media literacy-building skills to understand and decode media messages (Hobbs, 1998; Pinkleton et al., 2012). Due to their desire to satisfy SDT needs and their growing ability to critically examine media messages, preadolescents are a prime target age to examine media's potential influence on SDT need satisfaction.

A total of 440 preadolescents completed the survey. However, participants who did not pass an attention-check test were removed from analysis. This resulted in a final sample of 353

participants. Child gender was reported as 62.3% (N = 220) male, with an average age of 11.51 (SD = 2.08). Race was reported as 74.5% (N = 263) white, 11.9% (N = 42) African American, 7.9% (N = 28) Hispanic, 3.1% (N = 11) Asian, 1.7% (N = 6) American Indian or Alaska Native, and 0.8% (N = 3) Native Hawaiian or Pacific Islander.

Procedure

A single factor experimental design was used to expose children to one of five randomly assigned videos. The order in which participants respond to some items was also randomized. All participants answered the Children's Intrinsic Need Satisfaction Scale (CINSS; Koestner & Véronneau, 2001) immediately following the video. To ensure order effects did not interfere with other scales, the order of certain measures was randomized. Half of the participant completed the prosocial measure of intuitively motivated behavior (M-MIMB; Hahn et al., 2019), followed by the PANAS and story enjoyment. The remaining half began with the PANAS and story enjoyment scales and then completed the M-MIMB. All participant completed the study with demographic items. This allowed analyses intended to test hypotheses predicting the ability of need satisfaction to mediate the influence of media exposure on either behavior or enjoyment.

A 5 x 2 fixed-factor design varied exposure to one of five videos emphasizing different intuitions (competence, relatedness, care, ingroup loyalty, or hedonism/power) and two different orders for the outcome measures (CINSS, M-MIMB, PANAS/story enjoyment and character liking, and demographics, or CINSS, PANAS/story enjoyment and character liking, M-MIMB, and demographics). Preadolescents randomly assigned to conditions were instructed to first watch an online comic book video and then answer questions from three short measurements. When they were done watching the comic, the survey started immediately.

The entire process took 21 minutes on average. This consists of completing practice items, watching the comic book video, completing the main measures in the study (the CINSS, M-MIMB, PANAS-C, media enjoyment, and character liking), and finishing with a few demographic items.

Stimuli

Five comic books were manipulated to emphasize satisfaction of either one of the three egoistic intuitions (competence, relatedness, or hedonism/power) or two altruistic intuitions (care or ingroup loyalty). Content (images and text) across all comic book conditions was identical with exception of text manipulated at four plot points to vary emphasis on different intuitions. All five comic books were either developed by or adapted from work by Hahn et al. (2021). The first two were adapted to highlight the satisfaction SDT's competence and relatedness needs: They serve as inductions for questions and hypotheses examining the effect of competence and relatedness narratives on well-being and prosocial behavior. The remaining three are direct copies from Hahn et al. and serve as comparisons conditions. Two highlight the satisfaction of care and ingroup loyalty (altruistic intuitions), while the third highlights the combination of hedonism and power (two egoistic intuitions). Notably, unlike Hahn et al. (2021) or Aley et al. (2019) who had their participants read the comic to themselves, the current study exposed participants to video recordings of the comics. This was done in order to remove the concern for differing levels of participant reading ability and comprehension. A female narrator read the text shown above the images on each panel. As the text was being read, a circle was placed around the text to highlight the section being read. The videos ranged in time from 9 minutes 38 seconds to 9 minutes 57 seconds.

Hahn et al. (2019, 2021) exposed children to comic books featuring different moral (i.e., altruistic) intuitions (care, fairness, ingroup loyalty, authority) or a non-moral (i.e., egoistic) intuition (hedonism/power). Hahn et al.'s two altruistic intuition comics (care, ingroup loyalty) are used in the current study to both (a) replicate Hahn et al.'s findings, and (b) serve as comparison conditions to assure that changes in post-exposure outcomes were not caused by content unrelated to text manipulated to vary emphasis on egoistic intuitions. Participants exposed to the care and ingroup loyalty comics are expected to score lower on competence or relatedness satisfaction, respectively, than those in conditions highlighting competence or relatedness. The care and ingroup loyalty comics were specifically chosen as comparison conditions for several reasons. First, prior moral foundations research (MFT; Haidt & Joseph, 2007) research has, on occasion, suggested that 5 altruistic institutions fall in two superordinate categories that represent individualizing (concern for benefit to another individual over the self) or binding (concern for benefit to the group over the self) intuitions (Graham et al., 2011). Care (an individualizing intuition) and ingroup loyalty (a binding intuition) were selected to represent these two superordinate categories. Second, reliability indicators for the care and ingroup loyalty measures used in the current study have been among the highest found in previous research (Aley et al., 2019; Hahn et al., 2021). Hahn et al.'s egoistic intuition comic (hedonism/power) is used in the current study (a) once again, to both replicate the findings of Hahn et al. (2021) and assure that outcomes were not caused by content unrelated to text manipulated, and (b) to distinguish the unique influence of narrative's emphasizing SDT's egoistic intuitions (competence and relatedness) from narratives emphasizing other egoistic intuitions (hedonism/power).

Notably, research on the satisfaction of autonomy needs has focused on older adolescents (Cramer, 2001; Giles & Maltby, 2004). Scholars have suggested that the drive to satisfy autonomy needs spikes in importance during adolescence (Frank et al., 1990). Related to this is the development of identity, which is thought to be a critical phase of adolescence. During this phase, the child shifts away from the parent and gradually moves toward autonomy (Goosens & Marcoen, 1999; Steinberg & Silverberg, 1986). This developmental tendency is particularly relevant for the present investigation since it focuses on a preadolescent population (ages 8 to12). Given that the developmental drive to satisfy autonomy needs may not have peaked in preadolescent children, the current study focuses on competence and relatedness needs, and does not examine autonomy.

Basic Story

The stimuli were created using various panels from an online comic book called "Cleopatra in Space." The plot follows the main character, Cleopatra, as she attends school with her friend, Akila. Cleopatra is given a mission to go to a nearby planet, retrieve a key to an immense treasure, and present it to her commander. Pleased to be given the assignment, Cleopatra travels to the planet, retrieves the key, and begins the journey back to her spacecraft. While on her way, Cleopatra is surrounded by the planet's inhabitants ("Nebulans"). The Nebulans want the key for themselves, forcing Cleopatra to make a decision. After making her decision, Cleopatra arrives back at her spacecraft and explains her decision to Akila. The comic concludes with Cleopatra flying off to carry out her decision.

Conditions

The manipulation of intuition emphasis occurs at four specific points central to the plot. These include when (1) Cleopatra and Akila arrive at class and are called on by the professor to

answer questions, (2) the Nebulans try to convince Cleopatra to give them the key, (3) Cleopatra makes her decision on what to do with the key, and (4) Cleopatra discusses her decision back at the spacecraft with her friend Akila. At each of these four plot points, exemplars were provided to highlight the upholding of the condition's relevant intuition. Variations of the different conditions can be found in Appendix A.

The current project utilizes the original care, ingroup loyalty, and hedonism/power comics used in Hahn et al. (2021; 2019). In addition to edits designed to create the competence and relatedness induction, small changes were made to text in the original ingroup loyalty and hedonism/power comics for use in the current study. First, the ingroup loyalty condition contained a line with Akila saying "siding with your group and those close to you." To remove any confound with relatedness, the line was changed to "siding with your group." Additionally, the ingroup loyalty comic originally had the Nebulan responding to Cleo by saying "Don't pretend to be our friend." Once again, to remove any confound with the relatedness condition, this was changed to "Don't pretend to be on our side." Second, two small changes were made to the original hedonism/power version of the comic. Both changes were made to reduce any potential confound with competence by highlighting the importance of the individual Nebulan character having its own hedonism/power needs satisfied. For instance, in the hedonism/power comic, the Nebulan used to say, "we want the key to the treasure." This has been changed to "I want the key to the treasure." Additionally, the comic originally had the Nebulan saying, "But we know what to do with it. So, give us the key." This statement has been changed to, "But I know what to do with it. So, give me the key."

The text in versions emphasizing competence and relatedness (newly created for this study) was manipulated at the same four plot points identified above. The competence condition

was designed to emphasize the importance of being competent and show Cleo having an internal struggle with her own competence need satisfaction. Competence was emphasized at these four plot points as follows: The teacher begins by stating how important being competent is to survival and a strong society. When Cleo meets the Nebulans, one Nebulan states that he has never had his competence needs satisfied and wants the key to satisfy his needs. While deciding what to do, Cleo thinks about how important it is to satisfy her own competence needs and decides to keep the key. At the end of the comic, Cleo tells Akila that satisfying her competence needs is the best, making her feel stronger and better.

Similarly, the relatedness condition was designed to emphasize the importance of feeling related and show Cleo struggling with her own relatedness need satisfaction. Relatedness was emphasized at the same four plot points as follows: The teacher begins by discussing how important it is to feel like you belong and feel connected to others. When introduced to the Nebulan, one Nebulan laments how his own relatedness needs have never been satisfied, but that could change if Cleo gives up the key. Cleo decides her own relatedness need satisfaction is too important to give up. At the end of the comic, Cleo tells Akila that satisfying relatedness need is important because when you are connected to others you feel like you belong and feel better.

Measures

SDT Need Satisfaction

An adapted version of the Children's Intrinsic Needs Satisfaction Scale (CINSS; Koestner & Véronneau, 2001; Orpana et al., 2019) was used to measure need satisfaction. The CINSS was developed by Koestner and Véronneau (2001) as an adaption of Deci et al.'s (1981) Intrinsic Need Satisfaction Scale designed specifically for children. The resulting scale has been

validated with children between the ages of 7 and 18 years (Murnaghan et al., 2014). As such, it is appropriate for the age group sampled in this study.

The CINSS has been successfully implemented to the measure the SDT need satisfaction of 3rd to 7th graders (Véronneau et al., 2005), 6th to12th graders (Orpana et al., 2019), 8 to12 year old's (Quinlan et al., 2015) and 10 to19 year old (Züll et al., 2019). See Appendix B to view items. The CINSS contains 18-items, six each to measure the satisfaction of competence, autonomy, and relatedness needs. The satisfaction of each need (competence, autonomy, and relatedness) is measured by two items that are repeated three times to measure the feeling of satisfaction a child gets for that need from their parents, their school, and their peers. For example, feelings of competence need satisfaction were measured by two items stating, "I feel that my teachers think I am good at schoolwork." and "I feel I do things well at home." (α =.902) The essence of these items is then repeated for feelings of competence need satisfaction that the child gets from school and their peers. The same process is then used for feelings of relatedness (α =.883). Although the current study focused only on competence and relatedness needs, autonomy items were included to maintain the scales integrity.

The CINSS was adapted for the present study by adding two additional items to each six-item set for the three different needs. In addition to the original 18 CINSS items measuring the satisfaction a child gets from their school, peer, and parents, six new items (two each for competence, relatedness, and autonomy needs) were included to measure a fourth dimension representing a general feeling of personal need satisfaction. The personal dimension includes items such as "I feel that other people like me and care about me," and "I feel that I am good at many things." Research by Aley and Aladé (2021) on children ages 8 to12 years showed that these six personal items met or exceeded the reliability found in other studies using the CINSS

scale. The addition of these six new items resulted in a 24-item scale (see Appendix B for items and reliabilities).

Participants respond to each item by on a 4-point scale including "Really false for me" (= 1), "Sort of false for me" (= 2), "Sort of true for me" (= 3) or "Very true of me" (= 4). Scoring of the entire scale ranges from 24 to 96, with subscales ranging from 8 to 32. Higher levels of need satisfaction were indicated by higher score totals.

Well-Being

Participant well-being was measured with the Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999). The PANAS-C is adapted from the original 60 item version (PANAS-X; Watson & Clark, 1991) for use with a child sample. Twenty-seven items (12 for positive affect and 15 for negative affect) were used to obtain a child's feelings of affect. affect. Each item is an adjective representing positive (e.g., excited, cheerful, proud; α =.962) or negative (e.g., ashamed, miserable, mad; α =.983) affect. The original PANAS-C measures participants trait well-being by asking how they feel. These items were adapted in the current study to measure state feelings of well-being. The items were reworded to ask how participants feel about that adjective now. For example, one item stated, "How happy do you feel right now?" Participants responded on a five-point Likert scale (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely).

Several studies have used the PANAS-C to measure affect in children between the ages of 7 and 14 (e.g., Casuso et al., 2016; Eadeh, 2020; Hughes & Kendall, 2009; Veronese & Pepe, 2017). Notably, positive affect scores on the PANAS-C were found to correlate positively with high scores on CINSS measures of competence and relatedness need satisfaction (Murnaghan et

al, 2014). In line with this, high scores on negative affect were negatively correlated with high scores on measures of competence and relatedness need satisfaction.

Character Liking

Participants rated their liking of Cleopatra, the comic's protagonist. As the comic's protagonist, Cleopatra was expected to be well-liked. Nevertheless, a measure of character liking was used as a manipulation check to examine any potential effects of character liking. Character liking was assessed with a one-item measure used by Hahn et al. (2021). The item asked, "In the comic you just heard, how much did you like Cleopatra?" Responses ranged from 1 (really dislike) to 5 (really like).

Online M-MIMB

Immediately following the first CINSS, half of the participants completed the moral measure of intuitively motivated behavior (M-MIMB; Hahn et al., 2019), which was used as a measure of prosocial behavior. Adapted from a dictator game (Benenson et al., 2007; Gummerum et al., 2008; Kahneman et al., 1986), participants were presented with 20 tokens and told they can share the tokens with others (targets) or keep them. In Hahn et al. (2019), participants were told the tokens could be kept for a gift card when the study was complete. To account for the online nature of the study, participants in the current study were told any amount they kept would be added to their Qualtrics's payment. Unknown to them at the time, all participants would receive the same payment amount regardless of how many tokens they kept for themselves.

Pictures of three children (targets), who were similar in age to the participants, were shown with a brief description (See Appendix C). The first image (target) represented a care exemplar. Text under this photograph read: "She is a new student in the grade below you. She is

feeling *pretty sad* because her family has to move to a new town, and she will have to make new friends. She has been *crying a lot* in school. The *poor girl* really *needs help*." A respect for authority exemplar was represented in the second image (target). This target was part of the original M-MIMB and is retained here both to maintain the integrity of the original scale and for use in another study not part of this dissertation. The text under this photograph stated: "She is a student in the *grade above* you. She is going to be the next president of her class and will be *in charge* of making new school policies. She is the most *respected leader* the school has ever had, and students *always listen* to her advice!" The final image (target) represented an ingroup loyalty exemplar. This image was accompanied by text that stated: "She lives in the *same neighborhood* as you. Last year, she was a student in the same class as you are in now, and she even has the *same birthday* as you. So, you have a *lot more in common* with her than the other two people." The target images and the accompanying text was presented in a randomized order. Notably, because the sample used in the Hahn et al. (2019) study was predominately white, they used pictures of white children for targets. Since it is not clear that the Qualtrics sample planned for this study was predominately white, race was measured to determine how much this affects sharing with the ingroup loyalty target.

In order to familiarize participants with the M-MIMB procedure, participants completed a practice round of the M-MIMB on cartoon shapes developed by Hahn et al. (2019) before reading the comic books. In line with previous research (e.g., Engel, 2011), it was expected that participants would donate more to the targets who they deemed most deserving. The number of tokens participants share with the targets exemplifying care, respect for authority, or ingroup loyalty was interpreted as an indicator of altruistic (benefitting others) or prosocial behavior. The number of tokens participants keep for themselves was interpreted as an indicator of egoistic

behavior (benefitting self) and the lack of prosocial concern. The original test of the M-MIMB (Hahn et al., 2019) used a control comic that has been coded as exemplifying hedonism and power (Aley et al., 2019) suggesting that a desire for wealth may have been made salient in participates who read the control comic.

In order to measure prosocial behavior, the number of tokens shared amongst the three targets were summed for an overall sharing total. This total represented prosocial behavior, such that more tokens shared across the targets equated to higher prosocial behavior. Additionally, the number of tokens kept by the participant for themselves was used as a measure of antisocial behavior, so that the more tokens kept, the higher the antisocial score.

Story Enjoyment

Story enjoyment was measured using the interest and enjoyment subscales of the Intrinsic Motivation Inventory (IMI; Ryan, 1982). Four items were used to measure enjoyment. These items include "I enjoyed this comic very much.," "Watching the comic was fun.," "I would describe this comic as very interesting.," and "The comic held/kept my attention." All items were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5); ($\alpha = .861$). The wording of items is adapted to reference the watching the comic video. Items are included in Appendix B.

Demographics

Demographic characteristics were also obtained with items measuring age, grade, and gender. To obtain the most accurate age of the child, separate items were asked for the month, day, and year they were born. Children also provided the grade they were in, with options between the 2nd and 7th grade. Responses for gender include boy, girl, or other. Immediately following the parental consent, parents were asked to provide the race of the child. Race options

include American Indian or Alaska Native, Asian, African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, or Other/Prefer not to say.

Attention Check

Replicating the procedure of Hahn et al. (2021), an item was included on the last page of the survey. This item asked participants how well the stimulus held their attention. In order to avoid pressuring children to answer the way they believe the researcher expected them to (i.e., claiming that they paid very close attention to the comic) the attention question gave the following options: (1) *found the story really interesting and paid close attention*, (2) *found the story a little interesting and paid a little attention*, or (3) *didn't find the story very interesting and did not pay close attention* (Hahn et al., 2021).

RESULTS

Before testing the study's hypotheses, several descriptive tests were conducted. First, character liking was examined to determine whether children enjoyed Cleopatra as expected. A single sample *t*-test showed that participants liked the Cleopatra character ($M = 4.53$, $SD = 0.74$) significantly more than the scale midpoint of 3, $t(353) = 8.36$, $p = .038$.

Second, to ensure participant race did not influence character liking, a one-way ANOVA was conducted on liking scores with race (i.e., American Indian or Alaska Native, Asian, African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other) as the independent variable. The results showed no significant difference of participant race affecting character liking; $F(5, 347) = 1.559$, $p = .171$. As a result, the sample was collapsed across participant races for all analyses. See Appendix D for additional analysis of outcome variables by participant gender and race.

Third, correlations among different outcome variables of interest were examined. Results can be found in Table 1. Strong positive correlations were observed among competence satisfaction, relatedness satisfaction, character liking, story enjoyment, and positive affect (PANAS-C). Moral behavior (M-MIMB) was uncorrelated with other outcome measures.

Table 1.
Correlation Matrix Between Outcome Variables.

	Competence Satisfaction	Relatedness Satisfaction	Like Character	Enjoy Story	PANAS-C	Gender
Relatedness Satisfaction	.80**					
Like Character	.42**	.34**				
Enjoy Story	.48**	.41**	.54**			
PANAS-C	.43**	.38**	.36**	.41**		
M-MIMB	- .02	- .05	- .00	- .08	.01	
Gender	-.11*	.10	-.21**	-.13*	-.16**	
Race	-.02	-.04	-.03	-.03	-.02	-.00

Note. ** *indicates statistical significance at p < .01 level.*

To test H1a, a planned contrast ANCOVA was conducted to compare competence need satisfaction in the competence condition to all other conditions (i.e., the ratings of competence in all conditions where competence was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the competence condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing the competence score in the competence condition (M = 3.53, SD = 0.51) to the other conditions (M = 3.52, SD = 0.51) did not reveal any significant differences; $F(1, 347) = .008$, $p = .927$ (See Table 2).

To test H1b, a second planned contrast ANCOVA was conducted to compare relatedness need satisfaction in the relatedness condition to all other conditions (i.e., the ratings of relatedness in all conditions where relatedness was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the relatedness condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing the relatedness score in the relatedness condition (M = 3.46, SD = 0.62) to the other conditions (M = 3.53, SD = 0.49) did not

reveal any significant differences; $F(1, 347) = 1.586$, $p = .211$ (See Table 2). Due to the lack of significant findings, H1 is not supported.

Table 2.
Means and Standard Deviations for Intuition Competence Need Satisfaction.

Need Satisfaction Score	Care condition	Loyal condition	Hed/power condition	Competence condition	Relatedness condition	Average when not emphasized
Competence	3.51 (0.53)	3.53 (0.48)	3.57 (0.46)	3.53 (0.51)	3.47 (0.61)	3.52 (0.51)
Relatedness	3.52 (0.54)	3.50 (0.48)	3.59 (0.39)	3.50 (0.54)	3.46 (0.62)	3.53 (0.49)

Note. Standard deviations are located in parentheses.

To test H2a, the effect of exposure to the competence comic condition on story enjoyment, a planned contrast ANCOVA was conducted to compare story enjoyment in the competence condition to all other conditions (i.e., the ratings of story enjoyment in all conditions where competence was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the competence condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing the competence score in the competence condition ($M = 4.41$, $SD = 0.69$) to the other conditions ($M = 4.35$, $SD = 0.72$) did not reveal any significant differences; $F(1, 347) = .063$, $p = .802$ (See Table 3).

H2b was tested with a second planned contrast ANCOVA, which compared story enjoyment in the relatedness comic condition to all other conditions (i.e., the ratings of story enjoyment in all conditions where relatedness was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the relatedness condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing story enjoyment scores in the relatedness condition ($M = 4.36$, $SD = 0.74$) to the other conditions ($M = 4.36$, $SD = 0.74$) did not

reveal any significant differences; $F(1, 347) = 1.586$, $p = .211$ (See Table 3). Due to the lack of significant findings, H2 is not supported.

Table 3.
Means and Standard Deviations for Story Enjoyment by Condition.

	Care	Loyal	Hed/ power	Competence	Relatedness	Average when Competence not emphasize	Average when Relatedness not emphasize
Story Enjoy-ment	4.43 (0.73)	4.14 (0.87)	4.45 (0.68)	**4.41^{A} (0.69)**	**4.44^{a} (0.60)**	4.36^{A} (0.74)	4.36^{a} (0.74)

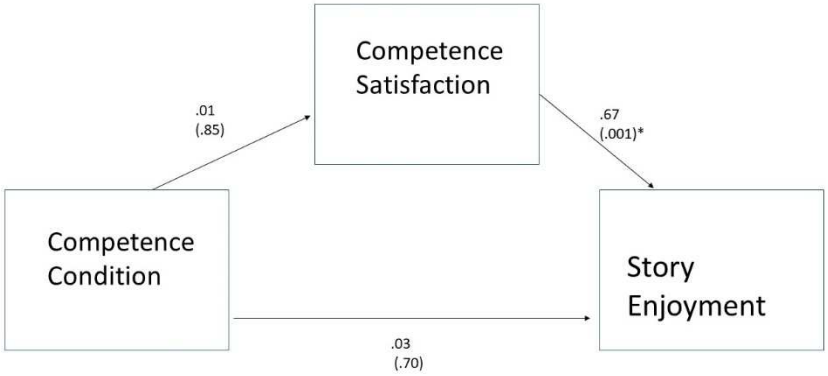
Note. Scores for emphasized intuitions are in bold. Standard deviations appear in parentheses. Comparisons are horizontal (comparing only the emphasized condition with the average when not emphasized). Scores with upper case superscripts and scores containing lower-case superscripts are compared in analyses. Different upper-case or different lower-case superscripts indicate statistical significance at $p < .05$. No significant differences were observed.

The present study proposed two models predicting that the effect of reading a comic book exemplifying a specific SDT need (i.e., competence, relatedness) on story enjoyment would be mediated by the extent to which the participant experiences satisfaction of the exemplified SDT need. To test these hypotheses, two simple mediation models were created for each SDT need condition: one for competence and one for relatedness. In each model, comic book condition was included as the exogenous variable, with the relevant condition (i.e., competence comic book in one model and relatedness comic book in the other) dummy coded as 1 and all other comic book conditions coded as 0. Participant SDT need satisfaction score was entered as the mediator variable, and the story enjoyment score was the outcome variable. Analyses were carried out using AMOS.

The first model tested H3, which examined the effect of the competence comic book on story enjoyment. Results of the path model for competence effect on story enjoyment can be seen in Figure 1. The model does not show a good fit: $\chi 2$ (2) = 92.127, $p < .001$, *CFI* = .986, *TLI* =

.712, *RMSEA* = .201, 95% CI [-.078, .094] though participant scores on competence need satisfaction positively predicted story enjoyment. However, exposure to the competence comic book condition did not predict increased competence need satisfaction and neither did the direct effect of the competence condition on story enjoyment. As such, the model does not support H3.

Figure 1.
Results of Competence Mediation on Story Enjoyment in Amos.



*Note. p-values are located in parentheses. ** indicates statistical significance at p < .01 level.*

The second model tested H4, which examined the effect of the relatedness comic book on story enjoyment. Results of the path model associated with this can be seen in Figure 2. The model does not have satisfactory fit: $\chi 2$ (2) = 67.532, $p < .001$, *CFI* = 1.00, *TLI* = .944, *RMSEA* = .170, 95% CI [-.134, .050], though participant scores on relatedness need satisfaction positively predicted story enjoyment. Once again, however, exposure to the relevant media (the relatedness comic book condition in this case) did not predict increased relatedness need satisfaction and neither did the direct effect of the relatedness condition on story enjoyment. Participants in the relatedness condition did not show an increase likelihood of increased relatedness need satisfaction. Therefore, the model does not support the hypothesis.

Figure 2.
Results of Relatedness Mediation on Story Enjoyment in Amos.

*Note. p-values are located in parentheses. ** indicates statistical significance at p < .01 level.*

H5a and H5b proposed reading a comic book exemplifying a specific SDT need (i.e., competence, relatedness) would increase participant well-being. To test H5a, a planned contrast ANCOVA compared positive well-being in the competence condition to all other conditions (i.e., the ratings of positive well-being in all conditions where competence was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the competence condition, and contrast scores of -1 were given to each of the remaining cells. The results of the contrast analyses comparing the positive well-being scores in the competence condition to the other conditions showed that the positive well-being score was significantly higher when competence was exemplified (M = 4.42, SD = 0.92) than when any other intuition was exemplified (M = 3.86, SD = 1.03), $F(1, 347)$ = 9.00, p = .003, $\eta 2$ = .08 (See Table 4).

Table 4.
Means and Standard Deviations for Positive Well-Being by Condition.

	Care	Loyal	Hed/ power	Competence	Relatedness	Average when Competence not emphasized	Average when Relatedness not emphasized
Positive Well-being	3.55 (1.21)	3.81 (0.99)	4.07 (0.97)	**4.22^{B} (0.92)**	4.09^{a} (0.94)	**3.86 ^{A} (1.05)**	3.92 ^{a} (1.05)

Note. Scores for emphasized intuitions are in bold. Standard deviations appear in parentheses. Comparisons are horizontal (comparing only the emphasized condition with the average when not emphasized). Scores with upper case superscripts and scores containing lower-case superscripts are compared in analyses. Different upper-case or different lower-case superscripts indicate statistical significance at $p < .05$.

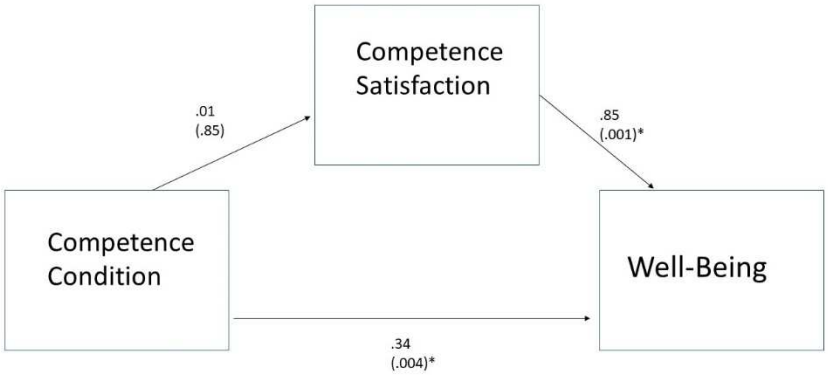
To test H5b, a planned contrast ANCOVA compared positive well-being in the relatedness condition to all other conditions (i.e., the ratings of positive well-being in all conditions where relatedness was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the relatedness condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing the positive well-being score in the relatedness condition (M = 4.09, SD = 0.94) to the other conditions (M = 3.92, SD = 1.05) did not reveal any significant differences; $F(1, 347) = 1.114$, $p = .292$ (See Table 4). Based on the findings above, H5a is supported, while H5b is not supported.

H6a and H6b proposed mediation models predicting that the effect of reading a comic book exemplifying a specific SDT need (i.e., competence, relatedness) on participant well-being would be mediated by the extent to which participants experience satisfaction of the exemplified SDT need. To test these hypotheses, two simple mediation models were created for each SDT need condition: one for competence and one for relatedness. In each model, comic book condition was included as the exogenous variable, with the relevant condition (i.e., competence

comic book in one model and relatedness comic book in the other) dummy coded as 1 and all other comic book conditions coded as 0. Participant SDT need satisfaction score was entered as the mediator variable, and the participant well-being score was the outcome variable. Analyses were carried out using AMOS.

H6a examined whether competence need satisfaction mediated the comic book's effect well-being. Results of the path model associated with this can be seen in Figure 3. The model did not have good fit: χ^2 (2) = 26.81, $p < .001$, *CFI* = .979, *TLI* = .862, *RMSEA* = .269 95% CI [-.093, .111). Exposure to the competence comic book did not predict increased competence need satisfaction. However, participant scores on competence need satisfaction were related to participant well-being, as was the direct effect of the competence condition to feelings of well-being. Therefore, the model does not support H6a.

Figure 3.
Results of Competence Mediation on Well-Being in Amos.

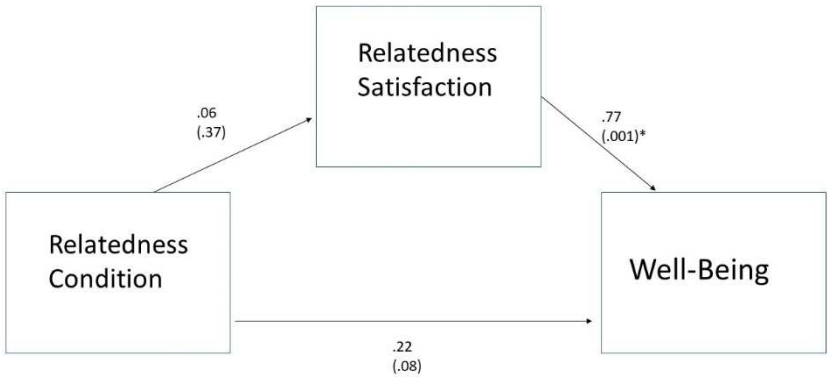


*Note. p-values are located in parentheses. ** indicates statistical significance at p < .01 level.*

H6b examined whether relatedness need satisfaction mediated the comic book's effect on participant well-being. Results of the path model associated with this can be seen in Figure 4. The model did not have a satisfactory fit: χ^2 (2) = 19.58, $p < .001$, *CFI* = .986, *TLI* = .943, *RMSEA* = .230, 95% CI [-.187, .062]. Additionally, exposure to the relatedness comic book did not predict increased relatedness need satisfaction and neither did it predict participant well-

being. Relatedness need satisfaction was shown to predict to participant well-being. Nevertheless, the model does not support H6b.

Figure 4.
Results of Relatedness Mediation on Well-Being in Amos.



*Note. p-values are located in parentheses. ** indicates statistical significance at p < .01 level.*

RQ1a and RQ1b asked whether reading a comic book exemplifying a specific SDT need (i.e., competence, relatedness) would affect a preadolescent observer's prosocial behavior. Two planned contrast ANCOVAs[1] were conducted to answer these questions. The first planned contrast ANCOVA compared prosocial behavior in the competence condition to all other conditions (i.e., the ratings of prosocial behavior in all conditions where competence was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the competence condition, and contrast scores of -1 were given to each of the remaining cells. The results of the contrast analyses comparing the prosocial behavior scores in the competence condition to the other conditions showed that the prosocial behavior score was significantly higher when competence was exemplified (M = 15.82, SD = 3.24) than when any other intuition was exemplified (M = 14.58, SD = 3.24), $F(1, 347) = 5.031$, $p = .026$, $\eta 2 = .10$ (See Table 5). The results suggest that reading a comic book exemplifying competence need satisfaction increased prosocial behavior.

Table 5.
Means and Standard Deviations for Prosocial Behavior by Condition.

Condition	Care	Loyal	Hedonism/ Power	Competent	Related	Average when Competent not emphasized	Average when Related not emphasized
Prosocial Behavior	14.45 (4.55)	14.00 (5.07)	14.88 (3.01)	**15.82** ^{A} **(3.24)**	15.12 ^{a} (4.61)	**14.58** ^{B} **(3.24)**	14.79 ^{a} (4.13)

Note. Scores for emphasized intuitions are in bold. Standard deviations appear in parentheses. Comparisons are horizontal (comparing only the emphasized condition with the average when not emphasized). Scores with upper case superscripts and scores containing lower-case superscripts are compared in analyses. Different upper-case or different lower-case superscripts indicate statistical significance at $p < .05$.

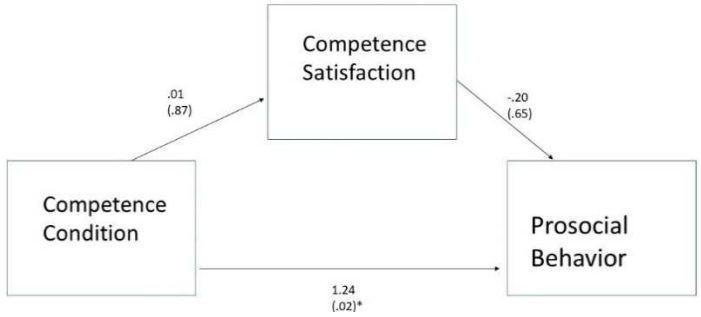
The second planned contrast ANCOVA compared prosocial behavior in the relatedness condition to all other conditions (i.e., the ratings of prosocial behavior in all conditions where relatedness was not exemplified), while controlling for character liking. To create the contrast ANCOVA, a contrast score of +4 was given to the cell corresponding with the relatedness condition, and contrast scores of -1 were given to each of the remaining cells. Results of the contrast analysis comparing the prosocial behavior score in the relatedness condition ($M = 15.12$, $SD = 4.61$) to the other conditions ($M = 14.79$, $SD = 4.13$) did not reveal any significant differences; $F(1, 347) = .340$, $p = .560$ (See Table 5). The results fail to suggest that reading a comic book exemplifying relatedness need satisfaction can increase prosocial behavior.

RQ2a and RQ2b asked whether the ability of a comic book exemplifying a specific SDT need (i.e., competence, relatedness) to affect a preadolescent observer's prosocial behavior would be mediated by the observer's SDT need satisfaction. To test these research questions, two simple mediation models were created for each SDT need condition: one for competence and one for relatedness. In each model, comic book condition was included as the exogenous variable with the relevant condition (i.e., competence comic book in one model and relatedness comic book in the other) dummy coded as 1 and all other comic book conditions coded as 0. Participant

SDT need satisfaction score was entered as the mediator variable, and the participant prosocial behavior score was the outcome variable. Analyses were carried out using AMOS.

RQ2a examined whether competence need satisfaction mediates the effect of a comic book exemplifying competence needs on a preadolescent observer's prosocial behavior. Results of the path model associated with this can be seen in Figure 5. The model did not have good fit: $\chi 2$ (2) = 5.510, p = .138, *CFI* = 1.00, *TLI* = .99, *RMSEA* = .049, 95% CI [-.091, .048]. Exposure to the competence comic book did not predict increased competence need satisfaction. Moreover, competence need satisfaction predicted decreased prosocial behavior. Exposure to the competence comic book was shown to predict prosocial behavior. Nevertheless, the results fail to suggest that competence need satisfaction mediates the effect of reading a comic book exemplifying competence need satisfaction on a preadolescent observer's prosocial behavior

Figure 5.
Results of Competence Mediation on Prosocial Behavior in Amos.



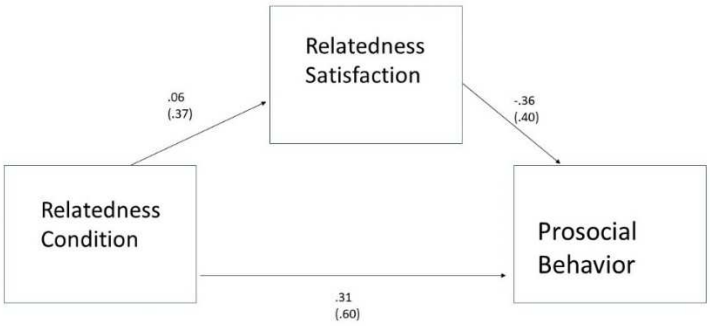
*Note. p-values are located in parentheses. ** indicates statistical significance at p < .01 level.*

RQ2b examined whether relatedness need satisfaction mediates the effect of a comic book exemplifying relatedness needs satisfaction on a preadolescent observer's prosocial behavior. Results of the path model associated with this can be seen in Figure 6. The model did have good fit: $\chi 2$ *(2) = 1.815, p = .612, CFI = 1.00, TLI = 1.01, RMSEA = .000,* 95% CI [-.031, .225]. However, exposure to the relatedness comic book did not predict increased relatedness need satisfaction. Moreover, participant scores on relatedness need satisfaction were unrelated to

participant prosocial behavior. Therefore, the results fail to suggest that relatedness need satisfaction mediates the effect of reading a comic book exemplifying relatedness need satisfaction on prosocial behavior.

Figure 6.

Results of Relatedness Mediation on Prosocial Behavior in Amos.



Note: *p*-values are located in parentheses. ** indicates statistical significance at $p < .01$ level.

DISCUSSION

An experiment exposed preadolescents to one of five comic book conditions emphasizing the satisfaction of different psychological needs (i.e., competence, relatedness, care, ingroup loyalty, and hedonism/power). Exposure's effect was examined to address two questions: First, whether narratives that emphasize a protagonist's egoistic-need satisfaction could vicariously satisfy the emphasized egoistic needs in preadolescents. Second, whether the vicarious satisfaction of the needs portrayed (competence and relatedness in this case) could mediate narrative media's effect on story enjoyment, feelings of well-being, and the prosocial behavior of preadolescent audiences. As part of this second question, this study also examined the direct effect of narratives that emphasize a protagonist's egoistic-need satisfaction on story enjoyment, feelings of well-being, and the prosocial behavior of preadolescent audiences.

In doing this, the investigation aimed to determine both direct effect of a protagonist egoistic-need satisfying narrative on SDT need satisfaction and this need satisfaction's resulting effect on a set of related outcomes. The effort to examine protagonist egoistic-need satisfying narrative's direct effect sought to extend prior research identifying non-media experiences (i.e., social interaction experience with parents, schools, and peers) capable of affecting SDT need satisfaction. Interest in a protagonist egoistic-need satisfying narrative's ability to shape other outcomes through these needs built on work identifying preadolescent SDT need satisfaction as an important factor in psychological well-being (Ryan & Deci, 2000; Lynch & Salikhova, 2016). The current study examined the protagonist egoistic-need satisfying narrative's potential to stimulate the influence of SDT need satisfaction on well-being, along with outcomes related to a narrative's appeal and its ability to impact prosocial behavior.

Although findings fail to provide support for either a protagonist egoistic-need satisfying narrative's direct effect on SDT need satisfaction or its indirect effect on different outcomes through need satisfaction, direct effects were observed on feelings of well-being and prosocial behavior. Discussion begins by examining this study's findings, along with their practical and theoretical contributions to research on children and media. Following this, several study limitations are identified and directions for future research are reviewed.

Narrative Media's Vicarious Influence on SDT Need Satisfaction

The study's findings failed to show that exposure to media emphasizing the satisfaction of a liked character's competence and relatedness needs would vicariously satisfy similar SDT needs in preadolescents. The most parsimonious explanation for these findings is that seeing a narrative character's SDT needs satisfied does not vicariously satisfy similar needs in a preadolescent. However, an alternative hypothesis also seems plausible. These interpretations are discussed in turn.

The first explanation suggests that viewing narrative characters have their SDT needs fulfilled does not satisfy these needs in adolescent observers. Perhaps affecting SDT need satisfaction is not as simple as highlighting the intuition throughout a narrative. Given this study's understanding of competence and relatedness needs as egoistic drives, their satisfaction might depend on one feeling personally involved. As such, it may be necessary for individuals to directly satisfy these needs for themselves, or to identify so strongly with the character experiencing the need satisfaction that one feels as though the experience is happening to themself. Relatedly, it may be that the satisfaction of competence and relatedness needs is particularly difficult to express in narrative content, making it difficult for an observer to vicariously experience their satisfaction. Although the effect of narrative stimuli highlighting

altruistic needs such as care and ingroup loyalty has been examined in previous preadolescent observer research (Aley et al., 2019; Hahn et al., 2021), the current study is the first to highlight the satisfaction of competence and relatedness. As such, it is unclear how stimuli emphasizing the satisfaction of these egoistic needs is received by preadolescents.

The alternative explanation is that a ceiling effect might have hindered this study's ability to observe exposure's influence on the satisfaction of competence and relatedness in participants. An unexpectedly high level of competence and relatedness need satisfaction was observed across all conditions, suggesting that the stimuli used in this study increased competence and relatedness need satisfaction for all participants. Prompted by awareness of these high levels, inspection of the stimuli for possible causes suggested that content cues related to competence and relatedness might have been unintentionally included in all conditions. Specifically, pertaining to competence, Cleo always completed her assigned mission, regardless of the intuitive need being highlighted in the narrative. Additionally, pertaining to relatedness, the narrative always ended with Cleo flying off into space with her best friend, Akila. Regardless of her decision concerning the key, Cleo always had the support of her friend in the end. Potentially, these narrative features led participants to experience heightened levels of competence and relatedness need satisfaction across all conditions to experience. Possible evidence of this can be seen in mean scores of 3.45 or above (on a four-point scale) across all conditions for both competence and relatedness need satisfaction.

Though it could be argued that preadolescents always report high levels of SDT need satisfaction, such heightened scores have not been found in previous research on preadolescents. Though not specifically designed to pilot test measures used in the current study, Aley and Aladé (2021) conducted survey research to examine the reliability of the CINSS in a population of

preadolescents. Their study used social media to recruit 219 participants (50.5% male, mean age 9.77, *SD*= 1.35). Participants in this study responded to the CINSS measure without prior exposure to any stimuli, thus providing a baseline for comparison with the findings of the current study. A comparison of findings from the two studies showed that preadolescents in the current study (who experienced prior exposure to narrative stimuli) scored higher on competence and relatedness satisfaction than those in the study by Aley and Aladé (who experienced no prior exposure). On competence need satisfaction, an independent samples *t*-test showed that participants who viewed the comic stimulus ($M = 3.52$, $SD = 0.52$) scored significantly higher than those who received no stimulus ($M = 3.00$, $SD = 0.55$); $t(577) = 11.57$, $p = .00$, Cohen's $d = 0.991$. Mirroring these findings for relatedness need satisfaction, participants who viewed the comic stimulus ($M = 3.52$, $SD = 0.52$) scored significantly higher than those who received no stimulus ($M = 3.05$, $SD = 0.59$); $t(577) = 9.92$, $p = .00$, Cohen's $d = 0.34$. Taken together, these findings are consistent with the contention that exposure to narrative cues included unintentionally in all experimental condition may have elevated a participant's competence and relatedness need satisfaction to a point where the hypothesized effect of the intended competence and relatedness inductions could not be ascertained.

Need Satisfaction's Ability to Mediate a Narrative's Effect on Several Outcomes

The current study's inability to demonstrate a direct effect of exposure to media emphasizing the satisfaction of competence and relatedness needs on the satisfaction of these needs in adolescent observers precludes its potential to demonstrate any of the hypothesized mediation effects. For each of the hypothesized mediation models (i.e., on outcomes related to story enjoyment, participant well-being, prosocial behavior), the ability of a narrative highlighting competence or relatedness needs to increase satisfaction of those needs in observers

was a requisite. In line with this, all mediation models failed. Implications of this finding are discussed below.

Protagonist SDT Need Satisfaction and Story Enjoyment

The study predicted that preadolescents viewing a story featuring the satisfaction of a liked character's competence or relatedness needs would enjoy the story more than preadolescents not exposed to a story satisfying those needs. This prediction was not supported by the study's findings. Similar to the findings on SDT need satisfaction, story enjoyment for participants was relatively high across all conditions, making it difficult to observe differences in liking due to variance in the story's emphasis on the satisfaction of competence or relatedness needs. Likewise, the potential that competence and relatedness need satisfaction cues might have inadvertently resided in all conditions would hinder efforts to observe differences in liking due to variance in the story's emphasis on the satisfaction of these needs.

The modified affective disposition model (MADM; Tamborini, Grizzard et al., 2021) suggests that media enjoyment is facilitated by story outcomes that vicariously satisfy the egoistic needs highlighted in a narrative. Though little research has directly examined the potential for media viewing to vicariously satisfy SDT needs, the stimuli limitations of the current study impede full examination of this claim. If every condition showed the satisfaction of competence and relatedness, the MADM would predict that participants should enjoy the story equally across all conditions. Future research could overcome this problem with stimuli manipulating whether a liked character's SDT needs were satisfied or thwarted.

Protagonist SDT Need Satisfaction and Well-Being

In addition to examining the influence of a character's SDT need satisfaction on story enjoyment, the current study also examined its influence on participant well-being. Research on

SDT suggests that the satisfaction of these needs can increase ratings of participant overall well-being, both in children and adults (Baard, 2002; Deci et al., 2001). The current study found that participants who viewed a narrative in which the main character had their competence needs satisfied in the conclusion reported higher positive affect than participants in any other condition. The fact that media exposure was shown to influence positive affect (i.e., positive well-being) but not the vicarious satisfaction of SDT needs challenges the mediation model predicted in this study. Observing change in the exogenous variable but not the mediator shows a direct effect calling for a different explanation than the vicarious experience hypothesized.

One possible explanation comes from research on affective disposition theory (ADT; Zillmann & Cantor, 1976), which holds simply that viewers like to see "good things" happen to good people. In the stimulus, Cleo was shown having her competence needs satisfied, which can be understood as a good thing. This understanding is consistent with the MADM (Tamborini, Grizzard et al., 2021), which specifically defines the "good things" that happen to good people in terms the satisfaction of a liked character's competence or other egoistic needs. In line with ADT, participants should like seeing Cleo have her competence needs satisfied, which may have led them to feel more positive affect (the current study's measure of well-being) after story exposure even if their own competence needs were not satisfied.

One caveat that should be offered with this account is the failure to find an effect of condition on story enjoyment. If participants liked seeing Cleo's competence needs satisfied, and this increased their positive affect, we might have expected to see an increase in story enjoyment scores. Though narrative research argues audiences can like but not enjoy stories like this, where protagonists must choose between conflicting intuitions (Tamborini, Grady et al. 2021), this account would have been strengthened by seeing an effect on story enjoyment scores.

Notably, satisfaction of the viewer's own competence need seems unnecessary for a narrative to cause an audience's positive affect to increase, as is indicated by the insignificant paths in the mediation model. This might indicate that seeing a narrative character's SDT needs satisfied increases the salience of these needs rather than vicariously satisfying them. Of course, while the findings of the current study did not show differences in the vicarious satisfaction of SDT needs, it does not negate the possibility that media has this ability. It is plausible that for vicarious need satisfaction to occur, the audience must be highly involved with the narrative, such as a sporting event, viewing a favorite character, or media with high emotion (i.e., horror, dramas, romance). It may be that a simple comic book does not generate the level of engagement needed to influence vicarious need satisfaction. Additional research is needed to fully examine narrative media's ability to affect vicarious need satisfaction.

No matter its cause, the fact that simply seeing a narrative character's SDT needs satisfied might increase positive affect has important implications. Though prior research shows that behavior satisfying one's SDT needs can increase an individual's feelings of well-being, the current study suggests that these feelings can be produced by simply observing a narrative character satisfy those needs. Not every child or adolescent has direct access to patrons known to generate feelings of well-being (i.e., parents, teachers, peers). As such, the potential for media to produce similar outcomes offers promise for these children, and a rational to continue examining the role of media in well-being outcomes.

If future evidence corroborates the findings observed here, the potential benefits in this area seem considerable. Studies show the prevalence of SDT needs in popular children's media, including songs (Hahn et al., 2019), books (Tamborini et al., 2020), television (Aley et al., 2021), and movies (Tamborini, Grizzard et al., 2021). Given the frequency with which media highlights

the satisfaction of a character's SDT needs, the availability of potentially beneficial content seems pervasive. Such potential gives reason for research examining how a single or repeated exposure to this narrative content can affect both the short-lived and chronic feelings of well-begin in children and preadolescents.

In this research, it is important to consider that while SDT scholars examine several definitions of well-being (see Dodge et al., 2012), the findings of the present study refer specifically to positive affect, which is only one part of an individual's well-being. As such, though evidence here supports the belief that media showing a character's SDT needs satisfied can increase positive affect, this study provides no evidence related to claims about other dimensions of well-being. Additional research is needed to determine whether media portrayals of SDT need satisfaction can influence other dimensions of well-being (i.e., higher life satisfaction, increased self-efficacy, lower depression, lower anxiety).

Protagonist SDT Need Satisfaction and Prosocial Behavior

Beyond the ability of SDT need satisfaction to increase an individual's feeling of well-being, research has explored need satisfaction's effect on prosocial behavior. Studies support claims that performing prosocial behaviors is itself need satisfying (Weinstein & Ryan, 2010), which in turn increases feelings of well-being (Martela & Ryan, 2016). However, little research has considered whether exposure to a narrative character's SDT need satisfaction can influence a viewer's future prosocial behavior. The current study begins to fill this gap. Its findings suggest that observing a character's competence needs satisfied can increase prosocial behavior.

One explanation for this considers the influence of SDT need satisfaction on altruistic motivations. Though not tested in the current study, the findings here are consistent with contentions that the satisfaction of an individual's SDT needs affects prosocial behavior by

saving energy (Sheldon & Gunz, 2009). Ostensibly, satisfying SDT needs reduces the energy required to manage those needs, allowing one to focus that energy elsewhere, such as performing prosocial behaviors.

Another potential explanation is that SDT need satisfaction increases prosocial behavior through its influence on positive affect. As noted above, participants in the competence condition scored higher on positive affect, as well as prosocial behavior. It stands to reason that people are more prosocial when they are in a good mood. This might coincide with the prior energy saving explanation, suggesting that positive affect is also associated with a reduced energy need. However, beyond simply providing energy for use anywhere else, positive affect might direct that energy toward positive actions, such as prosocial behaviors. Future research is needed to fully understand the mechanisms guiding the influence of a protagonist's SDT need satisfaction on prosocial behavior.

Theoretical and Applied Contributions

Although the major hypotheses tested in this investigation were unsupported, the findings of the current study have implications for several theoretical and applied issues. First, the current study showed the potential for narratives showing SDT need satisfaction to produce positive outcomes, such as feelings of well-being and prosocial behavior. Research on children and media often focuses on the negative outcomes associated with media, such as aggression (Bushman & Anderson, 2009), stereotypes (Ward & Grower, 2020), substance abuse (Dalton et al., 2003), poor academic performance (Cummings & Vandewater, 2007), or attention issues (Christakis et al. 2004). Though these outcomes should not be ignored, the current study showed the ability of media exposure to have positive outcomes.

Preadolescents who viewed a character's competence needs being satisfied not only experienced greater feelings of well-being but were more likely to behave in a prosocial manner, as measured by sharing in the current study. Previous research has demonstrated the ability for media highlighting a moral intuition to increase prosocial behavior and examined the MIME-based theoretical mechanisms through which this might occur (Hahn et al., 2019). The current study builds on this research by showing ability of media highlighting an egoistic or self-serving motivation to also increase a viewer's subsequent prosocial behavior but failed to provide evidence supporting its hypotheses that these outcomes might be explained through mechanisms of vicarious need satisfaction. This raises questions about whether the effects observed in this study might be explained by mechanisms similar to those found in Hahn et al.'s (2019) previous MIME-based research.

In that research, prosocial behavior was accounted for by priming and salience mechanisms associated with exposure to narratives showing altruistic need satisfaction. This raises questions regarding the possibility that the feelings of well-being and prosocial behavior observed in the current study might be explained by similar mechanisms associated with exposure to narratives showing egoistic/SDT need satisfaction. Future research on child populations is needed to examine this and other mechanisms that might account for narrative media's potential to produce the positive outcomes observed here, as well as their matching negative consequences.

A second contribution stems from the successful use of the moral measure of intuitively motivated behavior (M-MIMB) in an online study. Hahn et al. (2019) developed the M-MIMB to measure specific moral intuitions believed to motivate those behaviors. The M-MIMB is a technique for assessing a child's moral decision-making process. Not only does the M-MIMB

allow simultaneous examination of several moral motivations (i.e., care, fairness, ingroup loyalty, and authority), it increases our understanding of the factors influencing how a child responds to seeing decisions made by narrative characters faced with a moral dilemma.

Though Hahn et al. (2019) showed this measure's utility with a child population, the measure had only been used previously in an in-person data collection setting. The current study adapted the procedures developed by Hahn et al. (2019) but for an online study in ways that offer several benefits to an in-person data collection. First, the online M-MIMB continuously showed participants how many tokens they were sharing with each individual, while the in-person measure required them to remember this as they proceeded to share with others. Second, all participant responses were stored within the Qualtrics system, eliminating data entry concerns associated with human coding errors in the face-to-face protocol. Third, the online nature of the study allowed for a large sample to be gathered in a short amount of time. This sampling technique also made reaching a diverse sample more practical than a regional in person data collection.

The successful adaptation of this tool also brings to online settings several measurement advantages introduced by the M-MIMB. Most previous prosocial behavior measures use questionnaires or interviews to assess the behavioral intention of participant's when faced with a hypothetical moral dilemma (e.g., Krcmar & Cooke, 2001; Krcmar & Curtis, 2003; Mares & Braun, 2013; Martins & Wilson, 2012). The M-MIMB places participants in situations that allow researchers to observe the actual behavior of the participant. Additionally, the M-MIMB allows researchers to simultaneously assess four different dimensions of prosocial behavior in a single test. Participants can share with different targets in ways demonstrating care, fairness, in-group loyalty, or respect for authority. Alternatively, participants can choose to not share at all,

demonstrating egoistic or antisocial behavior. Through these affordances, the M-MIMB can help identify a specific underlying motivation (or cause) of a participant's prosocial behavior.

A third contribution stems from an addition to the CINSS. While the original scale measures satisfaction received from school, peer, and parental sources, the current study adds items measuring a general feeling of need satisfaction. The three original sources examined in the CINSS (i.e., parents, teachers, peers) all refer to active support by an outside provider that fosters a child's need satisfaction (Joussemet et al., 2008; Ryan et al., 2006). Since not every child has access to these external sources, understanding whether children are otherwise capable of satisfying their own SDT needs provides useful information. The current study's addition of a personal need satisfaction source to measure general feelings of need satisfaction provides adds this information to the original CINSS scale. Use of the personal need satisfaction measure should benefit future SDT research by ensuring all aspects of need satisfaction are being examined. Importantly, the personal subscale had satisfactory reliability.

Finally, the current study provides practical benefits for those most concerned with children's media use, such as caretakers and educators. The findings suggest that the portrayal of SDT need satisfaction, particularly competence needs, can increase a child's feeling of well-being and prosocial behavior. For caretakers and educators wanting to promote these feelings and behaviors in children, the findings provide a roadmap for creating a media diet that can facilitate these outcomes. The only thing needed is a program guide to tell users which programs show the satisfaction of a character's competence need or other SDT needs.

Notably, the satisfaction of self-serving needs like competence and relatedness are often represented as less socially desirable than altruistic intuitions. However, research from positive psychology suggests SDT need satisfaction is an essential component for a child's socio-

emotional development (Deci & Ryan, 1985), questioning the utility of uniformly representing self-serving needs as socially less desirable. For instance, research shows that the satisfaction of competence needs is associated with a person's desire to succeed (Ryan & Deci, 2000). Narratives might reflect this in messages that portray a character's egoistic need satisfaction more positively. In research examining a media character's SDT need satisfaction, Eden et al. (2015) found that the satisfaction of self-serving needs was associated with the character's personal growth or personal well-being. For example, in the movie Aladdin, the main character is depicted with the desire for wealth and power throughout the film. However, in the story's climax Aladdin chooses to satisfy relatedness needs (by freeing his friend the Genie), instead of wishing for wealth and power. This evidence of the character's personal growth is then rewarded with the power and wealth he desired.

Limitations

As with any study, several limitations associated with the current study should be considered. The first concern is that the stimuli used in the current study may have hampered rigorous examination of media's ability to increase competence and relatedness satisfaction in a viewer. If the stimuli elevated feelings of competence and relatedness across all conditions, the ability of need satisfaction to mediate exposure's effect on other outcomes would be difficult to detect. However, the findings' suggestion that viewing a character having their competence needs satisfied can directly lead to higher levels of prosocial behavior is important in itself. Future research is needed to determine whether the type of effect observed in this study is indicative of media's ability to vicariously satisfy SDT needs and subsequently lead to prosocial behaviors; or alternatively, whether the effect observed here can occur without an observer vicariously experiencing need satisfaction.

Second, the decision to utilize an online data collection may have impacted the current study's findings in several ways. One issue of online data collection is the researcher's lack of control over the selection of the participants. A reputable survey data organization was used for the collection of the data. Nevertheless, the issue remains a concern. A second issue is the potential for parents to take a more active part in an online study than a traditional lab setting. Though parents were asked to offer assistance *only* if necessary, it is possible that parents advised their child throughout the study. A third issue is the lack of control over the environment in which exposure occurs. Though the ideal setting would be a quiet area with no distractions, this is not guaranteed in an online study. It is possible that the participants could be distracted while viewing the comic video.

At the same time, though online studies may have limitations, its benefits may outweigh these concerns. While pandemics like COVID-19 can limit data collection in lab settings, online studies allow researchers to continue gathering data throughout such challenging times. An additional benefit to online data collection is its ability to reach a more diverse population. Previous in-person research by Hahn et al. (2021) and Aley et al. (2019) were regionally based studies with more limited sample diversity. The online study used here provided a unique opportunity to examine similar processes with a sample spanning the United States. Finally, the current study was able to take the protocol used in previous face-to-face SDT research and adapt it for online use. This showed the potential for the online application of measures designed for use with preadolescents, such as the CINSS or M-MIMB. In doing so, it offers evidence supporting the use of these measures in different settings.

The third limitation is the current study's lack of a baseline SDT need-satisfaction measure. Potentially, systematic differences in trait SDT need satisfaction across children from

various backgrounds could have attenuated the findings in this study. For example, group differences in trait need satisfaction along one or more of the SDT needs may strengthen attention to certain needs among some individuals and reduce attention among others. The decision to not include a baseline measure was a practical one based on the possibility of losing a participant's attention in a lengthy online study. This concern is increased with a child population. Future research should include a baseline measure to examine how a child's trait SDT need satisfaction might influence media's ability to increase these needs.

Related to this, a fourth concern is the potential for participant fatigue due to the survey's length. Though random assignment was used to ensure no one measure was always viewed last, the length of the study may have caused some participants to lose focus or interest in the survey. Future research should develop procedures capable of measuring necessary outcomes while remaining brief enough to limit participant fatigue.

The final limitation is the exclusion of participants who reported not paying close attention to the stimulus. As attention was found to influence participant responses in previous research (Hahn et al. 2021), participants reporting less than high levels of attention were removed from the analysis in the present study. It is possible that the results observed in the current study were attenuated by the removal of participants who reported not paying attention. A closer look at the current data revealed that participants who reported paying high levels of attention score significantly higher on Story Enjoyment, Character Liking, Competence Satisfaction, Relatedness Satisfaction, and Positive Well-Being (See Appendix E for results). The fact that stronger exposure effects were observed for children who reported paying attention suggests the importance of attention on receiving the benefit of media exposure. Not only did children who reported paying attention enjoy engaging with the media and characters, they also

reported feeling more competence, relatedness, and prosocial affect. Though logic suggests that at least a minimal level of attention is necessary to influence outcomes, future research is needed to fully understand how attention influences participant SDT need satisfaction.

Conclusion and Future Directions

Scholars have identified the satisfaction of SDT's egoistic needs as an important factor in an individual's development and overall well-being across the human lifespan (Ryan & Deci, 2000; Véronneau et al., 2005). Several sources for satisfying the SDT needs of a preadolescent child (i.e., parents, schools, peers) have been examined by scholars (Grolnick et al., 1997; Lenhart et al., 2010; Soenens et al., 2017; Vallerand et al., 1997). The current study attempted to examine narrative media as another source of SDT need satisfaction for preadolescent viewers. More specifically for these viewers, the current study attempted to examine (1) the effect of narratives that emphasize a protagonist's egoistic-need satisfaction on the vicarious satisfaction of the needs portrayed, (2) the ability of these narratives to directly affect three outcomes (story enjoyment, feelings of well-being, and the prosocial behavior), and (3) whether the vicarious satisfaction of the egoistic needs portrayed could mediate the effect of the protagonist need-satisfying narratives on the three different outcomes. Central in this regard were models predicting mediation.

Though findings did not align with the study's central mediation hypotheses, several important observations were made. First, high ratings on satisfaction of the egoistic SDT needs portrayed (competence and relatedness) across all conditions raise concerns about potential ceiling effects. These concerns give reason to continue examining the role of narrative media as a source of SDT need satisfaction.

Second, though providing no evidence that narratives can affect SDT need satisfaction in children, the findings are generally consistent with previous research showing that SDT need satisfaction can increase an individual's feelings of well-being (Baard, 2002; Deci et al., 2001). Using positive affect as a well-being measure, participants who viewed a character having their competence needs satisfied, reported higher positive affect than those in any other condition. Additional well-being measures should be used in future research to examine narrative media's ability to increase a viewer's overall well-being.

Finally, and most notably, the findings provide initial evidence that seeing a character's SDT needs satisfied can influence a viewer's feelings of well-being and prosocial behavior. The direct positive path from exposure to feelings of well-being and prosocial behavior for those in the competence need satisfaction condition show promise for future research. Viewing a character's competence needs satisfied increased both the positive affect and their sharing behaviors of participants over all other conditions. Though these finding offer initial evidence that exposure to narratives showing a character's SDT need satisfied can increase feelings of well-being and prosocial behavior, future research is needed to determine the strength of such content's influence on different dimensions of well-being and prosocial behaviors, the processes that underline these influences, and the factors that moderate these processes.

ENDNOTES

ENDNOTES

[1] Since count was used to assess participant sharing, additional analysis were conducted to account for problems associated with the use of a frequency measure in ANCOVA. Two Kruskal-Wallis tests were conducted to examine RQ1 and RQ2. Kruskal-Wallis did not show a significant difference between participants in the competence condition versus participants in all other conditions on measures of prosocial behavior, $H(1) = 3.493$, $p = .062$. Similarly, Kruskal-Wallis did not show a significant difference between participants in the relatedness condition versus participants in all other conditions on measures of prosocial behavior, $H(1) = 1.418$, $p = .234$.

APPENDICES

APPENDIX A: Plot Point Variations According to Condition.

Note. These variations are adopted from Hahn et al. (2017). For most plot points, condition differences exist only in keywords, while most of the text remains the same across all conditions. The main text for these scenes is presented under the descriptions of the plot points, and the condition key word differences are denoted by (A), (B), and (C) under the plot point description. The keywords that vary across conditions is located in the corresponding intuition columns.

Plot point 1:
Professor: "Throughout our history (A) has been key to all survival. Who can tell me why (B) is so important?"
Akila: "That's easy! (C) makes a stronger and happier society!"

Care	Ingroup Loyalty	Competence	Relatedness	Hedonism/ Power
(A) Supporting those in need (B) Giving aid (C) Supporting those in need	(A) Sticking together (B) Siding with your group (C) Siding with your group	(A) Being skillful and talented (B) Being skillful and talented (C) Being the best makes you feel stronger and happier	(A) Feeling like you belong (B) Feeling connected to others (C) Having close relationships makes you feel stronger and happier	(A) Seeking happiness (B) Following your dreams (C) Following your dreams makes a stronger and happier society

Plot Point 2:
Nebulans try to talk Cleo into giving them the key by saying:

Care	Ingroup Loyalty	Competence	Relatedness	Hedonism/ power
"Invaders **came and took everything we have**. They burned our homes and **left us with nothing**. Now our people are **homeless**, our children are **starving, and we have no money to buy food or**	"Don't **pretend to be our friend**. Humans and Nebulans have **never been friends**. So why should we think you are **different**? It is ours, not yours."	"The key… we want the key to the treasure! I've always **failed to get** that key. I need the key to show my people **that I can do anything** … **That I am the best**. If I take the key home, I will	"The key… we want the key to the treasure! I've been **apart from my people** for too long. I need the key to get back to Nebula **with my people**. If I take the key back, I will be **welcomed by everybody**. I want them to	"The key… we want the key to the treasure! I've looked for that key for years! It unlocks a vault filled with **riches beyond your wildest dreams**. You could never spend all the

shelter. The treasure is the only thing that can **save our people** now." "Please **save us** by giving us the key. Without the treasure it holds, **our people will die**. But you can **stop all our suffering**."	"If you are really are our **friend**, give us the key. If not, **you are our enemy** so we are against **you and your people**."	be treated like a **winner**. I want to show them that **I am successful**. So, give me the key!"	**accept and welcome** me. So, give me the key!"	**gold and diamonds**. I know what to do with it. So, give me the key!"

Plot point 3: Cleo thinks (A) when deciding what to do with the key, and then says/does (B):				
Care	**Ingroup Loyalty**	**Competence**	**Relatedness**	**Hedonism/ Power**
(A) "I suppose the Nebulans need it more than me and I **don't want anyone to suffer** just because I chose not to **aid** them. After all, **supporting those in need** creates a better world, and **without support, we'd all be sad**. I can make it to Helios another day. The Nebulans **need** this to **support** their injured. They should have it." (B) "I'm going to **support** you! Let me get the treasure for you. I'll **bring it back**	(A) "Their **species is scary**, and I can't imagine what they'd do with the power the treasure holds. No wonder people are **suspicious** of these guys. I **don't trust them**. **My people** would be in great danger if I gave them the key, so I must **side with my group**. After all, it's important to **stick with your group so they stick with you**. Let's try this…""	(A) "Do they really think I am going to give them the key? I can't. I have to prove that **I'm the best**. I need to show everybody that I can be a **winner**. I just can't give that up. Now how can I get away from the Nebulans? Let's try this..." (B) Cleo runs away with the key.	(A) "Do they really think I am going to give them the key? I can't. If I bring my key home, everybody will love me. I will belong more than ever. After all, feeling **close to others** is important. Now how can I get away from the Nebulans? Let's try this..." (B) Cleo runs away with the key.	(A) "It would be great to have that **treasure** for myself. I can already see me swimming on Helios in my new bikini! Do they really think I'm going to give the key to them? I can't! I have to travel the galaxy. It's what I was made to do, and it's what I've always **dreamed** of doing. I can't just give that up. Now how can I get away from the Nebulans? Let's try this…"

to assist you and your people!"	(B) Cleo runs away			(B) Cleo runs away with the key.

Plot point 4: Akila asks Cleo what happened and Cleo replies (A) and (B):				
Care	**Ingroup Loyalty**	**Competence**	**Relatedness**	**Hedonism/ Power**
A) "There's.. uh.. been a change in plans. I have to **give** the treasure to the Nebulans. It's the only way they'll survive. **They need me**" (B) "A wise woman once told me that **supporting those in need** is the most important thing in the world."	(A) "Yah, but those crazy creatures tried to get me to **abandon my group** and give them the key. We have to remain **devoted to our people**." (B) "And besides... a wise woman once told me that **siding with your group** is the most important thing in the world."	(A) "Yah … the Nebulans tried to make me look bad. But we are going to keep the treasure. **I am a winner**!" (B) "A wise woman once told me that **being the best** is the most important think in the world. **Winning** makes you feel stronger and better."	(A) "There's .. uh.. been a change in plans. We're going for the treasure and **everybody is going to like us**!" (B) "A wise woman once told me that **being close with others** is the most important thing in the world. When you are **connected to others**, you **feel like you belong** and feel better	(A) "There's .. uh.. been a change in plans. We're going for the treasure ourselves. (B) "And besides... a wise woman once told me that **following your dreams** is the most important thing in the world. I'm dreaming of bikinis and ocean waves in Helios!"

Appendix B: Scale Measures.

CINSS Scale

"Really false for me" (= 1), "Sort of false for me" (= 2), "Sort of true for me" (= 3) or "Very true of me" (= 4).

Competence (α =.902)

1. I feel I perform well at school. (School)
2. I feel that my teachers think I am good at schoolwork. (School)
3. I feel I do things well at home. (Home)
4. I feel that my parents think that I am a good child. (Home)
5. I feel do things well to be a good friend. (Peers)
6. I feel my friends think I am good at things. (Peers)
7. I feel that I am good at many things. (Personal)
8. I feel that others think I do things well. (Personal)

Autonomy (α =.824)

1. I choose the type of schoolwork to do. (School)
2. I feel free to expresses myself to my teachers. (School)
3. I feel free to express myself at home. (Home)
4. I choose the chores that I do at home. (Home)
5. I feel free to express myself to my friends. (Peers)
6. I choose the activities my friends and I do. (Peers)
7. I feel free to make my own decisions. (Personal)
8. I feel free express myself wherever I am. (Personal)

Relatedness (α =.883)

1. I feel my teachers like me and care about me. (School)
2. I like to spend time with my teachers. (School)
3. I like to spend time with my parents. (Home)
4. I feel my parents like me and care about me. (Home)
5. I feel my friends like me and care about me. (Peers)
6. I like to be with my friends. (Peers)
7. I like to be with other people. (Personal)
8. I feel that other people like me and care about me. (Personal)

Notably, the reliability was also satisfactory for the sources of school (α =.821), home (α =.790), friends (α =.845), and personal (α =.831).

The Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999)

(1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely)

"How _____ do you feel right now?"

Positive Affect

- Interested
- Excited
- Happy
- Strong
- Energetic
- Calm
- Cheerful
- Active
- Proud
- Joyful
- Delighted
- Lively

Negative Affect

- Sad
- Frightened
- Ashamed
- Upset
- Nervous
- Guilty
- Scared
- Miserable
- Jittery
- Afraid
- Lonely
- Mad
- Disgusted
- Blue
- Gloomy

IMI Scale (Ryan, 1982) (1 = strongly disagree, 5 = strongly agree)

1. I enjoyed this comic very much.
2. Watching the comic was fun.
3. I would describe this comic as very interesting.
4. The comic held/kept my attention.

Character liking (1 = really disliked, 10 = really liked)

- In the comic you just heard, how much did you like Cleopatra?

Demographics

In what month were you born?

- drop down of months

What is day of month you born?

- drop down of days

What year were you born?

- Drop down of years

What grade are you in?

Drop down of 3^{rd}-7^{th} grades

Are you a boy or a girl?

Boy, girl, other

What is your race?

- African American
- Asian
- Hispanic
- Native American
- Pacific Islander
- White
- Mixed/multi
- Other
- Prefer not to say

It's ok if you didn't pay close attention to the comic you just heard. But we do want to know how interesting you found it just in case we want to show it to other kids your age.

In the comic book you just read, how interesting did you find the story? Did it keep your attention?

A) I found the story really interesting and paid close attention.
B) I found the story a little interesting and paid a little attention.
C) I didn't find the story very interesting and did not pay close attention.

Appendix C: M-MIMB.

Note. These procedures are adopted from Hahn et al. (2019).

Now decide how many tokens each person will get. Under each picture is a description of the person you will be sharing with, so make sure you read about them before you decide to share!

This time you are playing the game for real. You can keep all the tokens yourself, share them equally, or give more to some people than others.

Once you decide, you can…

1. Give as many you want to the first girl.
2. Give as many you want to the second girl.
3. Give as many you want to the third girl.
4. Keep as many as you want for yourself.

Figure 7
M-MIMB Care, Loyalty, and Authority Images.

1

2

3

She is a new student in the grade below you. She is feeling ***pretty sad*** because her family has to move to a new town, and she will have to make new friends. She has been ***crying a lot*** in school. The ***poor girl*** really ***needs help***.	She is a student in the ***grade above*** you. She is going to be the next president of her class and will be ***in charge*** of making new school policies. She is the most ***respected leader*** the school has ever had, and ***students always listen*** *to her advice*!	She lives in the ***same neighborhood*** as you. Last year, she was a student in the ***same class*** as you are in now, and she even has the ***same birthday*** as you. So, you have a ***lot more in common*** with her than the other two people.

Appendix D: Analysis of Gender and Race on Outcome Variables.

Table 6
Outcome Results by Participant Gender.

Outcome	Male (*n*=220)	Female (*n*=132)	*F*	*t*	*p*
Competence	3.56 (0.47)	3.45 (0.58)	10.124	1.931	.027
Relatedness	3.55 (0.48)	3.44 (0.57)	5.130	1.812	.036
Positive Affect	4.08 (0.98)	3.27 (1.09)	3.517	3.906	.001
Prosocial Behavior	14.65 (4.59)	15.23 (3.47)	2.289	1.330	.092
Story Liking	4.45 (0.66)	4.24 (0.81)	5.667	2.431	.000
Character Liking	4.57 (0.65)	4.26 (0.83)	6.048	3.708	.000

Table 7
Outcome Results by Participant Race (Majority vs. Minority).

Outcome	Majority (*n*=263)	Minority (*n*=90)	*F*	*t*	*p*
Competence	3.53 (0.51)	3.50 (0.55)	.404	.383	.351
Relatedness	3.51 (0.55)	3.48 (0.56)	.148	.732	.233
Positive Affect	3.97 (1.04)	3.92 (1.04)	.033	.310	.379
Prosocial Behavior	14.91 (4.27)	14.67 (4.01)	.011	.857	.319
Story Liking	4.38 (0.74)	4.33 (0.70)	.285	.572	.284
Character Liking	4.46 (0.73)	4.43 (0.76)	.039	.289	.386

Appendix E: Participant Attention Effect on Outcomes of Interest.

Table 8

Outcomes of Interest by Participant Attention.

Outcomes	High Attention (n = 353)		Low Attention (n = 87)		*t*-test	*p*-value
	Mean	SD	Mean	SD		
Character liking	4.53	0.741	3.47	0.887	8.979	**<.001**
Story Enjoyment	4.37	0.731	3.37	0.934	10.739	**<.001**
Competence Satisfaction	3.52	0.519	3.248	0.568	4.372	**<.001**
Relatedness Satisfaction	3.51	0.520	3.24	0.601	4.177	**<.001**
Positive Well-Being	3.94	1.036	3.235	0.729	6.046	**<.001**
Prosocial Behavior	14.855	4.223	15.56	3.496	-1.445	.075

Note: Numbers in bold represent a significant difference.

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