I am more immersed now, *et vous*?

The effect of perspective and pronouns of address on a reader's immersion in French short stories

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Preface

Before you lies the thesis *I am more immersed now, et vous? The effect of perspective and pronouns of address on a reader's immersion in French short stories*, which I have written during the months September 2022 until January 2023.

How to address someone is something I always give extra thought to. I have always addressed my grandparents with the formal *u*, which was strange to some of my friends. In high school, *u* was the norm when addressing teachers, while at university it was less clear due to a more personal environment. When I heard of the ImPro-project, which studies the impact of pronouns on the addressee in various languages, and the possibility of doing an internship within the project, my interest was immediately sparked. After completing the internship, I still wanted to learn more about this subject, and I am glad I was given this opportunity for my thesis.

First, I would like to thank my supervisors Patricia Sánchez Carrasco and Gert-Jan Schoenmakers for their guidance, enthusiasm and all their advice and feedback. I have definitely learned a lot over the past few months and gained new experiences. In particular, I am very grateful I was given the opportunity to conduct this study in Lille, France, where I experienced another way of collecting data than I was used to throughout my bachelor's degree.

Next, I want to thank Helen de Hoop for taking the time to fulfil the role of second reader.

I would also like to thank Anne-Marie Gorisse for letting the University of Lille host our experiment, her enthusiasm for our project and effort to recruit as many participants as possible. My thanks extend to all teachers who helped us with promoting our project and recruiting participants, as well as all students who participated, showed interest, and spread the word about our experiment.

Lastly, I would love to thank my friends and family, who supported me, showed interest in my work over the past few months and lent an ear whenever I needed it. In particular, I'd like to thank friends and fellow-students Elsa Opheij and Celine de Loos, with whom I went to Lille to conduct the study and who worked on it as if it was their own.

I hope you enjoy reading my thesis, as much as I enjoyed writing it.

Marjolein van Hoften
Nijmegen, February 1, 2023

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Abstract

Previous research has shown that perspective, modulated through pronouns, affects the comprehension and immersion of a reader. The current study combines the methods used in previous studies to investigate the influence of pronoun on the immersion in French short stories. Second-person pronouns, used to address someone, have also been found to influence the receiver in French: in interaction, receivers react more positively to formal *vous* (V) than to informal *tu* (T), which is consistent with the general preference to be addressed with V in French in most situations. Therefore, this study also examines the influence of T/V-use on responses participants give regarding their immersion in a story and if this differs per pronoun in the story: a difference in immersion could influence a reader's reaction to an unexpected V or T. Participants read two French stories using the self-paced reading method, one with first-person pronoun and one with third-person pronoun, which was followed by a question related to the story that addressed the reader with V or T. After each story, participants answered questions about how immersed they were in the story, in which they were also addressed with V or T. No significant effect was found for first- and third-person pronoun on the reading times. However, the results of the questionnaire show that first-person pronoun stories score higher on immersion than third-person pronoun stories. The aspects *emotional engagement* and *narrative understanding* particularly showed this effect. These findings suggest that first-person pronouns can be used to better immerse readers. Through the questionnaire, we also found an effect for the interaction between T/V and pronoun, indicating that the effect of pronoun on immersion only occurred when addressed with V.

1. Introduction

When authors write a story they make certain decisions, not only in terms of content, but also textual features. These textual features can change the way a story is perceived. For instance, they can lead to better immersion in a story, which promotes prosocial behaviour and increased empathy (Johnson, 2012) and can change beliefs (Green & Brock, 2000). An example of a textual feature is perspective use: an author can write from the perspective of the person who experiences the events in the story (internal perspective) or from the perspective of an onlooker (external perspective). In stories, authors typically apply this through pronouns. But what is the effect on the reader of choosing one over the other? Previous studies found that first- and second-person pronouns promote an internal perspective, and third-person pronouns promote an external perspective (Brunyé et al., 2009; Brunyé et al., 2016). Child et al. (2018) investigated second- and third-person pronouns in short stories through the self-paced reading method. The results showed lower reading times and stronger mental representations for second-person pronoun, indicating better immersion in the text for the internal perspective. Hartung et al. (2016) also found better immersion for internal perspective, modulated through the first-person pronoun, using a questionnaire that measured immersion on multiple factors. Thus far, Hartung et al. (2016) is the only study focussing on existing literary stories, as opposed to relatively short fictional narratives (Brunyé et al., 2016; Child et al., 2018), but they do not use the online self-paced reading method, like Child et al. (2018) did. The current study combines questionnaire and self-paced reading, thereby striving to provide new evidence of the effect of pronouns in French. Thus, the first aim of this study is to investigate the effect that different pronouns in short stories have on reader's immersion.   Based on previous research (Brunyé et al., 2009; Brunyé et al., 2011; Brunyé et al., 2016; Child et al., 2018; Hartung et al., 2016), we hypothesize that immersion scores will be higher for first-person pronouns and reading times will be lower for these pronouns, thereby indicating better immersion in the story.

In addition to the influence of first- and third-person pronouns on readers (receivers), this study also looks at how formal and informal second-person pronouns affect a receiver when being addressed. In many languages speakers have to choose between formal or informal terms of address. In French, speakers choose between formal *vous* and informal *tu*. Generally, there is a strong tendency to use *vous* in French, except with family and friends (Schüpbach et al., 2007; Havu, 2009; Warren, 2006). Ollier et al. (2022) found that participants who were addressed with *vous* by a medical chatbot evaluated the conversation more positive than the one's addressed with *tu*. This indicates a more positive effect of *vous* on the receiver. To our

knowledge, Ollier et al. (2022) is the only study as of yet that examined the effect of the pronoun of address on the receiver, rather than the choice of the speaker or writer. Further research is needed to better understand this effect in different situations. As the choice of pronoun of address influenced the evaluations of interactions in Ollier et al. (2022), it is possible pronoun of address also affects participants and their immersion in a story when addressed. Thus, the present study aims to investigate this effect in relation to story immersion in French.

We predict that, because of the preference for *vous* (V), participants do not expect *tu* (T) and possibly perceive it as inappropriate (cf. *embarrassment potential* in Kretzenbacher et al., 2006). The use of T leads to a more negative attitude (Ollier et al., 2022) towards the experiment and therefore, lower immersion scores. We also argue that the pronoun that was used in the preceding story, could influence the effect of T/V: if immersion is higher for first-person pronouns, participants may react more strongly to an unexpected or inappropriate pronoun of address.

To conduct this study, French native speakers read French short stories with different perspectives using the self-paced reading method. The different perspectives are modulated through pronouns: first-person pronoun (*je* in French) for an internal perspective and third-person pronouns (*elle/il* in French) for external perspective. Each story ended with a question that directly addressed the reader, which invited readers to think about their own experiences related to the story. After each story, participants answered questions about how immersed they were in the story. We manipulated the address form (T/V) in the immersion questionnaire as a between-subjects variable.

The results of the immersion questionnaire showed an effect of pronoun on immersion: immersion was higher for stories in first-person pronoun than stories in third-person pronoun, in general, and specifically for the aspects *emotional engagement* and *narrative understanding*. Furthermore, an interaction was found between T/V and pronoun in the immersion questionnaire: the effect of pronoun on immersion, only occurred when addressed with V, as that was the expected form of address. These findings indicate that readers react differently to different pronouns of address.

This thesis is an in-depth report on this study and its findings. It will start with a review of the literature on immersion (2.1.), perspective use and pronouns (2.2.), and pronouns of address in the French language (2.3.), which will also contain the research questions and hypotheses. This is followed by a section about the current study (2.4.). Then, the method (3) and results (4) of the self-paced reading and questionnaires are presented. The results will then be discussed (5), after which conclusions will be drawn.

2. Literature review

2.1. Immersion

While reading a story, readers often create an image of the narrated events in their mind. They tend to get immersed in the story (Green, 2004). Nell (1988) was the first to bring up this effect (in the current report labelled 'immersion', but previously also labelled 'transportation' or 'engagement'), describing it as the feeling of 'being lost'. More specifically, immersion can be defined as 'the state of feeling cognitively, emotionally, and imaginally immersed in a narrative world' (Sestir & Green, 2010, p. 275). This state differs greatly between readers as do the implications of the immersion.

Immersion influences the impact a narrative has on attitudes. In the first experiment of a study by Green and Brock (2000), participants read a story about a college-student (Joan), whose little sister (Katie) was murdered in a mall by a psychiatric patient. The hypothesis was that more immersed participants would feel more positively toward the sympathetic characters, Joan and Katie. The immersion and character evaluations were measured, as well as the beliefs readers had about topics like the freedom the patient should have. Results showed that highly immersed readers evaluated the story protagonists (Joan and Katie) more positively and showed beliefs consistent with the events in the story. For example, the murder occurred at the mall, which suggests that malls are unsafe. More immersed readers believed more strongly that malls are unsafe. These findings were also supported by three follow-up experiments. Green & Brock (2000) therefore conclude that immersion can have the power to change beliefs.

Moreover, immersion can increase empathy and prosocial behaviour. Johnson (2012) tested readers subjective, behavioural, and perceptual responses after reading a short story. In a first experiment, participants read stories and filled out questionnaires about empathy, mood, and immersion. To measure helping behaviour, the experimenter 'accidentally' dropped pens within sight of the participant and recorded whether the participant helped picking them up. The results showed that participants who were more immersed experienced greater affective empathy and more prosocial behaviour. In a second experiment an emotional perception test was added in which participants had to detect subtle positive and negative emotions on faces. Participants who experienced greater affective empathy, were more likely to see fear depicted on a face that showed no emotion. Both the conclusions of Johnson (2012) and Green and Brock (2000) indicate implications of immersion in a narrative text.

The term 'immersion' covers several factors. Kuijpers et al. (2014) investigated how immersion could be divided into different factors, or dimensions, aiming to develop an

instrument to measure immersion in narrative texts. Through a literature study theoretical dimensions were formed. After the literature study, an interview study and pilot study were conducted to formulate statements for each dimension and the statements were tested with a confirmatory factor analysis. Together, the statements form a standardized questionnaire: the Story World Absorption Scale (SWAS). The dimensions of which immersion is formed according to Kuijpers et al. (2014) are attention, emotional engagement, mental imagery, and transportation. Attention is defined as a reader's focus on the story world and loss of awareness of the 'real world'. Emotional engagement describes the sympathy, empathy and emotional identification readers feel for and with the characters in the story. Mental imagery describes whether readers see story-related visuals in their mind while reading a story. The last dimension, transportation, is defined as the feeling of being transported to the story world.

2.2. Perspective use and pronouns

In order to positively influence readers through narratives, it should be determined which factors cause greater immersion. One aspect that is known to influence immersion are textual features such as perspective. There are two possible perspectives a reader can take when reading a story: readers can experience the story through the eyes of the protagonist (internal perspective) or as an observer of the events (external perspective) (Brunyé et al. 2009).

A way to encourage the adoption of a certain perspective are linguistic cues, for example personal pronouns. Several experiments have shown that pronouns can influence perspective-taking and comprehension of a situation. A study by Brunyé et al. (2009) focuses on the role of pronouns in perspective modulating while comprehending a simple event sentence in English. In their experiment, participants first read simple event sentences, containing either first-, second- or third-person pronouns. Then, a picture was shown from either an internal or external perspective. An example of an event sentence is 'I am slicing the tomato'. The picture that was shown for an internal perspective would be hands slicing a tomato from the bottom of the picture to make it look like they are the participant's hands. For an external perspective, the picture was rotated, so the hands appeared to be someone else's. Both the pronoun in the event sentence and the picture were within-subjects factors. Participants had to verify whether the picture matched or mismatched the event described in the event sentence. Response times for the picture verification were recorded. The authors hypothesized that the response times should be dependent on the pronouns, if the linguistic information influences the perspective a reader adopts. No predictions were made about the direction of the dependency. Results showed that readers respond faster to images depicting an internal perspective when having read sentences

with a first- or second-person pronoun than sentences with a third-person pronoun. However, when an external image was shown, participants responded faster when having read sentences with a third-person pronoun. Brunyé et al. (2009) conclude that the use of first- and second-person pronouns promote viewing situations through one's own eyes, as opposed to third-person pronouns, which promote viewing situations from an onlooker's point of view.

Ditman et al. (2010) checked whether Brunyé et al. (2009)'s results were caused by engagement during natural reading or by the task itself. They argue that showing action related pictures after each trial may have promoted mental simulation during reading. Through a memory task, where participants had to answer statements about action and descriptive elements of the text ten minutes (first experiment) or three days later (second experiment), they found that reader's memory of actions was better after reading statements with *you*. This suggests that readers mentally simulate actions even when that is not necessary to perform the task, thereby confirming that the results found in Brunyé et al. (2009) were triggered by natural reading processes.

The results of Brunyé et al. (2009) are also supported by a follow-up study by Brunyé et al. (2016). This study consisted of two experiments, the second of which will be discussed later in this review. The first experiment of the study is a replication of Brunyé et al. (2009)'s experiment with an additional questionnaire about the participants' reading habits and their empathic engagement (e.g., crying, feeling scared because of what is read). The expectation was that the patterns readers show would be similar to Brunyé et al. (2009): faster response times for internal images after reading first- and second-person pronoun sentences and faster response times for external images after reading third-person pronoun sentences. This expectation was found to be correct overall. However, a large proportion of the participants in this experiment did not show the expected pattern. Some of this variation can be attributed to individual differences in empathic engagement: the readers' questionnaire showed that participants with high self-reported empathic engagement were more likely to adopt an internal perspective when having read a first- or second-person pronoun. Additionally, the authors found that readers only showed the pattern in subset of all trials, indicating they adopted a certain perspective only to a subset of all the sentences. However, they were still accurate at verifying whether the picture matched or mismatched the target sentence for the majority of the trials. While perspective-taking does trigger greater engagement (Ditman et al., 2010), it does not appear to be essential for the comprehension of the situation.

The result that second-person pronouns promote a personal perspective, and third-person pronouns promote an onlooker's perspective is also found by Child et al. (2018). In a

first experiment, English text excerpts with characters in an emotional situation were presented and these texts were written from either a personal, internal perspective (*you*) or an onlooker's, external perspective (*he/she*). The end of the story contained an explicit emotional word that matched the valence of the story. Child et al. (2018) measured the reading times for each sentence and at the end of the experiment participants self-rated their own emotional status. The results of the first experiment showed that participants read more slowly when reading in third-person than when reading in second-person. The perspective effects found in Child et al. (2018) were valence specific: participants were more willing to immerse themselves in positive texts.

Child et al. (2018)'s second experiment was similar to the first experiment, but the final explicit emotion word could be a match or a mismatch with the emotional valence of the text. The results showed that the effects after a mismatch were stronger and more consistent for *you* than for *he/she*, which provides evidence that mental representations are stronger when readers read the text from a personal perspective. Child et al. (2018)'s findings indicate that readers are more easily immersed when reading from personal perspective (*you*) than from an onlooker's perspective (*he/she*). The authors conclude that the perspective used in a text influences the mental representations of events while reading.

Brunyé et al. (2011) also investigated the changes perspective can cause to mental representations. They specifically looked into different qualitative characteristics of representations, namely time, space, context, and characters. Additionally, they examined whether readers would be more likely to embody the protagonist's emotions if directly addressed with *you*. In the experiment, participants read two negatively-valenced narratives from fiction novels with either *you* or *I* as pronouns. Differently from previously discussed research, Brunyé et al. (2011) classified *I* as an external, onlooker's perspective and *you* as an internal, performer's perspective. Their reason for this is that *you* directly addresses the reader, whereas *I* does not. After reading the narratives, participants answered comprehension and emotion questions. The comprehension questions were designed to test for contextual knowledge (e.g., "Is it cold outside?"), character knowledge (e.g., "Does Dr. Patel dislike tea?"), temporal knowledge (e.g., "Is the war over?"), and spatial knowledge (e.g., "Is the office in the middle of the city?"). For the emotion questions, ten adjectives from the Brief Mood Introspection Scale were used to assess reader's affective valence and arousal state. Results showed higher sensitivity within the *you* condition compared to the *I* condition, but only for spatial knowledge. This is in line with Child et al. (2018), whose results show that mental representations are stronger for stories with a second-person pronoun than with a first-person pronoun. Furthermore, Brunyé et al. (2011) found that readers reacted more emotionally to the

narratives with the pronoun *you*, meaning second-person pronoun causes a more vivid internalisation of emotional events. These findings again suggest that a personal, internal perspective causes different, more internalised effects on the reader.

Brunyé et al. (2016)'s second experiment provides additional findings on the effects that each pronoun causes. They found that first-person perspective did not promote an internal point of view in longer narratives. In this experiment, they extended the short sentences into longer narratives extracted from real-world sources. This experiment showed similar results to Brunyé et al. (2016)'s earlier discussed first experiment. However, this was only the case for second- and third-person pronouns, not for first-person pronouns. First-person pronouns did not generate a specific pattern for internal or external perspective taking. That is, while there is evidence that pronouns can manipulate perspective taking (Brunyé et al., 2009; Brunyé et al., 2011; Brunyé et al., 2016; Child et al., 2018), these effects are modulated by the length of a text (Brunyé et al., 2016).

Where in Brunyé et al. (2016) looked at short narratives of 145 words on average, Hartung et al. (2016) investigated the effect of pronoun on immersion using even longer narrative texts: literary short stories with 1043 words per story on average. These short stories differ from Child et al. (2018)'s text excerpts and Brunyé et al. (2016)'s narratives in the sense that they are full-length short stories and are more comparable with literary short stories readers immerse in when reading literature. Hartung et al. (2016) investigated how the choice of pronoun referring to the main character affects the immersion of a reader in Dutch short stories, using questionnaires and Electrodermal Activity (EDA). The literary stories were presented with either first- or third-person pronouns. Second-person pronouns were not used, because these are rare in literary fiction. After reading a story, participants answered questions regarding their immersion in, comprehension of and appreciation of the story. Additionally, questionnaires for individual differences were included: the Dutch Author Recognition Test (DART, see also Koopman, 2015 and Brysbaert et al., 2020), questions about general reading habits and an Empathy Quotient (EQ) questionnaire. The immersion questionnaire results showed that stories written with first-person pronouns generally lead to higher levels of overall immersion compared to third-person pronouns. This contradicts Brunyé et al. (2016), whose results would suggest no effect for first-person pronouns. This discrepancy may be due to task effects of Brunyé et al. (2016). The aspects of immersion that led to the significant results in Hartung et al. (2016) were the transportation into and mental imagery of the story world. Better immersion also resulted in higher appreciation scores.

The results of the EDA signal were unexpected: third-person stories got higher results and more peaks than first-person pronoun stories. EDA measures arousal, which could reflect emotional response, an increased working load or startle. More and higher signals could suggest an increased level of immersion. However, Hartung et al. (2016) argue that these results are most likely because of increased processing demands for third-person perspective.

Similar to Brunyé et al. (2016), Hartung et al. (2016) mention individual differences between readers. A relation was found between empathy skills and the reading process: readers with better empathy, get immersed more easily. Additionally, a link was found between immersion and appreciation and appreciation was positively linked to reading experience, as measured by the DART. Although significant results have been found, it is important to note that these effects vary greatly between individuals, based on numerous factors.

Hartung et al. (2016) conclude that personal pronouns indeed can be crucial in how readers experience fiction. Readers are more easily immersed when reading first-person stories, but linguistic cues like personal pronouns are not always enough to overcome personal preferences or differences in empathy skills.

To sum up, previous research has shown that the use of pronouns can promote that readers take a certain perspective. First- and second-person pronouns seem to promote the perspective of the protagonist, whereas third-person pronouns promote an external, onlooker's perspective (Brunyé et al., 2009; Brunyé et al., 2016). Taking the perspective of the protagonist leads to better mental representations of and immersion in stories (Brunyé et al., 2011; Brunyé et al., 2016; Child et al., 2018; Hartung et al., 2016), which could lead to changed beliefs (Green & Brock, 2000), prosocial behaviour and increased empathy after reading (Johnson, 2012)

Several studies have focused on perspective use and the effects of pronouns, but only Hartung et al. (2016) focused on full-length literary short stories that are representative of short stories readers immerse in. However, Hartung et al. (2016) did not use self-paced reading, a method through which Child et al. (2016) found online reading time results of pronouns affecting immersion. The current study combines the immersion questionnaire and the self-paced reading method to investigate the effect of pronoun on immersion in literary texts in French. This first research question we intend to answer in this study is:

(1) What are the effects of the use of either first- or third-person pronouns on the reader's experience of immersion in French fictional short stories?

Based on previous studies (Brunyé et al., 2009; Brunyé et al., 2011; Brunyé et al., 2016; Child et al., 2018; Hartung et al., 2016), we predict that stories written with first-person pronouns will be read faster and that the immersion scores for these stories will be higher compared to stories written with third-person pronouns.

Several of the earlier discussed articles already mentioned the influence of individual differences on the results. Both Brunyé et al. (2016) and Hartung et al. (2016) stated that readers with high empathic skills are better at comprehending and immersing themselves in a text. As individual differences have been proven to play a role in immersion, we take into consideration how the reading habits of participants impact immersion and expect to see variability between participants due to reading experience and appreciation of the story (Hartung et al., 2016).

2.3. T/V use in French

In addition to the effect of first-person and third-person pronouns in reading, this study also investigates the effect that the use of informal and formal second-person pronouns in the experiment has on the participants. Some languages have (at least) two options when choosing a pronoun to address someone: formal (V) and informal (T). In Dutch, for example, speakers choose between *u* and *jij* (or *je*), in German, they choose between *Sie* and *du* and in French, they choose between *vous* (V) and *tu* (T). V is generally used to mark a certain degree of social distance and T marks a low degree of social distance (Brown & Gilman, 1960), but each language differs in when and for whom each pronoun is used (Clyne et al., 2009).

In French, there appears to be a general tendency towards the use of V. A study by Schüpbach et al. (2007) investigated the use of pronouns of address in multiple languages through focus groups, interviews, questionnaires, online discussion and participant observation. The results for French showed that *vous* maintains barriers, hierarchy, respect, and neutrality, whereas *tu* is used as a notion of proximity and connection. In comparable studies in terms of method, Havu (2009) and Warren (2006) found similar results: V is used to show formality and hierarchy and T is used for family and acquaintances. V is also used to address older people, whereas T is used to address younger people and the use of T is rare immediately upon meeting a person (Havu, 2009).

Schüpbach et al. (2007), Havu (2009) and Warren (2006)'s results were found by conducting interviews and administering questionnaires. In these interviews and questionnaires, they explicitly asked French informants about their use of pronouns. These findings depict the social rules of the use of T and V according to the informants. Contrary to these studies, more recent research investigated the use of formal and informal pronouns in the real-life

communication. For example, a corpus study by Den Hartog et al. (2022) investigated the choice of T and V in five languages in recruitment advertisements of international companies. These companies used V in their French recruitment ads almost exclusively, which the authors attribute to the fact that the intended readers of these ads are not friends or family, thereby supporting previous findings (Havu, 2009; Schüpbach et al., 2007; Warren, 2006).

Furthermore, Levshina (2017) investigated the use of formal and informal pronouns in situations that resemble real spoken interaction. They looked at T/V-use in, amongst other languages, French, by looking at the translated subtitles of originally English film scenes. Because English does not have a binary system for pronouns of address, the translator explicitly had to choose between *tu* and *vous* in the translated subtitles. Results showed that most of the English pronouns of address were translated to the formal *vous,* which suggests a strong preference for the use of V in French. The situations in which the pronouns were translated to T were restricted to conversations with family and friends.

All previously discussed studies showed a preference for V in French. However, these studies focused on the choice of the speaker, rather than the effect it has on the receiver. To our knowledge, Ollier et al. (2022) is the first study that addresses the effect that the use of T or V has on a reader, rather than the choice of the person producing the text. Ollier et al. (2022) examined the influence of the pronoun of address used by chatbots in healthcare service, 'conversational agents' (CA), on user evaluations in French. They hypothesized that, for French, V would improve the user evaluation scores. Additionally, they expected an influence of user age and gender. In the experiment, native French participants from Switzerland were presented with a French CA using either V or T. Their results are in line with Levshina (2017)'s and Den Hartog et al. (2022)'s: overall French speaking participants evaluated V more positively than T, indicating a preference for V. The results showed that V generated higher evaluation scores for younger men and older women. For older men and younger women, however, T generated higher evaluation scores. To conclude, although gender and age most certainly have an influence on the evaluation of CA's, V was evaluated more positively than T.

It is, however, important to mention that some studies do indicate a transition from preferred V-use to preferred T-use. For instance, Warren (2006) found that in several specific work areas such as the computing, fashion and media industries, T is more common than V. The same was true for the rare cases of T-use in Den Hartog et al. (2022): The only companies that used T were sporting goods and fashion retailers. T is continuing to gain territory from V and the use of T in informal research interviews with informants has also increased (Coveney, 2010).

To sum up, through interviews, questionnaires and corpus studies (Den Hartog et al., 2022; Havu, 2009; Schüpbach et al., 2007; Levshina, 2017; Warren, 2006), it is known that in French there is a preference for the use of V when choosing a pronoun of address and T is only used amongst family and friends. Thus far, Ollier et al. (2022) is the only study that takes a different approach to studying pronouns of address: they investigated the effect the choice of pronoun has on its receiver. Further research is needed to better understand this effect in different situations. Therefore, this study will focus on the influence that the choice of (in)formal pronouns of address has on the receiver, in addition to investigating the effect of first- versus third-person pronouns in narratives. More specifically, this study looks into this effect in an experimental setting. The research questions we intend to answer with this part of our study is:

(2) To what extent do participants expect an informal or formal second-person pronoun?

(3) To what extent will the use of V or T in the experiment to measure immersion in short stories influence the responses participant give in the engagement questionnaire?

(4) To what extent does the effect of T/V differ per pronoun used in the story?

We hypothesize that a V-preference is also present in our study and that the use of T alters the results of this study. Ollier et al. (2022) showed that participants evaluated the interaction with a chatbot more positive when V was used. Moreover, Coveney (2003, p. 182) stated that 'in a "classic" survey the informant and fieldworker are total strangers, and in France one would normally expect this to lead to reciprocal *vouvoiement* [the use of V] during the interview.'. Because readers expect V, being addressed with T could lead to a surprisal effect (cf. *embarrassment potential* in Kretzenbacher et al., 2006) and to a more negative attitude towards the experiment and therefore, lower immersion scores, as measured by the scales of the immersion questionnaire. Furthermore, we suspect that the pronoun used in the short story could influence the effect of T/V: if readers are better immersed through the use of first-person pronouns, they may react more strongly to an unexpected or inappropriate pronoun of address.

2.4. The present study

As previously stated, the current study focuses on the effect of first- and third-person pronouns in literary short stories and the effect of informal and formal second-person pronouns on the responses the participants give on the immersion questionnaire. These aims are combined into

one experiment with two measures: immersion scores according to an immersion questionnaire and reading times of the story.

First, participants will read short stories, using the self-paced reading method, which gives us the online reading times of the pronoun and its critical region. Each story ends with a question which starts with *et vous* 'and you' (formal) or *et toi* 'and you' (informal) and invites readers to think about their experiences relating to the story. Reading times for these questions are still recorded, which enables us to capture the putative surprisal effect of an unexpected T or V, which would lead to a higher reading time. After each story, participants complete an immersion questionnaire, which will be manipulated in such a way that half of the participants are addressed with V and the other half with T (between-subjects). Each participant will be presented with two stories, one in first-person, one in third-person (within-subjects). After reading both stories and answering the immersion questions, participants will fill out a questionnaire regarding demographics and reading habits.

This study focuses on literary texts, short stories in particular. Although previous research has shown distinct effects with second-person pronouns (Brunyé et al., 2009; Brunyé et al., 2011; Brunyé et al., 2016), they are a highly uncommon choice in literary texts and will likely result in a surprisal effect, which influences the reading times regardless of immersion level. They could influence the interpretation in a way that is not intended because of reader's limited prior exposure and possibly interpreting the second-person pronoun as generic (de Hoop & Tarenskeen, 2015). Therefore, first and third-person are chosen as pronouns in this study.

3. Method

3.1. Participants

111 French speakers were recruited from the faculty of Legal, Political and Social Sciences of the University of Lille (42 male, 67 female, 2 non-binary) between the age of 17 and 24 ($M = 19.2$, $SD = 1.43$). Participants were not aware of the purpose of this study. Participation was voluntary and participants received a Dutch snack as reward. All participants gave informed consent in English.

3.2. Data exclusion

Two participants were excluded from the data because they did not finish the experiment. The data of two more participants were deleted because they were addressed with one pronoun of

address in the stories and immersion questionnaire, and with the other pronoun of address in demographic and reading habits questions. Data from eleven participants were excluded because they were non-native speakers of French. This left us with a total of 95 participants (38 male, 56 female, 2 non-binary) between the age of 17 and 24 ($M = 19.1$, $SD = 1.39$).

Each participant read two stories and answered three content questions about each story. These content questions were designed to check if participants paid attention when reading. If more than one out of the three questions per story were answered incorrectly, all data from the participant for that story was excluded from analysis. This resulted in the deletion of 7.1% of the data.

3.3. Design

This study makes use of two main measures: the immersion scores and the reading times of the target words and its two following words (spill-overs). The target words are the pronouns in the story. Independent variables in this experiment are perspective (first-person pronouns vs. third-person pronouns; respectively corresponding to internal and external perspective in section 2.2.) and TV (T vs. V; pronouns of address). Story appreciation, individual reading habits and a French version of the Author Recognition Test are included as control measures (covariates).

This study makes use of a 2x2 between-subjects design with four conditions: (1) first-person pronouns followed by T-questions, (2) first-person pronouns followed by V-questions, (3) third-person pronouns followed by T-questions and (4) third-person pronouns followed by V-questions. Participants read one story in first-person and one story in third-person (within-subjects) and read either T-questions or V-questions (between-subjects).

3.4. Materials

3.4.1. Stories

Two French fictional short stories were selected (Table 1) from the website of the publishing house Short Édition (2022), where non-professional writers can submit short stories. The selected stories were chosen based on word length (approximately 500 words) and gender of the protagonist (one male and one female). Both stories have one protagonist, a single plotline and do not touch on sensitive subjects. We received written permission from Short Édition to use the short stories in the experiment.

Both stories were written with third-person pronouns, so we created a second version for each story in which the perspective (personal pronoun and corresponding verb) was changed to first-person. Thus, we ended up with two versions of two stories.

The region of interest for the self-paced reading were the first- and third-person pronouns in the story (target words) and the two spill-overs. We excluded a target word in both the T- and V-version of the story when it was the first word on the page in the experiment, when it was the last word on the page in the experiment, or when the target word contracted with the previous or following word. We also excluded a spill-over when the spill-over was a new target word.

Each story ended with a question related to the story that was directed at the reader, starting with *Et vous* 'And you' (formal) or *Et toi* 'And you' (informal). These questions can be found in Table 1. For these questions, the pronouns of address were considered target words. The two pronouns of address in the question and the two spill-overs of each pronoun of address were processed separately.

Table 1. Story information

Title	Author (year)	Original pronoun	Nr. of words	Protago-nists gender	Nr. of target words	Nr. of participants	Plot summary	'And you?'-question (V-version) (**target word; region of interest**)
Péripéties nocturnes	Cléa Barreyre (2019)	3rd	517	F	45	96	The protagonist, the tooth fairy (*petite souris,* lit. 'little mouse'), is being followed by an owl and must reach the children's bedroom to succeed at her mission.	Et **vous**, **est-ce que vous avez déjà** reçu la visite de la petite souris ?
Les grandes découvertes perdues	Maxime D. (2014)	3rd	415	M	34	86	A geneticist at NASA invented a way to teleport anywhere into the universe.	Et **vous, est-ce que vous aimeriez pouvoir** te téléporter ?

3.4.2. Questionnaires

The current study made use of several questionnaires, all discussed below, to measure immersion and potential other factors that influence immersion. TV in these questionnaires was manipulated as a between-subjects variable.

3.4.2.1. Immersion questionnaire

The questionnaire that was used to measure reader's immersion in the text, in addition to the online self-paced reading measure, is based on the Story World Absorption Scale (SWAS), developed by Kuijpers et al. (2014), and the narrative understanding dimension of the narrative engagement scale (NEQ) (Buselle & Bilandzic, 2009).

The SWAS was specifically designed to measure the subjective experience of absorption in the story world of narrative texts, as opposed to earlier developed scales (Cohen, 2001; Buselle & Bilandzic, 2009; Green & Brock, 2000; Knobloch et al, 2004), which is why we deemed this to be the best scale for the present study. The SWAS is divided into the subscales, each with their own set of three to five statements: attention (e.g., 'When I was reading the story I was focused on what happened in the story'), transportation (e.g., 'The world of the story sometimes felt closer to me than the world around me'), emotional engagement (e.g., 'I felt sympathy for the main character') and mental imagery (e.g., 'I could imagine what the world in which the story took pace looked like').

The SWAS does not contain a dimension about participants' understanding of the narrative and the ease with which they understand it. Kuijpers et al. (2014) assume that readers automatically understand a story when they are absorbed, since understandability is needed in order to immerse yourself. This assumption is not backed up by other research on immersion scales (Buselle & Bilandzic, 2009; Hartung et al., 2016), which is why we consider it useful including this dimension in the immersion questionnaire as well.

In the current study, several of the statements in the SWAS and NEQ were removed to avoid redundancy. All statements were translated into French and reformulated to statements with the second-person pronoun T and V. Six of the nineteen statements were reformulated into a negative statement, so participants did not have to slide the bar one way only and kept paying attention. Participants responded to the statements on a scale ranging from 0 to 100, with the labels 'I don't agree at all' (*Je ne suis pas du tout d'accord.*) and 'I agree completely' (*Je suis tout à fait d'accord.*). No score was initially visible on the slider, and the responses were forced. All immersion statements can be found in Appendix 1.

3.4.2.2. Reading habits questionnaire

As an indication of participant's reading habits, a questionnaire was compiled based on Hartung et al. (2016)'s reading habits questionnaire, consisting of five questions: two questions regarding reading frequency, two regarding genre preferences and one concerning the materials used for reading. With this questionnaire, variability between participants due to reading habits can be captured. These questions can be found in Appendix 2.

3.4.2.3. Appreciation questions

Story appreciation was also measured. Participants answered the question *Que pensez-vous de cette histoire ?* 'What do you think of the story?' by choosing between the following five semantic binary questions: *mauvaise-brilliante* 'bad – brilliant', *ennuyeuse-captivante* 'boring-captivating', *pas originale-originale* 'unoriginal-original', *nulle-drôle* 'lame-funny' and *mal écrite-bien écrite* 'badly written-well written'. These questions serve as a control for variability in stories and participants: if the appreciation of a story is different, it could influence the immersion of a participant in a story (Hartung et al., 2016).

3.4.2.4. Author recognition test

A French version of the author recognition test was created as an objective indication of participants' reading exposure. A small pre-test was done, in which French participants categorized a list of 78 names of which 60 were authors and twelve were foils, in three categories: *Je connais cet auteur* 'I know this author', *J'ai entendu parler de cet auteur* 'I've heard of this author' and *Je ne connais pas cet auteur* 'I don't know this author'. Based on the responses of fifteen French participants, a list of 42 names was compiled. This list consisted of ten authors from each category and twelve foils. The foils were created by combining a first and last name from the top 500 most common names in France according to Forebears (2022). These names were checked to make sure they were not coincidentally names of real authors. The list of authors that was used can be found in Appendix 3. The number of authors participants recognize is an indication of how much they read (Stanovich & West, 1989; Achesson et al., 2008; Mar & Rain, 2015), and it serves as a control for reading frequency, in addition to their self-reported reading habits.

3.4.2.5. Content questions

To ensure that the participants paid attention during reading, content questions were added to the questionnaire. For each story, three content statements were included, which participants

could answer with true (*vrai*) or false (*faux*). The content questions can be found in Appendix 4.

3.5. Procedure

This experiment was conducted on the campus of the faculty of Legal, Political and Social Sciences of the university of Lille. Three identical laptops were placed in a classroom with some distance between each laptop. Three students could be tested at the same time. The participants sat down, read and signed an English consent form and then started the experiment on the laptop. The first part of the experiment was presented using PsychoPy (Pierce et al., 2019). A self-paced reading moving window technique was used, meaning participants read the text one word at a time, from left to right. The length of the line gave an indication of the word length and punctuation served as an indication for sentence structure. Participants could continue to the next word using the spacebar. Reading times for each word were recorded. At the end of the story, still using self-paced reading, the final question with 'And you?' in French was directed at the reader. The reading times for the words in this sentence were also recorded but stored separately for the purposes of analysis. Participants did not answer this question.

Upon completing the first text and 'And you?'-question, participants were presented with the content and immersion statements, followed by the appreciation questions. They moved on to the second story, again followed by the same questions and statements. Lastly, the participants filled out a questionnaire concerning demographics and general reading habits, and carried out the French ART, using Qualtrics (2022). These questions and statements were presented at the end of the experiment, so as not to influence the participants by reading V and T at the beginning of the experiment. In the instructions prior to and during the self-paced reading part of this experiment, T and V pronouns were omitted.

3.6. Data analysis

All data are processed and analysed using R (version 4.2.2.; R Core Team, 2022). First, a factor analysis was conducted for the immersion questions using Crohnbach's alpha. The Cronbach's alpha for the mental imagery scale proved insufficient (α=0.447) (Tavakol & Dennic, 2011), which is why this scale was removed in the analyses. After checking Cronbach's alpha, the raw data of the immersion questions were processed. This was also done for the reading times of the entire story and the final question containing V or T. The answers on the general reading

habits questionnaire, the author recognition test and the appreciation questions were used as measures of individual differences.

R-package *lme4* (Bates et al., 2015) was used to perform multiple linear mixed effects regression analyses for immersion, reading times of perspective and reading times of TV. For immersion, each base model included the fixed effects of perspective and TV and an interaction between perspective and TV. By-participant, by-story, and by-question varying intercepts were included as random effects. For the reading times of perspective, each base model included perspective as a fixed effect and by-participant, by-story, and by-item (the pronoun in the story) varying intercepts as random effects. For the reading times of TV, each base model included the fixed effects of perspective, TV, and mean Immersion and an interaction between perspective and TV. By-participant and by-story varying intercepts were included as random effects.

To each of these base models, other potentially relevant factors (covariates) were added one by one. A covariate was only included in the model if it improved the model fit. Models were compared using ANOVA comparisons of the package *lmerTest* (Kuznetsova et al., 2017), using Satterhwaite's method.

We contrast coded the variables perspective, TV and the question on preferred materials in the reading habits questionnaire (question 5; see Appendix 2) as –0.5, 0.5.

R-package *emmeans* (Lenth, 2022) was used for the comparison of the conditions in the interaction, to correct for the multiple comparisons. *p*-values were Bonferroni-corrected. We further used R-package *MuMIn* (Bartoń, 2022) to calculate R-squared as a measure of the model fit and package *ggplot2* (Wickham, 2016) to visualize the data.

4. Results

In this section we report the results of the main measures immersion, the reading times of perspective in the story and the reading times of the formal and informal pronouns of address in the question that followed the story. To get a better idea of the reading habits of the participants, we first report the answers to the reading habits questionnaire and the Author Recognition Test (ART).

4.1. Individual differences

Participants answered five questions about general reading habits. Regarding the question *À quelle fréquence lisez-vous des ouvrages fiction?* 'How often do you read fiction?', 43% of the

participants indicated they do not read regularly, 15% reads daily, 13% reads twice a week, 20% reads once a week, and 7% never reads. Regarding the number of books participants read, 20% reads more than one book per month, 23% read eight to twelve books a year, 29% reads three to seven books per year, 22% reads less than three books per year, and 4% reads zero books per year.

Regarding the preferences of type of fiction, 33% prefers prose, 24% prefers comic books, and 15% prefers plays. 14% does not like fiction at all. The question about which genres participants liked was processed as the number of genres. Participants liked 3.6 genres on average (SD = 1.94, minimum = 1, maximum = 10). The vast majority of the participants preferred reading physical books (91%) over e-readers (7%).

The ART served as an indication of how much participants read without the bias of self-reporting reading habits. Participants recognised 8.8 authors on average out of 30 (SD = 3.96, minimum = 1, maximum = 20).

4.2. Immersion and T/V measured by the immersion questionnaire

For the main measure immersion, we analysed the entire questionnaire, as well as each scale. We start with the findings of the immersion questionnaire in its entirety. Then, the results of subscales are reported together. A report of every separate subscale can be found in Appendix 5.

4.1.1. Full immersion questionnaire

Figure 1 illustrates the immersion per perspective and TV. Immersion was higher for stories with first-person pronouns (M = 64.3, SD = 28.3) than for stories with third-person pronouns (M = 58.8, SD = 28.8). In addition, the pattern of immersion scores differs per perspective within TV. For V, first-person pronoun stories score higher on immersion (M = 66.4, SD = 28.9) than third-person pronoun stories (M = 57.2, SD = 31.4). This is different for T: there seems to be no great difference between first-person pronoun stories (M = 62.3, SD = 27.6) and third-person pronoun stories (M = 60.4, SD = 25.7). The violin plots show great variation between participants.
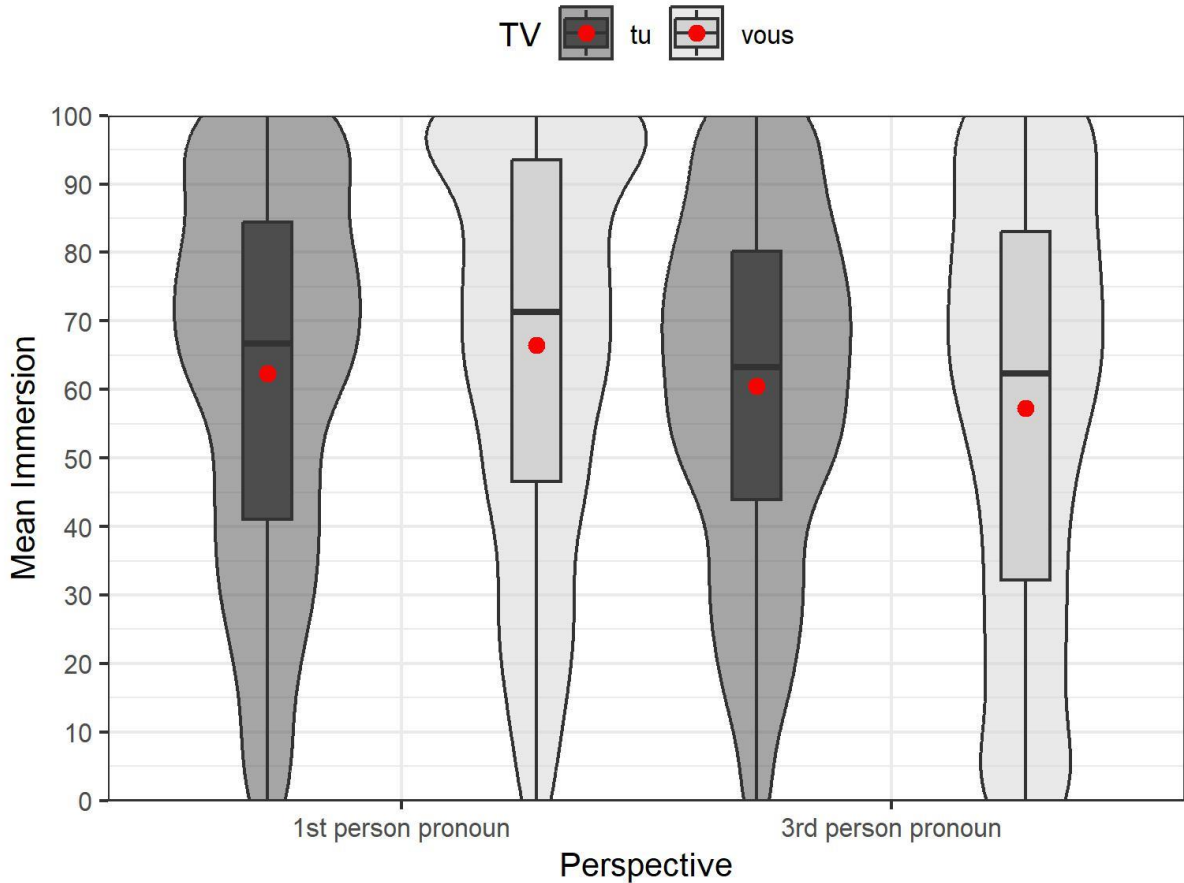
Figure 1. Immersion in French literary short stories per perspective and pronoun of address (TV)

The best model fit for the mixed model for immersion was achieved when including as covariates the reading habits question about frequency of reading (question 1 and 2; see Appendix 2), about genre preferences (question 3; see Appendix 2), about preferred reading materials (question 5; see Appendix 2) and the appreciation. A random intercept was included for participant, story, and question.

The analysis showed a significant effect for perspective on immersion (β = -3.89, *SE* = 0.90, *p* < .001). First-person pronoun stories scores higher on immersion than third-person pronoun stories. No significant effect was found for TV (β = 2.00, *SE* = 2.62, *p* = .446). However, the interaction between perspective and TV is significant (β = -5.76, *SE* = 1.81, *p* = .002). Whether perspective affects the immersion scores is TV dependent. An additional analysis was done using package *emmeans* (Lenth, 2022) to compare the different conditions. This analysis showed that no significant effect was found between the immersion scores of first- and third-person pronoun when T was used in the questionnaire, (β = 1.01, *SE* = 1.27, *p* = 1.000). However, a significant effect was found between first- and third person pronoun stories

when V was used in the questionnaire ($\beta = 6.77$, *SE* = 1.29, *p* < .0001). The immersion scores for first-person pronoun were higher than the scores for third-person pronoun, when addressed with V.

In addition, several covariates showed significant effects. Participants who read more than twice a week score significantly higher than participants who never read ($\beta = 20.95$, *SE* = 7.39, *p* = .005). Participants who prefer comic books score significantly higher than participants who do not like fiction at all ($\beta = 9.29$, *SE* = 4.44, *p* = .037). Participants who prefer physical books over e-readers score significantly higher on immersion ($\beta = 12.46$, *SE* = 5.26, *p* = .018). A significant effect was also found for appreciation ($\beta = 35.43$, *SE* = 2.85, *p* < .001). Immersion scores were higher for participants who scored higher on appreciation. Table 2 shows the full final model.

Table 2 also shows the random effects and model fit. It can be observed that participant and question explain much of the variance and that the model fit is weak ($R^2 = 0.11$) (Cohen, 1988).

Table 2. Mixed effect model of the full immersion questionnaire

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	8.87	7.98	1.11	.266
Perspective (3)	-3.89	0.90	-4.33	**<.001**
TV (V)	2.00	2.62	0.76	.446
Pronoun (3) : TV (V)	-5.76	1.81	-3.18	**.002**
RH-question 1: Not regularly	11.82	6.09	1.94	.052
RH-question 1: Twice a week	20.95	7.39	2.83	**.005**
RH-question 1: Daily	14.34	7.41	1.94	.053
RH-question 1: Once a week	8.63	6.89	1.25	.210
RH-question 2: 8-12 books per year	3.34	8.20	0.41	.684
RH-question 2: < 3 books per year	-3.06	7.91	-0.39	.699
RH-question 2: > 1 book per month	-1.02	8.49	-1.12	.904
RH-question 2: 3-7 books per year	0.01	7.88	0.002	.999
RH question 3: Comic books	9.29	4.44	2.09	**.037**
RH question 3: Poetry	2.01	5.24	0.38	.701
RH question 3: Prose	3.33	4.55	0.73	.464
RH question 3: Plays	7.48	4.62	1.61	.106
RH question 5 (physical book)	12.46	5.26	2.37	**.018**
Appreciation	35.43	2.85	12.45	**<.001**
Random effects		Variance	*SD*	
Participant		115.50	10.75	
Question		104.73	10.23	

StoryType		2.64	1.6
Residual		536.02	23.15
Marginal R^2 / Conditional R^2		0.110 / 0.372	

Note. Significant *p*-values are indicated in bold.

4.1.2. Subscales immersion

Figure 2 illustrates the immersion per subscale per perspective and TV. For all subscales, a similar pattern to the general immersion can be observed for perspective. First-person pronoun stories score higher on attention than third-person pronoun stories. The same TV pattern can also be seen: first-person pronoun stories score higher than third person pronoun stories for V, but no difference can be observed between first- and third-person pronoun stories for T. The violin plots show a great variation between participants, especially for emotional engagement.
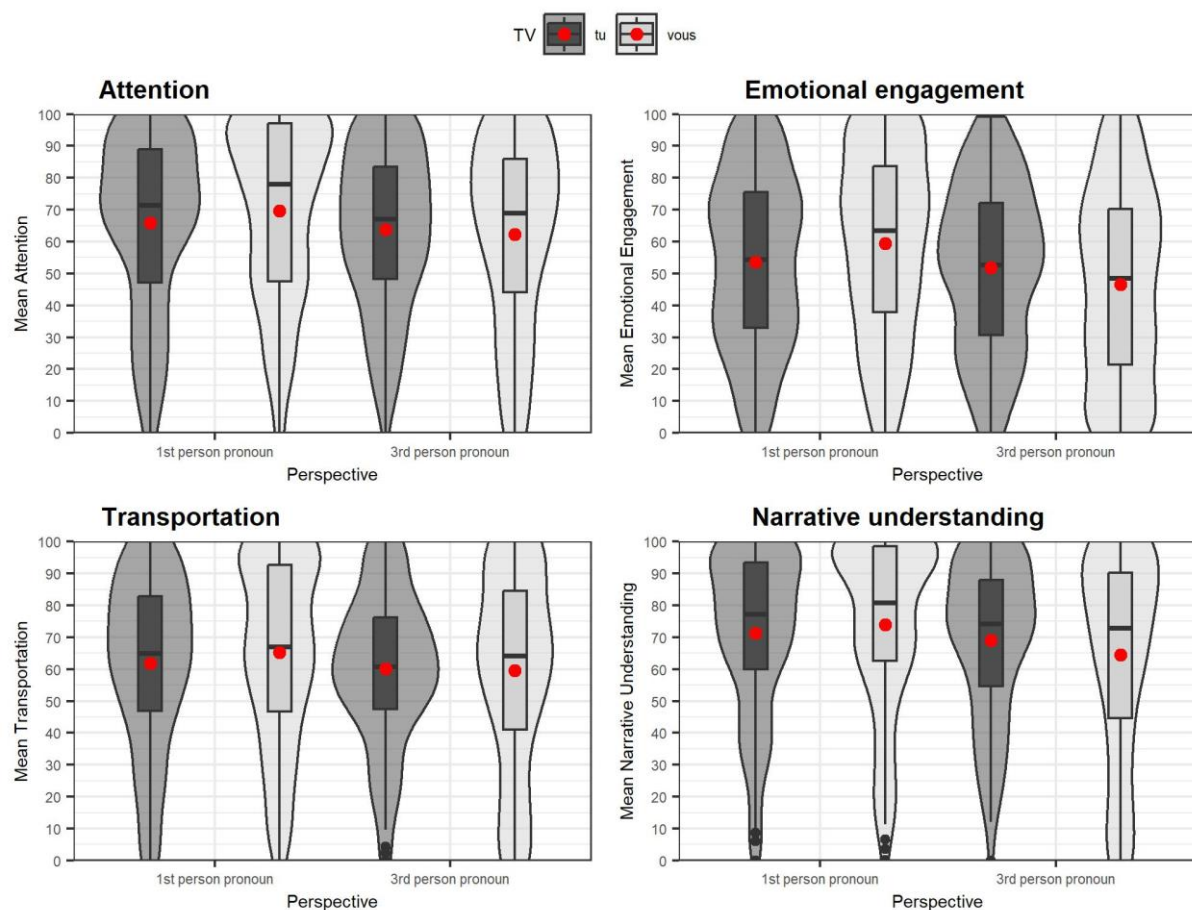

Figure 2. Immersion per subscale in French literary short stories per first- and third-person pronouns and pronoun of address (TV)

The best model fit for the subscales emotional engagement, transportation and narrative understanding was achieved when including as covariates the reading habits question about frequency of reading (question 1 and 2; see Appendix 1), genre preferences (question 3; see Appendix 2), preferred reading materials (question 5; see Appendix 2) and appreciation. A random intercept was included for participant, story, and question. For the attention subscale, the best model fit was achieved with the same model as the other subscales, but additionally including the ART.

The analyses of the subscales showed several significant effects. A significant effect was found for perspective on emotional engagement (β = -6.07, *SE* = 1.55, *p* < .001) and narrative understanding (β = -3.90, *SE* = 1.65, *p* = .018). First-person pronoun stories scored higher on these subscales than third-person pronoun stories.

For the emotional engagement scale, the interaction between perspective and TV was also significant (β = -9.65, *SE* = 3.09, *p* = .002). Whether perspective affects the immersion scores is TV dependent. An additional analysis was done using package *emmeans* (Lenth, 2022) to compare the different conditions. This analysis showed no significant effect for perspective on the emotional engagement scores when T was used in the questionnaire (β = 1.24, *SE* = 2.17, *p* = 1.000). However, a significant effect was found for perspective when V was used in the questionnaire (β = 10.89, *SE* = 2.22, *p* < .0001). The emotional engagement scores for first-person pronoun were higher than the scores for third-person pronoun when addressed with V.

Random effects in the models showed that participant and question both explain much of the variance and the model fit for all scales is moderate (Cohen, 1988), except for narrative understanding, which had a weak model fit.

In addition to the main effects, several covariates showed significant effects. On all scales, a significant effect was found for appreciation: immersion scores were higher when appreciation was higher. On all scales, except narrative understanding, a significant effect was found for RH-question 1 (frequency of reading): participants who read scored higher on these scales then participants who never read. For subscales attention and narrative understanding, a significant effect was found for RH-question 5 (reading materials): scores were higher for readers who prefer physical books over e-readers. The details of the mixed effect models for each subscale can be found in Appendix 5.

4.3. Immersion measured by the reading times

Three analyses were conducted on the reading times for perspective: one for the target word (the pronoun), one for the first word after the pronoun (first spill-over) and one for the second

word after the pronoun (second spill-over). Before the analyses, outliers were removed. First, all reading times below 50 ms or above 3000 ms were removed, because these responses were respectively implausibly low or high. This could have been caused by external factors. Second, datapoints were removed when the reading time differed 2.5 SD from the mean of a participant. Lastly, datapoints were removed when the reading time differed 2.5 SD from the item mean. Following these deletions, 7.0% of the datapoints for the target word were removed, 6.2% of the datapoints for the first spill-over were removed and 6.7% of the datapoints for the second spill-over were removed. Before analyses, the data was log-transformed.

Figure 3 shows the mean reading time and standard error per perspective. Differences can be observed between first-person pronoun and third-person pronoun for the target word (1: $M = 457.6$, $SD = 215.2$; 3: $M = 448.0$, $SD = 197.7$), first spill-over (1: $M = 424.3$, $SD = 149.6$; 3: $M = 402.9$, $SD = 128.4$) and second spill-over (1: $M = 411.2$, $SD = 149.4$; 2: $M = 408.9$, $SD = 154.9$). Stories with third-person pronouns appear to be read faster than stories with first-person pronouns.
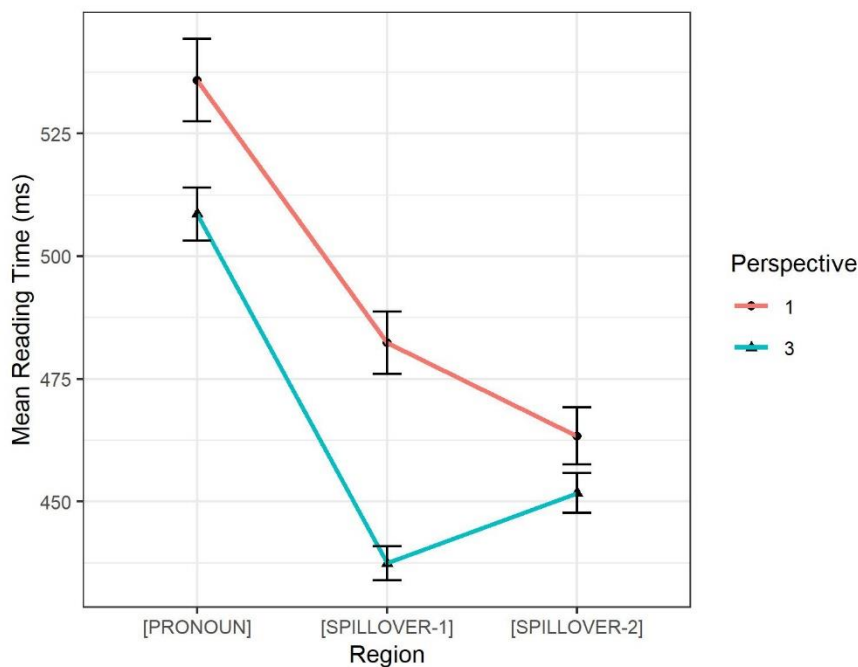

Figure 3. Mean reading times in milliseconds and standard error of the target word (pronoun) and its two spill-overs per perspective in French short stories

4.3.1. Target word (pronoun)

The best model fit for the mixed model for the target word (the pronoun) was achieved when only including appreciation as covariate. A random intercept was included for participant, story, and item.

No significant effect was found for perspective ($\beta = 0.018$, $SE = 0.057$, $p = .754$). The covariate appreciation did show a significant effect: reading times were significantly higher when appreciation was higher ($\beta = 0.061$, $SE = 0.029$, $p = .034$). Table 3 shows the full model.

Table 3 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak ($R^2 = 0.001$) (Cohen, 1988).

Table 3. Mixed effect model on the target word (pronoun) for the first- and third-person pronoun analysis

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	5.950	0.101	58.946	**<.001**
Perspective (3)	0.018	0.057	0.313	.754
Appreciation	0.061	0.029	2.116	**.034**
Random effects		Variance	*SD*	
Participant		0.068	0.135	
Item		0.018	0.261	
StoryType		0.012	0.108	
Residual		0.072	0.267	
Marginal R^2 / Conditional R^2		0.001 / 0.578		

Note. Significant *p*-values are indicated in bold.

4.3.2. First spill-over

The best model fit for the mixed model for the first spill-over was achieved when only including appreciation as covariate. A random intercept was included for participant, story, and item.

No significant effect was found for perspective on the first spill-over ($\beta = -0.011$, $SE = 0.044$, $p = .813$). The covariate appreciation did show a significant effect: reading times were significantly higher when appreciation was higher ($\beta = 0.072$, $SE = 0.025$, $p = .003$). Table 4 shows the full model.

Table 4 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak ($R^2 = 0.003$) (Cohen, 1988).

Table 4. Mixed effect model on the first spill-over for the first- and third-person pronoun analysis

Fixed effect	β	SE	t-value	p-value
(Intercept)	5.900	0.082	71.759	**<.001**
Perspective (3)	-0.011	0.044	-0.237	.813
Appreciation	0.072	0.025	2.944	**.003**
Random effects		Variance	SD	
Participant		0.201	0.100	
Item		0.010	0.201	
StoryType		0.008	0.090	
Residual		0.052	0.228	
Marginal R^2 / Conditional R^2		0.003 / 0.532		

Note. Significant *p*-values are indicated in bold.

4.3.3. Second spill-over

The best model fit for the mixed model for the second spill-over was achieved when only including appreciation as covariate. A random intercept was included for participant, story, and item.

No significant effect was found for perspective on the second spill-over (β = 0.027, *SE* = 0.050, *p* = .595). The covariate appreciation did show a significant effect: reading times were significantly higher when appreciation was higher (β = 0.072, *SE* = 0.026, *p* = .006). Table 5 shows the full model.

Table 5 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak (R^2 = 0.003) (Cohen, 1988).

Table 5. Mixed effect model on the second spill-over for the first- and third-person pronoun analysis

Fixed effect	β	SE	t-value	p-value
(Intercept)	5.860	0.094	62.018	**<.001**
Perspective (3)	0.027	0.050	0.531	.595
Appreciation	0.072	0.026	2.769	**.006**
Random effects		Variance	SD	
Participant		0.068	0.135	
Item		0.018	0.261	
StoryType		0.012	0.108	
Residual		0.072	0.267	
Marginal R^2/ Conditional R^2		0.003 / 0.571		

Note. Significant *p*-values are indicated in bold.

4.4. T/V measured by the reading times

Six mixed models were created for the analyses of the TV data: one for the first target word (first pronoun in the question), one for the first spill-over of the first target word, one for the second spill-over of the first target word, one for the second target word (second pronoun in the question), one for the first spill-over of the second target word, one for the second spill-over of the first target word. Before the analyses, outliers were removed. First, all reading times below 50 ms or above 3000 ms were removed, because these responses were respectively implausibly low or high, which could have been caused by external factors. Then, datapoints were removed when the reading time differed 2.5 SD from the mean of a participant. This led to the deletion of 3.7% of the datapoints. Before analyses, the data was log-transformed.

Figure 4 shows the mean reading times and standard errors of the two target words in the question and their two spill-overs, per TV. It can be observed that the reading times are lower for V (*M* = 347.3, *SD* = 100.8) than for T (*M* = 354.1, *SD* = 82.8), except for the first spill-over of the first pronoun. However, the differences appear to be very small.
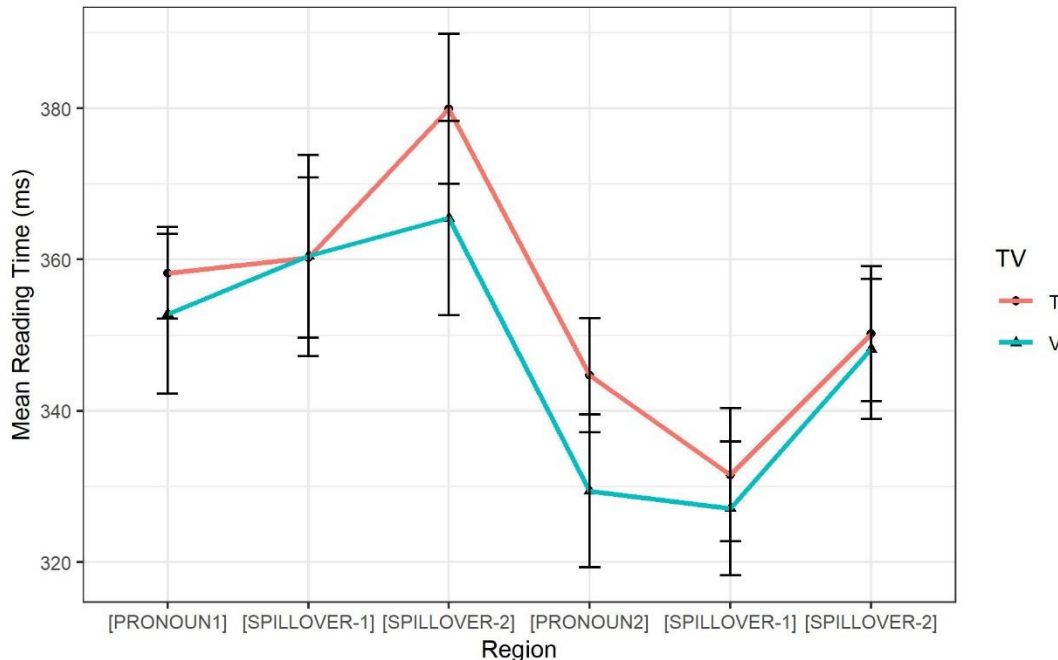

Figure 4. Mean reading times in milliseconds and standard error of the two target words (pronoun) and their two spill-overs in the 'And you?'-question per TV

For all models of the TV analyses the best model fit was achieved when including no covariates in the model, except for the model of the first spill-over of the second pronoun. The best model fit for that model was achieved when including a question on reading frequency (question 1; see Appendix 2) and the number of genres a participant liked (question 4; see Appendix 2). By-participant and story were included as random intercepts in all models. As we analysed each target word separately, item did not need to be included.

4.4.1. First pronoun

No significant effects were found for TV (β = -0.039, *SE* = 0.038, *p* = .303), perspective (β = 0.029, *SE* = 0.026, *p* = .272) or mean immersion (β = -0.0004, *SE* = 0.0009, *p* = .710). There was also no significant effect for the interaction between TV and perspective (β = 0.066, *SE* = 0.053, *p* = .214). Table 6 shows the full model.

Table 6 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak (R^2 = 0.017) (Cohen, 1988).

Table 6. Mixed effect model on the target word (first pronoun) for the TV-analysis

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	5.870	0.088	66.558	**<.001**
TV (V)	-0.039	0.038	-1.036	.303
Perspective (3)	0.029	0.026	1.106	.272
TV (V) : Perspective (3)	0.066	0.053	1.253	.214
Mean Immersion	-0.0004	0.0009	-0.373	.710
Random effects		Variance	*SD*	
Participant		0.018	0.133	
StoryType		0.008	0.088	
Residual		0.027	0.165	
Marginal R^2/ Conditional R^2		0.017 / 0.493		

Note. Significant *p*-values are indicated in bold.

4.4.2. First pronoun, first spill-over

No significant effects were found for TV (β = -0.013, *SE* = 0.056, *p* = .812), perspective (β = -0.030, *SE* = 0.033, *p* = .364) or mean immersion (β = -0.0004, *SE* = 0.001, *p* = .742). There was also no significant effect for the interaction between TV and perspective (β = 0.003, *SE* = 0.067, *p* = .961). Table 7 shows the full model.

Table 7 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak ($R^2 = 0.004$) (Cohen, 1988).

Table 7. Mixed effect model on the first spill-over of the first pronoun for the TV-analysis

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	5.805	0.011	51.163	**<.001**
TV (V)	-0.013	0.056	-0.239	.812
Perspective (3)	-0.030	0.033	-0.913	.364
TV (V) : Perspective (3)	0.003	0.067	0.049	.961
Mean Immersion	-0.0004	0.001	-0.330	.742
Random effects		Variance	*SD*	
Participant		0.050	0.224	
StoryType		0.011	0.105	
Residual		0.041	0.204	
Marginal R^2/ Conditional R^2		0.004 / 0.597		

Note. Significant *p*-values are indicated in bold.

4.4.3. First pronoun, second spill-over

No significant effects were found for TV (β = -0.057, *SE* = 0.050, *p* = .253), perspective (β = 0.034, *SE* = 0.033, *p* = .311) or mean immersion (β = -0.001, *SE* = 0.001, *p* = .488). There was also no significant effect for the interaction between TV and perspective (β = 0.037, *SE* = 0.067, *p* = .586). Table 8 shows the full model.

Table 8 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak ($R^2 = 0.016$) (Cohen, 1988).

Table 8. Mixed effect model on the second spill-over of the first pronoun for the TV-analysis

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	5.926	0.116	51.182	**<.001**
TV (V)	-0.057	0.050	-1.147	.253
Perspective (3)	0.034	0.033	1.020	.311
TV (V) : Perspective (3)	0.037	0.067	0.546	.586
Mean Immersion	-0.001	0.001	-0.695	.488
Random effects		Variance	*SD*	
Participant		0.033	0.182	
StoryType		0.013	0.118	
Residual		0.043	0.211	

Marginal R^2/ Conditional R^2	0.016 / 0.522		

4.4.4. Second pronoun

No significant effects were found for TV (β = -0.051, *SE* = 0.046, *p* = .266), perspective (β = -0.041, *SE* = 0.025, *p* = .110) or mean immersion (β = -0.001, *SE* = 0.001, *p* = .484). There was also no significant effect for the interaction between TV and perspective (β = -0.026, *SE* = 0.051, *p* = .612). Table 9 shows the full model.

Table 9 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak (R^2 = 0.017) (Cohen, 1988).

Table 9. Mixed effect model on second pronoun for the TV-analysis

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	5.838	0.093	62.902	**<.001**
TV (V)	-0.051	0.046	-1.115	.266
Perspective (3)	-0.041	0.025	-1.606	.110
TV (V) : Perspective (3)	-0.026	0.051	-0.508	.612
Mean Immersion	-0.001	0.001	-0.701	.484
Random effects		Variance	*SD*	
Participant		0.036	0.189	
StoryType		0.008	0.094	
Residual		0.024	0.156	
Marginal R^2/ Conditional R^2	0.017 / 0.652			

4.4.5. Second pronoun, first spill-over

No significant effects were found for TV (β = -0.029, *SE* = 0.044, *p* = .513), perspective (β = -0.014, *SE* = 0.030, *p* = .652) or mean immersion (β = -0.000, *SE* = 0.001, *p* = .676). There was also no significant effect for the interaction between TV and perspective (β = -0.072, *SE* = 0.061, *p* = .240).

Two covariates did show a significant effect. A significant effect was found for participants who read more than twice a week (β = 0.261, *SE* = 0.100, *p* = .010). Reading times were higher compared to participants who do not read at all. The number of genres participants liked also shows a significant effect (β = 0.023, *SE* = 0.011, *p* = .039). Reading times were higher for participants who like more genres. Table 10 shows the full model.

Table 10 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is weak ($R^2 = 0.086$) (Cohen, 1988).

Table 10. Mixed effect model on the first spill-over of the second pronoun for the TV-analysis

Fixed effect	β	SE	t-value	p-value
(Intercept)	5.549	0.125	44.364	**<.001**
TV (V)	-0.029	0.044	-0.657	.513
Perspective (3)	-0.014	0.030	-0.452	.652
TV (V) : Perspective (3)	-0.072	0.061	1.731	.240
Mean Immersion	-0.000	0.001	-0.418	.676
RH-question 1: Not regularly	0.156	0.090	2.608	.087
RH-question 1: Twice a week	0.261	0.100	1.200	**.010**
RH-question 1: Daily	0.117	0.098	1.915	.233
RH-question 1: Once a week	0.178	0.093	2.096	.059
RH-question 4: Number of liked genres	0.023	0.011	-1.185	**.039**

Random effects	Variance	SD	
Participant	0.018	0.134	
StoryType	0.013	0.115	
Residual	0.036	0.191	

Marginal R^2/ Conditional R^2	0.086 / 0.506		

Note. Significant *p*-values are indicated in bold.

4.4.6. Second pronoun, second spill-over

No significant effects were found for TV (β = 0.001, *SE* = 0.046, *p* = .986), perspective (β = 0.001, *SE* = 0.027, *p* = .979) or mean immersion (β = 0.001, *SE* = 0.001, *p* = .570). There was also no significant effect for the interaction between TV and perspective (β = -0.038, *SE* = 0.053, *p* = .476). Table 11 shows the full model.

Table 11 also shows the random effects and model fit. It can be observed that the random effects barely explain the variance in reading times and that the model fit is very weak ($R^2 = 0.003$) (Cohen, 1988).

Table 11. Mixed effect model on the second spill-over of the second pronoun for the TV-analysis

Fixed effect	β	SE	t-value	p-value
(Intercept)	5.792	0.068	85.135	**<.001**
TV (V)	0.001	0.046	0.018	.986
Perspective (3)	0.001	0.027	0.027	.979
TV (V) : Perspective (3)	-0.038	0.053	-0.716	.476

Mean Immersion	0.001	0.001	0.569	.570
Random effects		Variance	*SD*	
Participant		0.034	0.184	
StoryType		0.000	0.000	
Residual		0.028	0.167	
Marginal R^2/ Conditional R^2		0.003/0.552		

Note. Significant *p*-values are indicated in bold.

5. Discussion

5.1. Immersion

The first goal of this experiment was to examine the influence of the pronoun in French fictional short stories on the immersion readers experience. This was investigated through two main methods: an immersion questionnaire and online reading times of participants. First, the participants read a story in first- or third-person pronoun, which was followed by a questionnaire about how immersed they felt in the story. Then, a second story was shown written with the other perspective. In this section, the findings of the questionnaire will first be discussed in relation to previous research. Then, the same will be done with the findings of the reading times.

5.1.1. *Perspective in the immersion questionnaire*

Based on Brunyé et al. (2009), Brunyé et al. (2011), Brunyé et al. (2016), Child et al. (2018) and Hartung et al. (2016), we predicted that stories written with first-person pronoun would score higher on the immersion questionnaire than stories with third-person pronoun, which would indicate better immersion for stories written with first-person pronoun. Our results corroborate this claim. The questionnaire that was used enabled us to observe more clearly what aspects of immersion caused this effect. The effect of perspective was significant in the subscales *emotional engagement* and *narrative understanding*: first-person pronoun stories scored higher on the scales than third-person pronouns, meaning immersion is better when reading first-person pronoun stories for these scales.

While the main effect is in line with previous research by Hartung et al. (2016), the current study did not show an effect in the subscale *transportation*, whereas Hartung et al. (2016) did. The results of the present study indicate a similar effect, but this effect is not significant. Hartung et al. (2016) also found an effect for mental imagery, but this scale will not be discussed here, as we excluded it from our analysis due to it lacking internal consistency.

It is unclear why the study by Hartung et al. (2016) did yield a significant effect for the transportation scale and the present study did not. It is possible that the stories that were used were not as inviting to transport into. Hartung et al. (2016) used eight stories, compared to two in this study, which means there was less chance that Hartung et al. (2016)'s effect was due to story. Moreover, the stories in Hartung et al. (2016) are all realistic stories, whereas the stories in the present study are both fantasy stories. It is unclear to what extent this could affect specifically the transportation scale of immersion.

The effect found in the present study for emotional engagement, on the other hand, is in line with previous research by Brunyé et al. (2011) and Child et al. (2018). Brunyé et al. (2011)'s results show that an internal perspective in the text, in this case achieved by using first-person pronouns, causes a more vivid internalisation of emotional events. Child et al. (2018) found that level of immersion depends on the emotional valence of a text, which indicates that emotional engagement is a contributing factor to immersion. Participants were more willing to immerse themselves in positive texts. The stories used in the present study were relatively positive stories (except for the ending of one), which means more willingness to immerse. Thus, the higher scores of the emotional engagement scale that were found are supported by previous findings.

We also found the same effect of perspective on narrative understanding: comprehending the story was easier when it was written with first-person pronouns. This is in line with the results of the EDA signals of Hartung et al. (2016). They argued that third-person pronouns have increased processing demands, because external perspective is likely to anticipate from multiple perspectives, even when it is not needed at the time. Therefore, it makes sense that first-person pronoun stories score higher on narrative understanding, despite the effect not being found in Hartung et al. (2016).

In addition to these main effects, we also observed several (participant-related) factors that caused variance in immersion. For example, on most scales (except for narrative understanding) frequency of reading showed significant effects. In general, participants who read more were also better at immersing in the story. Furthermore, attention and narrative understanding scores were higher for participants who prefer physical books over reading an e-reader, and the ability to emotionally engage is influenced by the type of fiction a reader likes. Another notable factor is the appreciation: Kuijpers et al. (2014) showed that immersion contributes to the appreciation of a story, and that can also be observed in the current study. Readers appreciated the stories better when immersion was higher. Previous studies already reported great variability between participants due to individual differences (Brunyé et al., 2016; Hartung et al., 2016), and our findings corroborate those studies.

5.1.2. Immersion according to the self-paced reading

Based on Brunyé et al. (2009), Brunyé et al. (2011), Brunyé et al. (2016) and Child et al. (2018), we also hypothesized that first-person pronoun stories would be read faster than third-person pronoun stories. Child et al. (2018) found lower reading times for an internal perspective (*I/you*) than for an external perspective (*he/she*), indicating better immersion with an internal perspective. The results in the present study did not show a similar effect: no significant difference was found between reading times of first- and third-person pronouns in the stories.

A reason for this could be the chosen pronoun for the internal perspective. Brunyé et al. (2016) investigated first-, second- and third-person pronouns in extended texts and these results indicated no specific pattern for first-person pronouns, whereas response times for a picture with an internal perspective were lower after reading a second-person sentence and response times for a picture with an external perspective were lower after reading a third-person sentence. Child et al. (2018) only compared *you* with *he/she* and Brunyé et al. (2011) compared *you* with *I*, and even labelled *I* as an external perspective, instead of internal, like the other studies did. We reject the label of external perspective for *I*, as the results of Brunyé et al. (2009) and the first experiment of Brunyé et al. (2016) indicated that first- and second-person pronouns promote an internal perspective. The results for the extended texts in Brunyé et al. (2016) showed no effect for first-person pronoun, which does not indicate the absence of an effect, merely that it was not found for extended narratives.

Regardless of label, Brunyé et al. (2011)'s results showed a stronger effect for second-person pronoun compared to first-person pronouns, which suggests finding an effect would be more likely with *you*. However, we refrained from using *you*, because it would likely lead to a surprisal effect, as it is rarely used as pronoun for the protagonist in literary stories and reading times would be higher regardless of immersion (but see Andeweg et al., 2013). It is plausible that the effects for first-person pronouns were too subtle to detect through self-paced reading in this study.

If it were a matter of subtlety, however, one might expect higher reading times for third-person pronouns and lower for first-person pronouns, even though that difference may not be significant. This was not the case in the present study. It is possible that the assumption that more immersed readers read faster is not realistic in the current study due to the use of a different kind of texts. In this study appreciation proved to be a significant factor on the reading times for the target word and both spill-overs: higher appreciation resulted in higher reading times. The results of the immersion questionnaire showed that the immersion was better when appreciation was higher. Together, this could indicate that more immersed readers read more

slowly than less immersed readers. Less immersed readers may lack the motivation to read the story, and try to read it as fast as possible, to be done with the task. This theory does not contradict earlier research (Brunyé, 2011; Brunyé, 2016; Child et al., 2018) as they did not use literary texts and appreciation was therefore less or possibly not a contributing factor.

5.1.3. Conclusion about immersion

Considering the results of both main measures, we conclude that immersion is different for first-person pronouns compared to third-person pronouns. Readers immerse themselves better in stories written in a first-person pronoun, which modulates an internal perspective, than in stories written in a third-person pronoun, which modulates an external perspective. This still varies greatly between participants. The results of the reading times did not show an effect.

5.2. T/V-use

The second goal of this study was to investigate the influence of T/V-use in this experiment in general and how it influences the results of this experiment. We also discussed the possibility of an interaction between perspective and TV. Again, we assessed the effect of TV with the immersion questionnaire and reading times of self-paced reading. The immersion questionnaire was manipulated between-subjects: half the participants read questions that contained formal pronouns of address (*vous*) and the other half read questions that contained informal pronouns of address (*tu*). Reading times were obtained from a question at the end of each story that addressed the reader and contained V or T. First, the results of the immersion questionnaire will be discussed. Then, the results of the reading times will follow.

5.2.1. T/V-use in the immersion questionnaire

Based on previous studies (Warren, 2006; Schüpbach et al., 2007; Havu, 2009; Levshina, 2017; Den Hartog et al., 2022), we hypothesized that in this experiment participants prefer to be addressed with V. V would generate a more positive attitude (Ollier et al., 2022) towards the experiment in the present study and therefore, T would cause lower immersion scores in the questionnaire.

The results of the immersion questionnaire partly support this hypothesis. No effect was found for TV on immersion, in general, nor for the separate scales, indicating that participants did not fill out the questionnaire differently for V or T. However, an effect was found for the interaction between perspective and TV, both for the full immersion scale and for the emotional engagement scale. This implies that, whether the immersion scores were affected by

perspective, depends on the pronoun of address (TV) that was used in the story. When T was used in the questionnaire, no significant effect was found between the immersion scores of first- and third-person pronoun stories. However, when V was used, first-person pronoun stories scored significantly higher on immersion than third-person pronoun stories. This could indicate that T was unexpected and thereby eliminated the effect the first-person pronoun had on immersion, which is why no significant effect was found between first- and third-person pronoun stories. By contrast, V was expected. Hence, the effect the first-person pronoun had on immersion was still present in the immersion scores of the questionnaire.

The effect that was found for first-person pronoun with V is in line with the results of Ollier et al. (2022). In their study, the conversational agents that used V were evaluated more positively than the conversational agents that used T. This indicates a less positive attitude towards the agent when T was used, which is similar to the findings in the present study. The unexpectedness of T is in line with Warren (2006), Schüpbach et al. (2007) and Havu (2009), who stated that T is almost exclusively used with family and friends, and rarely with strangers.

5.2.2. *T/V-use according to the self-paced reading*

Because of the predicted V-preference (Warren, 2006; Schüpbach et al., 2007; Havu, 2009; Levshina, 2017; Den Hartog et al., 2022), we also expected a surprisal effect for the use of T in the question that directly followed the story and addressed the reader. This surprisal effect would lead to higher reading times, as processing an unexpected pronoun takes longer.

This hypothesis is not supported by the results of the experiment. No effects were found for TV on reading time or the interaction of TV and pronoun, which means that these results provide no evidence for a surprisal effect for the use of T.

A possible limitation that could explain the lack of effect of TV is the participants. Although Ollier et al. (2022) did find results indicating higher evaluation scores for V in general, they also found variability due to gender and age. Younger men and older women evaluated the conversational agents with V better, whereas older men and younger women evaluated the agents with T better. The majority of the participants in the current study were female (60.4%) and the mean age was 19.1 years old. The results of Ollier et al. (2022) indicate that younger women prefer T, which would mean they do not show a surprisal effect for T. As they are most likely used to seeing V, there would be no surprisal effect for V either. As this group comprises the majority of the participants, it is possible this altered the results.

5.2.3. Conclusion about T/V-use

Based on the results of both main measures, we can conclude that T/V-use does have an influence on participants and their responses. However, the influence it has depends the pronoun of address that was used: T was unexpected and thereby eliminated the effect of the first-person pronoun on immersion. V was expected, which is why the effect of perspective on immersion was still present. No evidence of this effect was found through the reading times.

5.3. Relevance, limitations, and future research

The results of this study show that personal pronouns play an important role in the immersion a French reader experiences in a story. In particular, a reader's emotional engagement and narrative understanding is influenced through pronouns. This can be used to positively influence readers: first-person pronouns can be used to appeal to a reader's emotions and behaviour. This adds to existing knowledge on immersion and perspective use.

This study also shows that the use of certain pronouns of address can affect how readers respond to stories and questions. Research on how T/V-use affects the receiver is limited as of yet. To our knowledge, Ollier et al. (2022) and the present study are among the first studies to have taken this approach, instead of focussing on the choice of the speaker or writer. Both these studies do show effects of T/V-use and demonstrate that it is not a straightforward relation. Further research is needed to provide a broader view and more details on the effects of T/V-use.

There are two additional limitations to this study that are worth mentioning, the first being the mental imagery scale. As mentioned, the mental imagery scale was removed from our analysis as the scale did not reach the Cronbach's alpha threshold, meaning it did not have the needed internal consistency. This means the results did not include one of the aspects, which Kuijpers et al. (2014) had argued was part of immersion. Considering Hartung et al. (2016), the mental imagery scale could have shown an effect of perspective.

Another possible limitation to this study is the situation in which the experiment took place. Not all participants finished and started at the same time, which resulted in people walking in and out when other participants were taking the experiment. Disturbances were attempted to be kept to a minimum, but it is possible participants got distracted at times. In the current study, this was corrected by removing extreme data points. Nevertheless, in future research it would be beneficial to not have multiple participants in the same room taking the experiment.

6. General conclusion

In conclusion, the present study has shown that pronouns influence the receiver, both when reading literary stories and when being addressed. First-person pronouns cause readers to be more immersed in the story than third-person pronouns according to the immersion questionnaire, specifically in the aspects *emotional engagement* and *narrative understanding*. No effect was found for readers reading first-person pronoun faster than third-person pronoun, which could have indicated better immersion. Furthermore, the effect of pronoun on immersion is influenced by the pronoun of address. The effect of pronoun on immersion only occurred when addressed with V, indicating an effect of T/V-use on the receiver.

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Appendix 1. Immersion questionnaire – V-version

Attention
1. En lisant l'histoire, vous avez perdu la notion du temps.
2. Vous avez eu du mal à rester concentré.
3. Votre attention était tellement concentrée sur l'histoire que vous avez oublié votre environnement.
4. Vous étiez immergé dans l'histoire pendant que vous lisez.

Mental Imagery
5. En lisant, vous avez eu du mal à imaginer le personnage principal dans votre esprit.
6. En lisant, vous pouviez voir des images des situations décrites.

Emotional engagement
7. Vous avez ressenti la même chose que le personnage principal.
8. Vous avez eu du mal à imaginer ce que les personnages vivaient émotionnellement.
9. L'histoire vous a affecté émotionnellement.
10. Vous avez été capable de comprendre les événements de l'histoire d'une manière similaire à celle dont les personnages les ont compris.
11. Vous ne vous êtes pas senti connecté au personnage principal de l'histoire.

Transportation
12. Vous avez oublié vos propres problèmes et préoccupations au cours de l'histoire.
13. Lorsque vous avez terminé de lire l'histoire, vous avez l'impression d'avoir voyage dans le monde dans lequel l'histoire se déroule.
14. En lisant, vous avez l'impression d'être à l'intérieur du monde narratif.
15. Par moments, vous avez l'impression que le monde de l'histoire et la réalité semblent se chevaucher.

Narrative understanding
16. Vous avez eu du mal à suivre le fil de l'histoire.
17. À certains moments, vous avez eu du mal à comprendre ce qui se passait dans l'histoire.
18. Vous avez compris pourquoi les personnages on fait ce qu'ils ont fait.
19. Vous pouviez comprendre pourquoi les personnages ressentaient ce qu'ils ressentaient.

Appendix 2. Reading Habits Questionnaire

1. À quelle fréquence lisez-vous des ouvrages de fiction ?
   a. Quotidiennement
   b. Plus de deux fois par semaine
   c. Une fois par mois
   d. Je ne lis pas régulièrement
   e. Je ne lis jamais
2. Combien de livres lisez-vous par an ?
   a. Plus d'un par mois
   b. Huit à douze par an
   c. Trois à sept par an
   d. Moins de trois par an
   e. Zéro
3. Quel type de fiction préférez-vous ?
   a. Prose
   b. B.D.
   c. Poésie
   d. Théâtre
   e. Je n'aime pas du tout la fiction
4. Quels genres populaires préférez-vous ?
   a. romance
   b. action-aventure
   c. science-fiction
   d. fantasy
   e. thriller
   f. jeune-adulte
   g. horreur
   h. mystère/crime
   i. fiction historique
   j. fiction féminine
   k. saga familiale
   l. roman psychologique
   m. passage à l'âge adulte
   n. fiction littéraire
   o. autres :
5. Lisez-vous généralement sur un liseuse numérique ou un livre physique ?
   a. Liseuse numérique
   b. Livre physique

Appendix 3. French Author recognition test

These names were presented in a random order.

Très connu	Méconnus	Inconnus	Foils
Marc levy	Annie Ernaux	Valérie Perrin	Aurelie Marc
Honoré Balzac	Michel Bussi	Carène Ponte	Julien Vallet
Albert Camus	Virginie Grimaldi	Julien Sandrel	Mila Clerc
Guy de Maupassant	Patrick Modiano	Agnès Ledig	Mohamed Lombard
Victor Hugo	Leïla Slimani	Alain Mabanchkou	Oumar Magnin
Guillaume Musso	Raphaëlle Giordano	Claudine Jacques	Dorothée Le Breton
Michel Houellebecq	Delpine de Vigan	Aurélie Valognes	Ahamandi Coutant
Maxime Chattam	Franck Thilliez	Olivier Norek	Aissa Baudoin
Romain Gary	Philippe Ségur	Melissa da Costa	Clementine Bardin
Sylvain Tesson	Katherine Pancol	Maurice LeBlanc	Augustin Duval
			Francis Blanchet
			Gaëlle Ferre

Appendix 4. Content questions

The content questions for the story *Péripéties nocturnes*:

1. La protagoniste est suivi par un grand-duc.
2. La protagoniste trouve une place de secours sous un rocher.
3. La protagoniste accomplit sa mission à temps.

The content questions for the story *Les grandes découvertes des perdues*:

1. Le protagoniste est un astronaute de la NASA.
2. Le protagoniste ne peut se téléporter que dans des endroits qu'il peut voir.
3. Le protagoniste s'est perdu dans l'univers infini.

Appendix 5. Additional results of the subscales of the immersion questionnaire

In this appendix the results of each separate subscale are reported.

Attention scale
Table 12 displays the results of the mixed effect model of the subscale *attention*. The analysis showed no significant effect for perspective on attention (β = -2.32, *SE* = 1.96, *p* = .237), TV on attention (β = 3.75, *SE* = 3.24, *p* = .248) or the interaction between perspective and TV (β = -3.39, *SE* = 3.96, *p* = .392).

Several covariates showed significant effects. A significant effect was found for participants who do not read regularly (β = 19.59, *SE* = 7.98, *p* = .014), who read more than twice a week (β = 33.03, *SE* = 9.37, *p* < .001) or who read daily (β = 24.24, *SE* = 9.32, *p* = .010). Attention scores were higher compared to participants who do not read at all. No significant effect was found for participant who read once a week (β =17.19, *SE* = 8.69, *p* = .050). A significant effect was found for reading physical books versus reading on e-readers (β = 19.20, *SE* = 6.49, *p* = .003). Participants who read physical books score higher on attention that participants who read on e-readers. A significant effect was also found for appreciation (β = 37.48, *SE* = 5.60, *p* < .001). Attention scores were higher for participants who scored higher on appreciation.

Table 12 also shows the random effects and model fit. It can be observed that mainly participant explains much of the variance and that the model fit is moderate (R^2 = 0.18) (Cohen, 1988).

Table 12. Mixed effect model for the attention scale

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	14.35	11.41	1.23	.209
Perspective (3)	-2.32	1.96	-1.18	.237
TV (V)	3.75	3.24	1.16	.248
Perspective (3) : TV (V)	-3.39	3.96	-0.86	.392
RH-question 1: Not regularly	19.59	7.98	2.46	**.014**
RH-question 1: Twice a week	33.03	9.37	3.52	**<.001**
RH-question 1: Daily	24.24	9.32	2.60	**.010**
RH-question 1: Once a week	17.19	8.69	1.98	.050
RH-question 2: 8-12 books per year	-2.34	10.46	-0.22	.823
RH-question 2: < 3 books per year	-11.88	10.04	-1.18	.237
RH-question 2: > 1 book per month	-5.88	10.82	-0.54	.587
RH-question 2: 3-7 books per year	-9.19	10.08	-0.91	.362
RH question 3: Comic books	9.17	5.52	1.66	.097

RH question 3: Poetry	-7.23	6.43	-1.13	.261
RH question 3: Prose	-1.56	5.64	-0.28	.782
RH question 3: Plays	10.08	5.76	1.75	.081
RH question 5 (physical book)	19.20	6.49	2.96	**.003**
ART	-0.57	0.47	-1.22	.222
Appreciation	37.48	5.60	6.69	**<.001**
Random effects		Variance	SD	
Participant		112.18	10.59	
Question		23.15	4.81	
StoryType		2.42	1.56	
Residual		493.87	22.22	
Marginal R^2/ Conditional R^2		0.180 / 0.359		

Note. Significant *p*-values are indicated in bold.

Emotional engagement scale

Table 13 displays the results of the mixed effect model of the subscale *emotional engagement.* The analysis showed a significant effect for perspective on emotional engagement (β = -6.07, *SE* = 1.55, *p* < .001). First-person pronoun scored higher on emotional engagement than third-person pronoun. No significant effect was found for TV (β = 1.26, *SE* = 2.72, *p* = .642). The interaction between perspective and TV, however, is significant (β = -9.65, *SE* = 3.09, *p* = .002). Whether TV affects the emotional engagement is perspective dependent. An additional analysis was done using package *emmeans* (Lenth, 2022) to compare the different conditions. This analysis showed that no significant effect was found for perspective on the emotional engagement scores when T was used in the questionnaire (β = 1.24, SE = 2.17, p = 1.000). However, a significant effect was found for perspective when V was used in the questionnaire (β = 10.89, SE = 2.22, p < .0001). The emotional engagement scores for first-person pronoun were higher than the scores for third-person pronoun, when addressed with V.

Several covariates showed significant effects. A significant effect was found for participants who do not read regularly (β = 13.73, *SE* = 6.46, *p* = .034), who read more than twice a week (β = 21.74, *SE* = 7.77, *p* = .005) and who read daily (β = 17.23, *SE* = 7.76, *p* = .027). Emotional engagement scores were higher compared to participant who do not read at all. No significant effect was found for participants who read once a week (β = 9.82, *SE* = 7.25, *p* = .176). No significant effects were found for participants who read one or more books per year compared to the participants who read no books (details can be found in table 13). A significant effect was found for participants who prefer comic books (β = 9.87, *SE* = 4.60, *p* = .032) or prose (β = 9.48, *SE* = 4.73, *p* = .045). These participants score higher on emotional engagement compared to participants who do not like fiction. Similar significant effects were

not found for the preferences of poetry (β = 3.71, *SE* = 5.40, *p* = .491) or plays (β = 6,24, *SE* = 4.79, *p* = .193). A significant effect was also found for appreciation (β = 34.09, *SE* = 4.46, *p* < .001). Emotional engagement scores were higher for participants who scored higher on appreciation.

Table 13 also shows the random effects and model fit. It can be observed that participant and question explain much of the variance and that the model fit is moderate (R^2 = 0.14) (Cohen, 1988).

Table 13. Mixed effect model for the emotional engagement scale

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	-2.30	9.54	-0.24	.810
Perspective (3)	-6.07	1.55	-3.92	**<.001**
TV (V)	1.26	2.72	0.46	.643
Perspective (3) : TV (V)	-9.65	3.09	-3.13	**.002**
RH-question 1: Not regularly	13.73	6.46	2.13	**.034**
RH-question 1: Twice a week	21.74	7.77	2.80	**.005**
RH-question 1: Daily	17.23	7.76	2.22	**.027**
RH-question 1: Once a week	9.82	7.25	1.36	.176
RH-question 2: 8-12 books per year	4.69	8.64	0.54	.587
RH-question 2: < 3 books per year	-2.94	8.35	-0.35	.725
RH-question 2: > 1 book per month	-2.62	8.96	-0.29	.770
RH-question 2: 3-7 books per year	3.64	8.37	0.44	.664
RH question 3: Comic books	9.87	4.60	2.15	**.032**
RH question 3: Poetry	3.71	5.40	0.69	.491
RH question 3: Prose	9.48	4.73	2.01	**.045**
RH question 3: Plays	6.24	4.79	1.30	.193
RH question 5 (physical book)	9.25	5.42	1.71	.088
Appreciation	34.09	4.46	7.65	**<.001**

Random effects	Variance	SD		
Participant	86.73	9.31		
Question	108.69	10.43		
Residual	509.15	22.56		
Marginal R^2 / Conditional R^2	0.143 / 0.381			

Note. Significant *p*-values are indicated in bold.

Transportation scale
Table 14 displays the results of the mixed effect model of the subscale *transportation*. The analysis showed no significant effect for perspective on transportation (β = -2.35, *SE* = 1.58, *p*

= .137), TV on transportation (β = 4.80, *SE* = 3.37, *p* = .155) or the interaction between perspective and TV (β = -3.15, *SE* = 3.20, *p* = .324).

Several covariates showed significant effects. A significant effect was found for participants who do not read regularly (β = 17.51, *SE* = 7.92, *p* = .027) and who read more than twice a week (β = 20.47, *SE* = 9.57, *p* = .033). Transportation scores were higher compared to participants who do not read at all. No significant effect was found for participants who read once a week (β = 15.84, *SE* = 8.92, *p* = .076) or who read daily (β = 18.06, *SE* = 8.58, *p* = 0.060). A significant effect was found for appreciation (β = 40.38, *SE* = 3.20, *p* < .001). Transportation scores were higher for participants who scored higher on appreciation.

Table 14 also shows the random effects and model fit. It can be observed that participant and question explain much of the variance and that the model fit is moderate (R^2 = 0.13) (Cohen, 1988).

Table 14. Mixed effect model for the transportation scale

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	11.54	11.20	1.03	.303
Perspective (3)	-2.35	1.58	-1.49	.137
TV (V)	4.80	3.37	1.42	.155
Perspective (3) : TV (V)	-3.15	3.20	-0.99	.324
RH-question 1: Not regularly	17.51	7.92	2.21	**.027**
RH-question 1: Twice a week	20.47	9.57	2.14	**.033**
RH-question 1: Daily	18.06	9.58	1.89	.060
RH-question 1: Once a week	15.84	8.92	1.78	.076
RH-question 2: 8-12 books per year	-5.07	10.63	-0.48	.633
RH-question 2: < 3 books per year	-7.53	10.26	-0.73	.464
RH-question 2: > 1 book per month	-5.31	11.01	-0.48	.630
RH-question 2: 3-7 books per year	-7.69	10.26	-0.75	.453
RH question 3: Comic books	5.61	5.71	0.98	.326
RH question 3: Poetry	0.43	6.71	0.06	.949
RH question 3: Prose	-1.26	5.86	-0.22	.829
RH question 3: Plays	3.10	5.94	0.52	.602
RH question 5 (physical book)	8.60	6.74	1.28	.203
Appreciation	40.38	4.77	8.47	**<.001**

Random effects	Variance	SD		
Participant	162.48	12.75		
Question	70.45	8.39		
StoryType	15.42	3.926		
Residual	419.55	20.48		
Marginal R^2/ Conditional R^2	0.130 / 0.453			

Note. Significant *p*-values are indicated in bold.

Narrative understanding scale

Table 15 displays the results of the mixed effect model of the subscale *narrative understanding*. A significant effect was found for perspective on narrative understanding ($\beta = -3.90$, $SE = 1.65$, $p = .018$). First-person pronoun scored higher on narrative understanding than third-person pronoun. No significant effect was found for TV on narrative understanding ($\beta = -0.75$, $SE = 3.84$, $p = .845$) or for the interaction between perspective and TV ($\beta = -5.23$, $SE = 3.28$, $p = .112$).

For this scale, only two covariates showed significant effect: appreciation ($\beta = 30.63$, $SE = 5.04$, $p < .001$) and reading physical books versus reading e-readers ($\beta = 15.42$, $SE = 7.68$, $p = .045$). Immersion scores were higher for participants who scored higher on narrative understanding and participants who prefer physical books over e-readers scored higher on narrative understanding. Table 6 shows the full model for the narrative understanding scale.

Table 15 also shows the random effects and model fit. It can be observed that participant and question explain much of the variance and that the model fit is weak ($R^2 = 0.12$) (Cohen, 1988).

Table 15. Mixed effect model for the narrative understanding scale

Fixed effect	β	*SE*	*t*-value	*p*-value
(Intercept)	21.71	11.30	1.92	.055
Perspective (3)	-3.90	1.65	-2.37	**.018**
TV (V)	-0.75	3.84	-0.20	.845
Perspective (3) : TV (V)	-5.23	3.28	-1.59	.112
RH-question 1: Not regularly	-3.21	8.99	-0.36	.721
RH-question 1: Twice a week	11.46	10.87	1.05	.292
RH-question 1: Daily	-0.60	10.88	-0.06	.956
RH-question 1: Once a week	-6.53	10.13	-0.65	.519
RH-question 2: 8-12 books per year	13.27	12.07	1.10	.272
RH-question 2: < 3 books per year	6.53	11.65	0.56	.575
RH-question 2: > 1 book per month	8.05	12.50	0.64	.520
RH-question 2: 3-7 books per year	8.89	11.63	0.76	.445
RH question 3: Comic books	11.67	6.50	1.80	.073
RH question 3: Poetry	8.26	7.65	1.08	.280
RH question 3: Prose	3.86	6.67	0.58	.563
RH question 3: Plays	12.27	6.76	1.81	.070
RH question 5 (physical book)	15.42	7.68	20.01	**.045**
Appreciation	30.63	5.04	6.08	**<.001**

Random effects		Variance	*SD*	
Participant		223.53	14.951	
Question		5.03	2.24	

Residual	453.63	21.30
Marginal R^2/ Conditional R^2	0.115 / 0.412	

Note. Significant *p*-values are indicated in bold.