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The effect of TikTok exposure on young adults' sustained attention span and the comprehension of information in digital texts and videos

Romy Victoria Siehoff

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Abstract

Previous research demonstrates that media multitasking is negatively associated with cognitive skills - such as memory or attention (Parry & le Roux, 2021). However, limited literature has shed light on how individuals' cognitive abilities may be impacted by the use of TikTok, a social media app that captures users' attention with an algorithm-driven strategy. This raises the question of whether exposure to TikTok (light/heavy users) has an effect on young adults' sustained attention span and the comprehension of information in digital texts and videos. This study gathered information about 191 participants on the basis of their TikTok exposure, comprehension of information, and attention span. TikTok exposure was shown to have an effect on sustained attention span, particularly in relation to distractibility. Heavy TikTok users had more difficulty blocking out distracting thoughts than light TikTok users. However, TikTok exposure had no effect on information comprehension and this effect was also not influenced by the format in which the information was presented (text/video). Accordingly, the effect of TikTok on information comprehension is not as detrimental as initially assumed. Nevertheless, it should be noted that the effect of TikTok exposure on sustained attention span may indicate that the newly-established platform may have long-term effects on information comprehension, which cannot be predicted with current research.

Keywords: TikTok exposure, sustained attention span, information format, information comprehension, media multitasking, technology

Introduction

The way we interact with information has radically changed as a result of recent technological advancements. The emergence of social media in particular has revolutionized the way we interact with other people as it is now our preferred medium of everyday communication (Dentzel, 2013). However, this exposure to digital media may also affect our cognitive skills (Parry & le Roux, 2021). There is a rising school of thought that contends that we cannot assimilate new technology as quickly as it advances (Subramanian, 2018). Since social media can be considered a subset of technology, it follows that the two - i.e., social media and technology - may have a profound influence on one another. This impact can vary depending on users' exposure to social media (and/or technology). As long as information technology is continuously encroaching on our lives, information comprehension for digital texts and sustained attention span will inevitably continue to decline (e.g., Mangen et al., 2013; Ophir et al., 2009). To the best of our knowledge, limited attempts have been made to investigate the effect of social media on young adults' cognitive skills. More research is needed to determine how more algorithm-driven social media sites affect individuals'

cognitive abilities. The following study will focus on TikTok exposure and its effects on sustained attention span and the comprehension of information in digital texts and videos.

1.1 The role of social media exposure in young adults' daily lives

Social media generally refers to digital technologies that place an emphasis on user-generated content or interactions (Kaplan & Haenlein, 2010). The number of people visiting and using social media sites daily is increasing rapidly (Keenan & Shiri, 2009). As of 2015, social media sites such as Twitter, Instagram, and Facebook were routinely used by 90% of young American adults (Perrin, 2015). The overall number of minutes spent on social networking sites per day has increased by an average of 37% year-over-year in the United States alone (Nielsen, 2012). Nowadays, social media platforms like Facebook, Twitter, and LinkedIn have more than 1 billion users, making up roughly 25% of all Internet usage (Monica-Ariana & Anamaria-Mirabela, 2014). Studies estimate that university students use social networking sites for 8 to 10 hours per day to browse, like, and publish (Wood, 2018).

Despite the fact that not everyone has access to social media and that some nations have prohibited or restricted social media, individuals who do have access make constant use of it. Social media usage has increased significantly not just among the working society but also among students, or more generally in the educational context (Raut & Patil, 2016). Nearly one-third of teenagers habitually watch TV, listen to music, chat on the phone, send instant messages, or browse the internet while doing their homework (Lin et al., 2011). Due to the rapid developments of multimedia and social media, core reading tasks, homework assignments, and classroom activities increasingly incorporate audio and video, both consciously and unconsciously, online and offline (Lin et al., 2011). Depending on the environment's multimedia design, this can either result in a thought-provoking, educational experience or disorientation and skepticism (Mayer, 2001). Additionally, research demonstrates a detrimental correlation between social networking and students' academic performance (e.g., Lau, 2017; Tafesse, 2022).

1.2 Attention span and the role of social media

Visual-spatial attention span is defined as “the maintenance of attention over time to specific stimuli in a visual environment” (Espiritu, 2016). With the exception of the retina, every part of the visual pathway is susceptible to top-down influences (Gilbert & Li, 2013). Top-down processing is the procedure by which prior knowledge, experiences, or expectations influence how sensory data is interpreted (Gazzaniga et al., 2010). Perceptions

in top-down processing move from the more general to the more specific knowledge (Novakazi, 2020). According to Salmerón et al. (2018), top-down processing typically results in a stimulus being fixated, suggesting that when reading, for instance, social media users deliberately focus their attention on the most important information to extract data from the text. However, researchers claim that the average attention span has decreased from twelve seconds at the start of the 2000s to eight seconds presently (Subramanian, 2018).

Particularly sustained attention span has received a considerable amount of attention recently. Sustained attention is crucial to be able to function uninterruptedly while performing activities of daily life. With the development and engagement of social media, media multitasking - i.e., using numerous social media platforms and tasks at once - is becoming an increasingly common phenomenon (Lin et al., 2011). Most students indicate that since they grew up with technology, they are able to focus their attention on several tasks at once, without it having negative effects on their academic performance (Henderson et al., 2016).

However, media multitasking has been found to be inversely connected with cognitive skills – such as memory or attention (Parry & le Roux, 2021). Individuals with higher levels of media multitasking show increased distractibility and greater difficulty with cognitive control compared to those considered as having lower levels of exposure to media multitasking (Parry & le Roux, 2021). In a study by Ophir et al. (2009), participants were asked to perform a sustained attention test, where they report whether a (red) rectangle had changed the orientation between two consecutive exposures in order to filter environmental distractions by ignoring distractor (blue) rectangles. Results show that college students who engage more frequently in multitasking activities (heavy media multitaskers), like responding to emails while listening to a podcast, perform worse on a task-switching ability test and find it more difficult to filter out interference from the irrelevant task set than those who multitask less frequently (light media multitaskers) (Ophir et al., 2009).

The Load Theory of Selective Attention and Cognitive Control states that in conditions of high perceptual load, the perceptual selection process facilitates the exclusion of irrelevant distractor stimuli from awareness (Lavie et al., 2004). This rather passive mechanism prevents interference from irrelevant distractions by prohibiting perception of the distractions when processing capacity is insufficient. The current study attempts to apply the Load Theory of Selective Attention and Cognitive Control by investigating the effect of TikTok exposure on cognitive control. This study suggests that high exposure to TikTok could lead to a detriment of the perceptual selection mechanism by overloading the brain's

capacity and function with constant stimulation and impairing the brain's ability to filter out stimuli when individuals find themselves in situations without constant overload.

The inability to maintain focus also has a negative impact on academic performance since it makes it more difficult to learn the skills and knowledge required, as well as to plan ahead and manage time effectively (Anastopoulos & King, 2015). According to recent research, most studies indicated a substantial negative correlation between the quantity of screen exposure and sustained attention span (e.g., Anderson & Hanson, 2013). Van der Schuur et al. (2020) found that studies employing self-reports measuring academic attention problems revealed a detrimental association between media multitasking and adolescents' academic achievement. Furthermore, Radesky et al. (2014) found that media exposure is linked to later issues with executive functioning, language development, cognition, attention, and academic achievement.

Barton et al. (2021) examined that while social media use and attention are linked to the grade point average (GPA) of students, the association between social media and GPA is not significantly impacted by attention (and vice versa). Regardless of how much control they claimed to have over their study environment and time, students' GPAs typically decreased the more social media use they admitted to (Barton et al., 2021). Students who struggled with focusing were also more likely to report poorer GPAs, regardless of whether they used social media. Nevertheless, previous literature has only shed light on the effect of social media platforms like Twitter, Facebook, and YouTube (e.g., Alloway et al., 2013) on sustained attention span, and has neglected more recently-established platforms such as TikTok.

Additionally, earlier research generally demonstrated that social media usage and media multitasking have an effect on individuals' cognitive abilities, especially in relation to sustained attention (e.g., Parry & le Roux, 2021). However, other cognitive skills such as individuals' comprehension of information have received little attention so far. Investigations into the effect of social networking sites (SNSs) engagement on cognitive skills revealed that active SNS users are assigned a similar weight to incoming streams of information than passive SNS users (Alloway & Alloway, 2012).

1.3 Information comprehension

The last ten years have also seen a marked increase in interest in the research area of information comprehension in relation to digital texts. This rising interest is predominantly related to declining information comprehension in digital texts (Wolf et al., 2009). However, although previous research into information comprehension in digital texts is extensive, the

comprehension of information in videos has received limited attention so far. Nevertheless, current trends suggest that individuals prefer video over digital texts since visual content is more engaging than words alone (Slade-Silovic, 2018). This could make listening a powerful tool to expose students to complex contexts and new vocabulary.

Information comprehension in texts

According to Rodrigues and Martins (2008), reading comprehension creates relationships between previously known information and new information by acquiring means of inferences during the reading process. As individuals read for comprehension, coreference and coherence-building processes integrate incoming propositions (i.e., sentences) with the knowledge of their evolving mental representation (Kintsch, 1988).

The primary method of learning to read and reading to learn has long been printed texts. Digital texts have, however, become more prevalent due to the pervasiveness of technology, and the growing volume of these texts calls for new comprehension skills (Pardede, 2019), such as reading techniques required to engage with digital texts. Understanding how the medium affects reading comprehension has become crucial due to the increased preference for digital reading over paper reading (Delgado et al., 2018).

Noyes and Garland (2005) uncovered that although test participants who read on a computer screen could perform equally well on a comprehension test as participants who read the same text in print form, their cognitive processing strategies did differ. In essence, readers of printed texts comprehended the information, whereas readers of digital texts just retained a memory of it. This demonstrates that individuals are only able to discriminate between the distinctions between digital and printed reading materials under specific circumstances. Furthermore, Lin et al. (2011) showed that when individuals are reading and engaging in video content simultaneously, their reading comprehension skills are impaired.

In contrast, Pardede (2019) claims that studies done specifically after 2010 demonstrate the superiority of digital reading over paper reading for information comprehension, which may be related to the rising usage of digital media in our daily life. However, a lesser number of studies (e.g., Delgado et al., 2018; Mangen et al., 2013) still demonstrate the superiority of printed reading or a negligible difference in the impact of the two forms on comprehension. Possible causes of this discrepancy are the amount of technological innovation used as reading tools, participant familiarity with the technology, participant mastery of digital reading strategies, and participant perception of digital reading (Pardede, 2019).

Over the past few decades, numerous researchers have made claims about how individuals process information in text format (e.g., Braasch & Bråten, 2017; List & Ballenger, 2019). The documents model (DM) describes how readers conceptualize various messages in terms of the information sources that are used to convey them (Britt & Rouet, 2012). Regardless of how the documents are related to one another, the DM advises readers to create source-content linkages (Braasch & Bråten, 2017). In other words, readers should treat all communications equally in terms of their respective information sources (Braasch & Bråten, 2017). As a result, readers are expected to build a coherent mental representation of information in multiple, distinct texts (Braasch & Bråten, 2017). However, the current study makes the assumption that information comprehension in videos is different from that in digital texts. Individuals are expected to understand video content by not only creating source-content linkages but by also encoding images and narration and by mapping the order of information (List & Ballenger, 2019).

Information comprehension in videos

Several experimental studies have investigated the comprehension of information in digital and printed texts. However, limited literature has examined the comprehension of information in videos. Listening comprehension is defined as “one’s ability to listen and comprehend the spoken language of multiple utterances and oral texts” (Kim & Pilcher, 2016). Particularly on recently developed platforms like Instagram, YouTube, and TikTok, young adults are constantly exposed to digital forms of media that demand their listening skills. In contrast to recent research indicating a detriment in information comprehension in texts as a result of increased exposure to digital formats of text, information comprehension for videos seems not to be affected by this phenomenon, mainly because it is more memorable (Yadav et al., 2011).

Information in videos has reportedly been found to be easier to understand than text-based content. Chan and Allman-Farinelli (2022) showed that young adults choose video-style posts over both realistic image formats and text or icon. Additionally, Ali Batel (2014) conducted an experiment in order to assess the general comprehension of intermediate-level English as a Second Language (EFL) student using video versus written text as a learning technique. The results showed that using a video rather than a written text was more helpful for language comprehension. Accordingly, previous research indicates that among students, listening to a passage often results in better comprehension than reading the same passage (Ali Batel, 2014).

Rahimi and Soleymani (2015) examined how mobile learning - i.e., education or learning through mobile devices - affected the listening comprehension of EFL students. The experimental group engaged in listening exercises over the course of one semester while listening to podcasts on their smartphones and/or portable digital media players. The control group conducted their listening exercises while using desktop computers. Findings show that the experimental group performed significantly better on listening comprehension tests compared to the control group (Rahimi & Soleymani, 2015). These results indicate that students listening to podcasts showed better listening comprehension skills compared to those that conducted their listening exercises while using desktop computers.

As a result of the exponential growth of SNS, our cognitive resources are in increasing demand (Alloway & Alloway, 2012). There is strong evidence that when a person performs two or more attentionally demanding activities at once, their ability to allocate their attention to each activity is constrained, which negatively affects their performance (Wickens, 1980). Accordingly, since social media demands numerous activities at once, it hinders cognitive abilities which are essential for information comprehension (e.g., Alloway & Alloway, 2012; Wickens, 1980).

1.4 Measuring social media use in the case of TikTok

It is important to note that despite previous literature highlighting the negative aspects of social media in general and digital forms of information comprehension in particular, relatively few studies have been published on the use of TikTok in English information comprehension. Originally designed as a platform for sharing short-form videos, especially of dancing and lip-syncing, TikTok has subsequently grown into a full-fledged video service featuring content for all types of authors (Iqbal, 2021). The popularity of the platform grew significantly during the COVID-19 pandemic (Kennedy, 2020) and its tremendous impact in terms of setting trends, originating viral content, and shaping contemporary culture is well-recognized (Stahl & Literat, 2022). In contrast to other social media apps that are based on following and followers, TikTok is primarily algorithm-driven (Anderson, 2020). The average Generation Z user watches over 7.2 hours of videos daily (Faughnder, 2022). Accordingly, TikTok has the means to capture the user's attention by providing an extensive database of short-form videos with a smart algorithm that presents a constant stream of addictive personalized content.

TikTok has provided the optimum delivery length for the consumer market since it adapts to peoples' narrowing attention spans (Fallon, 2022). However, due to its ever-swiping

nature, the platform's short video format has been associated with a decrease in sustained attention span (Fallon, 2022). Particularly, the compulsion to keep watching an endless supply of short-form videos could be impacting our attention spans, even though the exact impact remains unclear (Hockaday, 2023).

Although it is relevant to study the effect of social media on individuals' cognitive skills, researching this relationship is challenging due to issues related to the methodology used to study this phenomenon. Studies on the use of social media have primarily relied on participants' self-reports of their usage (e.g., Kaushik, 2018; Parry & le Roux, 2021). However, Mahalingham et al. (2023) reported relatively low validity of self-reported social media use, indicating no significant correlation between a single estimate of subjective and objective social media use. In light of this, the study suggests that subjective and objective social media use may not be significantly associated (Mahalingham et al., 2023). Furthermore, research indicates that people both overestimate and underestimate their use of social media (e.g., Junco, 2013). As a result, researchers should assess participants' social media exposure using more objective measurements.

1.5 Research question and relevance

The impact of TikTok exposure on sustained attention span and the comprehension of information in digital texts and videos will be carefully examined in the following study. Based on the investigations introduced beforehand, this study presents the following research question and related sub-questions:

RQ: What effect does TikTok exposure have on young adults' sustained attention span and the comprehension of information in digital texts and videos?

SQ1: Does TikTok exposure have an effect on sustained attention span?

SQ2: Does TikTok exposure have an effect on information comprehension and is this effect influenced by the format in which the information is presented (text/video)?

To assess participants' social media exposure, they were exposed to a set of TikTok sound bites and were asked to continue them. Participants heard a brief segment of a song or user-created sound and were then asked to choose one of four multiple-choice options to indicate the continuation of the sound bite. The impact of TikTok exposure on participants'

cognitive skills was then assessed by measuring information comprehension and sustained attention span.

Based on the literature review, it is predicted that TikTok use affects sustained attention and information comprehension (e.g., Chan & Allman-Farinelli, 2022; Pardede, 2019; Parry & le Roux, 2021). Since the effect of social media usage on cognitive skills has only been investigated for social media platforms such as Twitter, Facebook, and YouTube (Alloway et al., 2013), outcomes of the current experiment can only be assumed. Based on previous research by Anderson and Hanson (2013), the current study hypothesizes that when asked to report their self-reported sustained attention, heavy TikTok users will report a shorter attention span compared to light TikTok users. This is based on the assumption that heavy social media users engage more frequently with social media platforms, interfering with their sustained attention span (Fallon, 2022). Furthermore, current trends suggest that individuals prefer video over digital texts since visual content is more engaging than words alone (Slade-Silovic, 2018). Therefore, the current study establishes the following five hypotheses:

H1: Heavy TikTok users will report worse attention-driven skills than light TikTok users.

H2: Light and heavy TikTok users will understand information equally well regardless of the information format (text/video).

H3: Videos will be easier to understand than digital texts regardless of the level of TikTok exposure.

H4: Light TikTok users will better understand information in digital texts than in videos.

H5: Heavy TikTok users will better understand information in videos than in digital texts.

Investigating the effect of TikTok exposure on young adults' cognitive abilities is of relevance from both, theoretical and practical perspectives. Studies on sustained attention have not yet specifically examined how participants' exposure to TikTok affects their sustained attention span. There are numerous claims related to the impact of TikTok on

attention span (e.g., Fallon, 2022). However, these claims have not been validated by research. Accordingly, the present study will address this research gap by offering insights into the impact of TikTok exposure on young adults' attention spans. Attention span is highly related to productivity and the ability to learn and organize new information. By using insights regarding declining attention span, future researchers can devise strategies to help young adolescents focus in a school environment and concentrate on acquiring new material.

The majority of earlier research indicates that when individuals are exposed to digital copies of texts, reading comprehension levels are noticeably lower (Noyes & Garland, 2005), whereas their listening comprehension is not influenced or even higher when exposed to digital videos (Ali Batel, 2014). However, to date, research regarding information comprehension has only used self-reported social media use. The present study will address this research gap; it will be the first study to investigate whether there is a significant impact of social media exposure on information comprehension (text/video) by using an objective measurement of a social media platform that has been found to be highly addictive and may consequently further impact attention. By having a deeper knowledge of how students learn in mediated contexts, educators and scholars may better integrate media into teaching and learning. Furthermore, the ability to comprehend information is a requirement for success in employment, school, and life in general. Accordingly, research in this area will enrich our general knowledge of the influences of TikTok exposure on our information comprehension.

Methodology

This study is part of a larger research carried out by four International Business Communication students at Radboud University, Nijmegen. In the sections that follow, only those elements of the experiment that are relevant to answering the research question and the related sub-questions of this thesis will be described.

Materials

Information format (text/video)

To assess participants' information comprehension, they were exposed to four information formats (2 texts and 2 videos). Two transcripts of TikTok videos were used to assess participants' information comprehension of digital texts. Using transcripts increases validity by ensuring similarity between the two information formats. The reading comprehension test was self-paced to ensure reliable results. Second language researchers are increasingly adopting self-paced reading tests (SPRs) (Marsden et al., 2018). Accordingly,

SPR was likely to increase text comprehension, particularly in the underlying English L2 context, and additionally ensured that participants had enough time to read the texts and watch the videos. Two TikTok videos were used to assess participants' information comprehension of videos. Participants could only continue the experiment after seeing the entire video. Furthermore, they were randomly assigned to two transcripts and two videos and the order in which they appeared. In total, participants were exposed to four different information formats. The researcher could retrieve the document's average viewing time. Participants spent more time watching the video than reading the text (see *Table 1*).

Table 1. Average time spent on information format (text/video) in seconds

Information format	<i>M</i>	<i>SD</i>	<i>n</i>
Text 1	70.90	44.57	99
Video 1	110.13	25.61	92
Text 2	53.47	35.14	99
Video 2	72.18	34.83	92
Text 3	89.43	62.37	99
Video 3	115.53	59.75	92
Text 4	102.32	77.80	99
Video 4	139.57	55.18	92

Subjects

This study included 191 voluntary participants (age: $M = 25.94$, $SD = 11.36$; range 18-92¹). The proportion of female participants (53.9%) was slightly higher than that of male participants (44.0%). A further three individuals (1.6%) claimed to be non-binary or to belong to a third gender, while one participant (0.5%) preferred to self-describe. The majority of participants indicated that their highest achieved level of education is a Bachelor's degree

¹ Participants' age range differs widely. Analysis of performance, however, revealed no evidence to support the exclusion of any participants from the experiment.

(46.1%) or secondary education (38.7%). Furthermore, 9.4% indicated that they achieved a Master's degree, 5.2% indicated that they successfully completed an apprenticeship ('Ausbildung'), and one person (0.5%) indicated to have a Doctoral degree or equivalent. In the experiment, a total of 32 nationalities were represented. The majority of participants were from Italy (25.1%), Germany (24.6%), the Netherlands (17.9%), and Cyprus (6.3%). Accordingly, 26.1% belonged to another nationality.

Based on the median split ($Mdn = .60$), participants were categorized into light and heavy TikTok users. Participants who correctly identified up to five out of ten TikTok sound bites were categorized as light users. In contrast, participants who correctly identified more than six TikTok sound bites were categorized as heavy users. Among the participants, 92 (48.2%) were considered light TikTok users, while 99 (51.8%) were considered heavy TikTok users. Across the two TikTok groups (light/heavy), there was no significant difference in the mean age distribution ($\chi^2(90) = 93.14, p = .389$). Moreover, education groups ($F(3, 378) = 1.05, p = .372$) and nationality groups ($\chi^2(93) = 77.89, p = .870$) were distributed equally across the two TikTok groups. However, gender was not distributed equally across the two TikTok groups ($\chi^2(3) = 8.08, p < .001$). Female participants ($N = 132$) showed higher levels of TikTok exposure than male participants ($N = 62$).

Design

The study had a mixed experimental design. The information format (text/video) had a within-subjects design as all participants were exposed to the two levels of the information format. Social media exposure had a between-subjects design since there were different levels of users' exposure to TikTok.

Instruments

TikTok use

For the assessment, a TikTok checklist was developed to test participants' knowledge of the app (adapted from Troncoso-Ruiz et al., 2022). As part of a Qualtrics questionnaire (Qualtrics, 2023), participants were exposed to 10 items of TikTok sound bites. In this context, a sound bite refers to a short extract of a song or user-created sound on TikTok. The four BA students that conducted the experiment independently drafted a list of the 20 most recently popular TikTok sound bites based on articles that compile popular sounds. The list was then compared and the 10 sounds that appeared in all four lists were selected for the TikTok knowledge test.

Participants heard a fragment of a sound bite and were asked to choose one of four multiple-choice options to indicate the continuation of the sound bite (see *Appendix E*). An example of a TikTok sound bite is “Let me raise a toast, to the girl I love most in the whole world ...”. For the example provided, participants needed to select the answer “Please, don’t say my name (2x). Darla”. The internal consistency of the items was acceptable ($\alpha = .73$).

Sustained attention span

To measure participants’ sustained attention span, they were asked to respond to questions regarding their self-reported sustained attention. Participants rated themselves on their ability to focus and shift their attention using the Attentional Control Scale (ATTC) (Derryberry & Reed, 2002). Sustained attention was measured with four 7-point Likert scales anchored by ‘never - always’ (adopted from Derryberry & Fajkowska, 2010): “When concentrating, I can focus my attention so that I become unaware of what’s going on in the room around me”, “When I am reading or studying, I am easily distracted if there are people talking in the same room”, “When trying to focus my attention on something, I have difficulty blocking out distracting thoughts”, “When a distracting thought comes to mind, it is easy for me to shift my attention away from it”.

Since the measure of internal reliability was unacceptable ($\alpha = .66$), the items of sustained attention span were analyzed separately. Attention Span 1 measured participants’ capacity to maintain attention while being distracted by external factors. Attention Span 2 measured participants’ capacity to read or study while being distracted by external factors. Attention Span 3 measured participants’ capacity to maintain attention while being distracted by factors under their control. Attention Span 4 measured participants’ capacity to divert their attention from distractions that are under their control.

Information comprehension

To assess information comprehension, participants were exposed to two digital texts and two TikTok videos and answered two comprehension questions after each fragment. The text and video fragments discussed nutritional information provided by a verified doctor on TikTok. For a transcript of the fragments, please refer to *Appendix C*. The length of the TikTok videos was between one and two minutes, which can be considered above the average length of TikTok videos (Jesutofunmi, 2022).

Participants filled in an online questionnaire in which they answered multiple-choice questions for the four fragments (see *Appendix D*). Liu (2009) demonstrated that

multiple-choice questions and short response questions are the most straightforward to comprehend, although all three test formats - multiple choice, gap filling, and short answers - substantially impact reading comprehension. Multiple-choice questions were shown to require the least time to complete. Accordingly, there is a strong probability that participants answered these questions honestly and attentively.

The researcher independently established multiple-choice questions by thoroughly investigating the videos and filtering out the most important information. By altering the information offered in the same video and by looking up alternate but incorrect answers on the Internet, three incorrect alternative solutions for each question were established. This ensured that participants had to read the texts and watch the videos in their entirety to answer the question correctly. Participants were exposed to eight multiple-choice questions in total, each with four alternative responses (*a* to *d*), only one of which was correct. This improved psychometric quality by limiting the effect of random guessing.

The information comprehension tests were administered in a randomized order which means that participants were randomly assigned to the conditions. A mean score ($M = .63$) was then calculated for each participant indicating how many out of four questions they answered correctly for the videos and for the texts separately. The score ranged from 0% to 100%. Participants who answered none of the four questions correctly received a score of 0%, those who correctly answered one out of the four questions received a score of 25%; those who correctly answered two out of the four questions received a score of 50%; those who correctly answered three out of the four questions received a score of 75%; and those who correctly answered all four questions received a score of 100%.

Procedure

Using the online survey software Qualtrics, the questionnaire was distributed in English (Qualtrics, 2023). Starting with the author's own network, participants were contacted via social media and personal contacts. Participation was entirely voluntary, without financial compensation or other incentives. Participants who were under the age of 18 were excluded from the study since they are considered a vulnerable population as they lack the autonomy and capacity for decision-making necessary to comprehend and accept the risks connected with research involvement. In order to use their data, participants were required to sign a consent form after reading an introductory page (see *Appendix A*). Participants who were eligible for the experiment reported having at least a secondary education diploma and English proficiency at the B1 level. Using the Council of Europe's

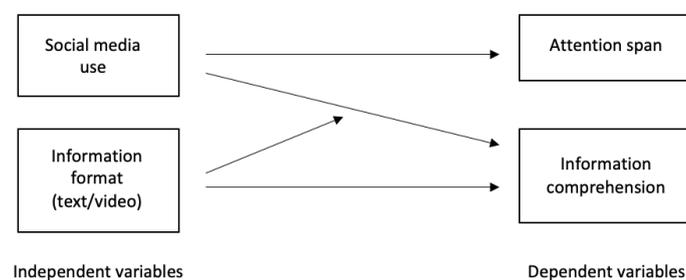
English Self-Assessment Grid (CEFR), participants were asked to indicate their self-assessed level of English (Council of Europe, 2023). Those with levels below B1 and inadequate educational backgrounds were sent to the end of the questionnaire and were excluded from the study. English proficiency level was questioned to rule out inequalities and disadvantages in reading English text fragments and listening to English TikTok videos for a non-native English-speaking audience. Participants then provided background information on their gender and nationality. See *Appendix B* for the background survey.

Afterwards, they were exposed to two texts and two TikTok videos and answered two information comprehension questions after each fragment. Participants were then asked to answer multiple-choice questions for completing the sound bites. Lastly, they answered questions about their sustained attention span. After finishing the questionnaire, participants were thanked for their participation. To avoid biases in their responses, participants were not informed about the study's actual purpose. Participants' bias can harm the research outcome since individuals can adjust their answers and behaviours based on the research question, which can result in a lack of validity. Completing the experiment took about 15 minutes.

Statistical treatment

To examine the impact of social media exposure on attention span, a one-way univariate ANOVA was conducted. A two-way univariate analysis of variance (ANOVA) with between-subjects and within-subjects factors was used to examine the impact of TikTok exposure (between-subjects factor) and information format (within-subjects factor) on information comprehension.

Figure 1. *Analytical Model*



Results

The study's objective was to examine the effect of TikTok exposure on young adults' sustained attention span and the comprehension of information in digital texts and videos.

The results of the experiment are presented in two sections. First, the relationship between TikTok exposure and attention span will be reported. Second, the effect of information format (text/video) on information comprehension and TikTok exposure (light/heavy) on information comprehension will be investigated separately, before the effect of TikTok exposure and information format (text/video) on information comprehension will be evaluated.

Sustained attention span

Since the measure of internal reliability was unacceptable, several independent one-way analyses of variance with TikTok exposure (light/heavy) as a factor were conducted in order to investigate the effect of TikTok exposure on sustained attention span. Analyses revealed general trends in the effect of TikTok exposure on sustained attention span. However, not all trends were statistically significant.

Light TikTok users ($M = 4.22$, $SD = 1.33$) seemed to report having greater problems maintaining attention while being distracted by external factors than heavy TikTok users ($M = 4.33$, $SD = 1.37$). However, a one-way analysis of variance showed no significant effect of TikTok exposure (light/heavy) on sustained attention 1 ($F(1, 380) < 1$). No evidence was found for heavy TikTok users to report having problems maintaining attention while being distracted by external factors.

Heavy TikTok users ($M = 3.27$, $SD = 1.31$) seemed to report having greater problems reading or studying while being distracted by external factors than light TikTok users ($M = 3.33$, $SD = 1.43$). However, a one-way analysis of variance showed no significant effect of TikTok exposure (light/heavy) on sustained attention 2 ($F(1, 380) < 1$). No evidence was found for heavy TikTok users to report having problems reading or studying while being distracted by external factors.

Heavy TikTok users ($M = 3.52$, $SD = 1.35$) seemed to have more difficulty maintaining attention while being distracted by factors under their control than light TikTok users ($M = 3.86$, $SD = 1.42$). Confirming the general trend, a one-way analysis of variance showed a significant effect of TikTok exposure (light/heavy) on sustained attention 3 ($F(1, 380) = 5.72$, $p = .017$). Heavy TikTok users ($M = 3.52$, $SD = 1.35$) had more difficulty blocking out distracting thoughts than light TikTok users ($M = 3.86$, $SD = 1.42$).

Lastly, heavy TikTok users ($M = 3.97$, $SD = 1.26$) seemed to report having greater problems diverting their attention from distractions that are under their control than light TikTok users ($M = 4.14$, $SD = 1.2$). However, a one-way analysis of variance showed no significant effect of TikTok exposure (light/heavy) on sustained attention 4 ($F(1, 380) =$

1.73, $p = .189$). No evidence was found for heavy TikTok users to report having problems diverting their attention from distractions that are under their control. Table 2 shows mean and standard deviations of sustained attention in function of TikTok exposure.

Table 2. Mean and standard deviations of sustained attention in function of TikTok exposure (1 = low sustained attention; 7 = high sustained attention)

Item	TikTok exposure	<i>M</i>	<i>SD</i>	<i>n</i>
Sustained Attention 1	light	4.22	1.33	92
	heavy	4.33	1.37	99
Sustained Attention 2	light	3.33	1.43	92
	heavy	3.27	1.31	99
Sustained Attention 3	light	3.86	1.42	92
	heavy	3.52	1.38	99
Sustained Attention 4	light	4.14	1.29	92
	heavy	3.97	1.26	99

Information comprehension

In order to investigate the effect of TikTok exposure on information comprehension and whether this effect is influenced by the format in which the information is presented (text/video), a two-way univariate analysis of variance (ANOVA) with between-subjects and within-subjects factors was carried out. Analyses revealed general trends in the effect of TikTok exposure and/or information format on information comprehension. However, none of the trends were statistically significant.

Light TikTok users (63.3%) seemed to generally better comprehend information than heavy TikTok users (62.4%). However, analyses revealed that TikTok exposure does not have a significant effect on information comprehension ($F(1, 378) < 1$). No evidence was found that light TikTok users demonstrate better information comprehension skills than heavy TikTok users regardless of the information format.

Digital texts (64.1%) seemed to be easier to understand than videos (62.0%). However, information format had no significant main effect on information comprehension ($F(1, 378) < 1$). No evidence was found that videos were easier to comprehend than digital texts regardless of the level of TikTok exposure.

Lastly, light TikTok users seemed to generally better comprehend information in digital texts (66.6%) than in videos (61.7%). Contrary, heavy TikTok users seemed to generally better comprehend information in videos (63.1%) than in digital texts (60.9%). However, the interaction effect between TikTok exposure and information format was not statistically significant ($F(1, 378) = 1.74, p = .187$). No evidence was found that light TikTok users showed better information comprehension in digital texts than in videos. Furthermore, no evidence was found that heavy TikTok users showed better information comprehension in videos than in digital texts. Table 3 shows the mean and standard deviations of information comprehension in function of TikTok exposure and information format.

Table 3. Mean and standard deviations of correct responses for information comprehension in function of TikTok exposure and information format (0% = low information comprehension; 100% = high information comprehension)

Information format	TikTok exposure	<i>M</i>	<i>SD</i>	<i>n</i>
Text	Light	66.6%	.25	92
	Heavy	60.9%	.29	92
	Total	64.1%	.26	184
Video	Light	61.7%	.26	99
	Heavy	63.1%	.25	99
	Total	62.0%	.27	198
Total	Light	63.3%	.28	191
	Heavy	62.4%	.25	191
	Total	63.0%	.26	382

Discussion and Conclusion

Discussion

This study investigated whether TikTok use has an effect on sustained attention span (SQ1) and whether exposure to the platform has an effect on information comprehension and if this effect is influenced by the format in which the information is presented (text/video) (SQ2). The findings of the current study suggest that TikTok use has an effect on sustained attention span, particularly in relation to distractibility. Heavy TikTok users had more difficulty blocking out distracting thoughts than light TikTok users (Sustained Attention 3). However, TikTok use was not found to have an effect on information comprehension, and this effect was also not influenced by the format in which the information was presented (text/video). In the paragraphs that follow, the research question and outcomes of the hypotheses will be discussed separately.

Attention span

Heavy TikTok users were expected to report worse attention-driven skills than light TikTok users (Hypothesis 1). Results revealed a significant difference in participants' capacity to maintain attention while being distracted by factors under their control (Attention Span 3). Heavy TikTok users reported having more difficulty blocking out distracting thoughts than light TikTok users. However, results concerning the effect of TikTok exposure on sustained attention span revealed no statistically significant difference for the remaining items. Accordingly, there was no significant difference in sustained attention span between light and heavy TikTok users in their capacity to maintain attention and to read or study while being distracted by external factors (Sustained Attention 1 & 2), and their capacity to divert their attention from distractions that are under their control (Sustained Attention 4).

The findings of this study are consistent with earlier research in which social media was demonstrated both, to have an impact on sustained attention (Parry & le Roux, 2021) and to not have an impact (Alloway & Alloway, 2012). Current findings support earlier research indicating that individuals with higher levels of media multitasking show increased distractibility (Parry & le Roux, 2021) and that the short video format TikTok is associated with a decrease in sustained attention span (Fallon, 2022). Additionally, earlier research claimed a substantial correlation between the quantity of screen exposure and sustained attention span (Anderson & Hanson, 2013). However, current research demonstrates that the level of TikTok exposure, at least, has no significant impact on sustained attention in this

particular context. On the other hand, this finding confirms previous research on the effect of social media use on cognitive skills, showing no significant negative relationship between regular engagement with social networking sites and cognitive control (e.g., Alloway & Alloway, 2012; Alloway et al., 2013).

Previous research investigated the effect of social media and media multitasking on one aspect of attention only, namely sustained attention capacity. However, this study offers various measures of sustained attention by offering four questions that assess different aspects of individuals' cognitive abilities. Sustained attention span questions in this study measured participants' capacity to maintain attention - or to read and study - while being distracted by both internal and external factors and their capacity to divert their attention from internal distractions. However, TikTok exposure only had an effect on participants' capacity to maintain attention while being distracted by internal factors, more specifically by their own thoughts. Possibly, mixed results in previous literature are due to the fact that attention was treated as a whole, instead of investigating different aspects of attention. This study adds to the body of previous literature by providing a more fine-grained measurement of sustained attention and disentangles which aspects of this cognitive ability seem to be affected by social media usage.

Additionally, previous literature has focused on the effect of overall social media usage on sustained attention span (e.g., Parry & le Roux, 2021). However, the present study is the first academic study to investigate the effect of TikTok exposure on young adults' sustained attention. The focus of the current study was on TikTok, in particular, since it is relevant to disentangle the effect of the newly-established algorithm-driven social media platform on individuals' sustained attention span. Compared to other social media platforms, TikTok exclusively displays short-form videos, which are associated with the platform's ever-swiping nature (Fallon, 2022). This phenomenon has led to the assumption that TikTok's features are associated with decreased sustained attention span (Fallon, 2022). Confirming this prediction, this study found that short-form video exposure hinders reported attention.

The findings of this study both confirm and contradict the Load Theory of Selective Attention and Cognitive Control (Lavie et al., 2004). This theory proposes that, under situations of high perceptual load, irrelevant distractor stimuli can be excluded if individuals are asked to maintain attention (Lavie et al., 2014). In these situations, such as reading or studying, users have to avoid diverting their attention from external distractors and distractors under their control. External distractors can, for example, include other people and noises around an individual or distractions from the person's own phone or social media accounts.

Internal distractions include factors such as an individual's own thoughts and emotions; things that the person themselves provokes. However, our findings demonstrate that when individuals are asked to maintain attention when distracted by factors under their control, irrelevant distractor stimuli cannot be excluded, showing that the level of TikTok exposure influences individuals' distractibility. Particularly, TikTok exposure hinders the ability to maintain attention by overstimulating the brain, which leads to difficulties blocking out internal factors. Accordingly, being frequently exposed to short-form videos on TikTok makes it more difficult to concentrate on matters that do not provide the same instant gratification (Hockaday, 2023).

Information comprehension

TikTok exposure as a predictor of information comprehension

This study expected light and heavy TikTok users to understand information equally well regardless of the information format (text/video) (Hypothesis 2). Confirming the hypothesis, research showed no statistically significant relationship between information comprehension and TikTok exposure regardless of the information format. Light and heavy TikTok users did not differ in their comprehension of information.

Since there were no previous studies conducted on the effect of TikTok exposure on individuals' information comprehension, the hypothesis of the current study was derived from Alloway & Alloway's (2012) study into the effect of the SNSs Instagram, Twitter, and YouTube on cognitive skills. The current study confirms previous research stating that active SNS users are assigned a similar weight to incoming streams of information than passive SNS users (Alloway & Alloway, 2012). However, since the current study focuses on TikTok specifically, this finding extends previous research by confirming that Alloway & Alloway's (2012) findings also hold true for exposure to TikTok. Additionally, it provides new insights into the impact of the algorithm-driven platform on general information comprehension.

The present study was the first to investigate the effects of TikTok exposure on information comprehension. It was shown that there was no effect of exposure to the platform on young adults' information comprehension. The finding implies that, currently, TikTok exposure has no negative detrimental effect on information comprehension. Light and heavy TikTok users perform equally well on information comprehension tasks. Accordingly, visual information processing and memory are currently not affected by exposure to TikTok, suggesting that individuals are generally proficient in comprehending information.

Information format as a predictor of information comprehension

This study hypothesized that videos would be easier to understand than digital texts regardless of the level of TikTok exposure (Hypothesis 3). However, research showed no statistically significant relationship between information comprehension and information format (text/video) regardless of TikTok exposure. Information comprehension did not statistically differ between digital texts and videos. This result contradicts findings from previous studies claiming that information in videos is easier to understand than text-based content (Chan & Allman-Farinelli, 2022).

Previous research showed that using a video rather than a written text is more helpful for general language comprehension, for example, in an intermediate-level EFL context (Ali Batel, 2014). Accordingly, earlier studies indicated that listening to a passage often results in better comprehension than reading the same passage (Ali Batel, 2014). However, current research showed no significant difference between listening to a video and reading the same information in text-based form.

The current study exposed participants to only a small passage of text or a short-form video, compared to Ali Batel's (2014) approach of using a 10-minute segment of a movie or its corresponding section in the book. Accordingly, differences in research approaches could have led to contradictory findings, showing that particularly for short-form segments, information comprehension does not differ between the two information formats.

This study helps to understand the relationship between information format and information comprehension. Contradicting earlier studies, current research demonstrates that information comprehension is not affected by the information format to which individuals are exposed. Digital texts are equally comprehensible as videos. This implies that the information format is not relevant for people to understand information, suggesting that individuals are not only literate in comprehending texts, but that the same applies to videos.

TikTok exposure and information format as a predictor of information comprehension

This study expected light TikTok users to better understand information in digital texts than in videos (Hypothesis 4), but heavy TikTok users to better understand information in videos than in digital texts (Hypothesis 5). However, research showed no statistically significant relationship between TikTok exposure (light/heavy) and information format (text/video) on information comprehension. Light and heavy TikTok users were shown to comprehend information equally both in digital texts and videos.

Since there were no previous studies conducted on the interaction between TikTok exposure and information format on information comprehension, the hypotheses were based on presumptions established based on prior research into information comprehension. Previous research has found that readers of digital texts simply retained a memory of the information (Noyes & Garland, 2005). Furthermore, Lin et al. (2011) showed that when individuals are reading and engaging in video content simultaneously, their reading comprehension skills are impaired. These previous studies led to the assumption that heavy TikTok users will better comprehend information in videos than in digital texts since they engage more frequently in multi-tasking, leading to an impairment of reading comprehension skills. Consequently, light TikTok users were expected to better comprehend information in digital texts than in videos since they were expected to retain a memory of the information. However, both hypotheses were rejected, showing that TikTok exposure and information format have no effect on information comprehension.

Current research supports the documents model by demonstrating that readers treat all communications equally in terms of their respective information sources when reading texts from multiple, distinct sources (Braasch & Bråten, 2017). Participants were shown to understand information in videos and digital texts equally well. Accordingly, this study extends the DM by suggesting that social media usage, particularly TikTok, has no negative impact on how readers treat communications in information sources, and by confirming that the model also applies to information comprehension in videos (Braasch & Bråten, 2017).

Limitations and Further Research

The conducted investigation and its findings have limitations. Current research on the impact of TikTok exposure on cognitive abilities in general and attention span, in particular, is limited. Accordingly, it should be noted that the findings for the relationship between TikTok exposure and attention span should be generally seen with caution since the social media platform TikTok was only launched in 2016 and first introduced to most European countries in mid-2018 (Waterworth, 2020). Long-term effects of the platform can be significantly different from current findings. Especially for younger generations, exposure to TikTok may lead to long-term consequences, including shorter sustained attention spans and concentration problems, which cannot be predicted with current research. Future studies should be conducted in a time frame of five to ten years from now and should replicate this study to preclude an effect of TikTok on sustained attention span and information

comprehension in digital texts and videos. This replication would then also offer insights into trends amongst Generation Z, which are particularly active on TikTok (Howarth, 2023).

The distribution of gender between the two TikTok groups was not equal. Frequency analysis showed that female participants showed higher levels of TikTok exposure than male participants. On the one hand, this can be related to the general distribution of gender in the experiment. The proportion of female participants (53.9%) was slightly higher than that of male participants (44.0%). Additionally, as of January 2023, roughly 54% of TikTok's users worldwide were female (Statista, 2023). Since there are more female than male TikTok users, this general trend may have also contributed to an uneven gender distribution between the two TikTok groups in the current study. According to Goldman (2017), the average reading comprehension of women consistently exceed that of men, suggesting that the unequal distribution of gender may have resulted in unbalanced findings. Future research could examine factors that make TikTok particularly popular among women.

Another limitation of the current study includes the instrumentation of sustained attention span with a self-reported measurement of participants. Verbeij et al. (2021) indicate that self-reported measurement methods yield relatively low accuracy. Future research should investigate the effect of TikTok exposure on sustained attention span by using more reliable measurements to investigate different aspects of sustained attention.

Although current research suggests that individuals with high levels of TikTok exposure function normally on most cognitive tasks, it shows that the exposure of TikTok hinders one specific aspect of attention, namely the ability to block out distracting thoughts while focusing. If users become aware of the negative impacts linked to TikTok, the platform's popularity and usage may be affected. Accordingly, the current study contributed to the still-evolving field of research on TikTok usage and can aid future studies by setting the groundwork for how TikTok exposure affects young adults' cognitive capacities. By educating young adolescents about the potential impacts of TikTok exposure on sustained attention, future researchers can develop techniques to help them concentrate in a school setting. Additionally, scholars may better integrate media into teaching and learning since it was shown that there is no noticeable difference in information comprehension between digital texts and videos.

Conclusion

The findings of the current study are highly important as they significantly advance understanding of the influence of the newly-established and algorithm-driven social media

platform TikTok in relation to young adults' sustained attention span and information comprehension. The study demonstrated that confirming the hypothesis, TikTok exposure has an effect on young adults' distractibility. However, TikTok exposure was shown to have no effect on the comprehension of information in digital texts and videos. This effect was also not influenced by the format in which the information was presented (text/video). Future studies need to be carried out as the findings of this study cannot predict negative effects on younger generations, which are particularly active on the social media platform and may be more susceptible to its detrimental effects on general cognitive abilities. This study lays out the groundwork for further research and has enriched our understanding of the relationship between TikTok exposure and cognitive abilities, suggesting techniques to implement media into teaching and learning.

References

- Ali Batel, E. (2014). The Effectiveness of Video vs. Written Text in English Comprehension and Acquisition of ESL Students. *Arab World English Journal*, 5(4).
- Alloway, T. P., & Alloway, R. G. (2012). The impact of engagement with social networking sites (SNSs) on cognitive skills. *Computers in Human Behavior*, 28(5), 1748-1754.
- Alloway, T. P., Horton, J., Alloway, R. G., & Dawson, C. (2013). Social networking sites and cognitive abilities: Do they make you smarter?. *Computers & Education*, 63, 10-16.
- Anastopoulos, A. D., & King, K. A. (2015). A cognitive-behavior therapy and mentoring program for college students with ADHD. *Cognitive and Behavioral Practice*, 22(2), 141-151.
- Anderson, D. R., & Hanson, K. G. (2013). What researchers have learned about toddlers and television. *Zero to three*, 33(4), 4-10.
- Anderson, K. E. (2020). Getting acquainted with social networks and apps: it is time to talk about TikTok. *Library hi tech news*.
- Barton, B. A., Adams, K. S., Browne, B. L., & Arrastia-Chisholm, M. C. (2021). The effects of social media usage on attention, motivation, and academic performance. *Active Learning in Higher Education*, 22(1), 11-22.
- Braasch, J. L., & Bråten, I. (2017). The discrepancy-induced source comprehension (D-ISC) model: Basic assumptions and preliminary evidence. *Educational Psychologist*, 52(3), 167-181.
- Britt, M. A., & Rouet, J. F. (2012). Learning with multiple documents: Component skills and their acquisition.
- Chan, V., & Allman-Farinelli, M. (2022). Young Australian Adults Prefer Video Posts for Dissemination of Nutritional Information over the Social Media Platform Instagram: A Pilot Cross-Sectional Survey. *Nutrients*, 14(20), 4382.
- Council of Europe. (2023). *Self-Assessment Grids (CEFR)*. Retrieved, February 25, 2023, from <https://www.coe.int/en/web/portfolio/self-assessment-grid>
- Delgado, P., Vargas, C., Ackerman, R., & Salmerón, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational research review*, 25, 23-38.
- Dentzel, Z. (2013). How the internet has changed everyday life. *Ch@ nge*, 19, 235-252.
- Derryberry, D., & Fajkowska, M. (2010). Psychometric properties of Attentional Control Scale: The preliminary study on a Polish sample. *Polish Psychological Bulletin*, 41(1).

- Derryberry, D., & Reed, M. A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of abnormal psychology, 111*(2), 225.
- Espiritu, M. (2016). Early Childhood iPad Use and Effects on Visual Spatial Attention Span.
- Fallon, R. (2022, August 5). *Tick Tock And TikTok: Shorter Attention Spans And The Consumer Market*. Forbes.
<https://www.forbes.com/sites/forbesagencycouncil/2022/08/05/tick-tock-and-tiktok-shorter-attention-spans-and-the-consumer-market/?sh=7dec00073ec8>
- Faughnder, R. (2022, April 12). *Gen Z spends half its waking hours on screen time. Here's the good and bad news for Hollywood*. Los Angeles Times.
<https://www.latimes.com/entertainment-arts/business/newsletter/2022-04-12/gen-z-spends-half-its-waking-hours-on-screen-time-heres-the-good-and-bad-news-for-hollywood-the-wide-shot>
- Gazzaniga, M. S., Heatherton, T. F., & Halpern, D. F. (2010). *Psychological science*. New York: WW Norton.
- Gilbert, C. D., & Li, W. (2013). Top-down influences on visual processing. *Nature Reviews Neuroscience, 14*(5), 350-363.
- Goldman, B. (2017). Two minds: The cognitive differences between men and women. *Sex, Gender and Medicine*.
- Henderson, M., Finger, G., & Selwyn, N. (2016). What's used and what's useful? Exploring digital technology use (s) among taught postgraduate students. *Active learning in higher education, 17*(3), 235-247.
- Hockaday, J. (2023, March 26). *What Is TikTok Doing To Our Attention Spans?* Yahoo.
<https://uk.news.yahoo.com/what-is-tiktok-doing-to-our-attention-spans-145845561.html>
- Howarth, J. (2023, January 13). *TikTok User Age, Gender & Demographics (2023)*.
<https://explodingtopics.com/blog/tiktok-demographics#>
- Iqbal, M. (2021). TikTok revenue and usage statistics (2021). *Business of apps, 1*(1).
- Jesutofunmi, A. (2022, June 7). *How long are TikTok videos? TikTok video length guide for 2023*. sociality.io blog. <https://sociality.io/blog/tiktok-video-length/>
- Junco, R. (2013). Comparing actual and self-reported measures of Facebook use. *Computers in Human Behavior, 29*(3), 626-631.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business horizons, 53*(1), 59-68

- Kaushik, S. (2018). Media technology used according to preferences of different age categories of urban respondents. *International Journal of Education and Management Studies*, 8(2), 224-229.
- Keenan, A., & Shiri, A. (2009). Sociability and social interaction on social networking websites. *Library review*.
- Kennedy, M. (2020). 'If the rise of the TikTok dance and e-girl aesthetic has taught us anything, it's that teenage girls rule the internet right now': TikTok celebrity, girls and the Coronavirus crisis. *European journal of cultural studies*, 23(6), 1069-1076.
- Kim, Y. S. G., & Pilcher, H. (2016). What is listening comprehension and what does it take to improve listening comprehension?. *Interventions in learning disabilities: A handbook on systematic training programs for individuals with learning disabilities*, 159-173.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension: a construction-integration model. *Psychological review*, 95(2), 163.
- Lau, W. W. (2017). Effects of social media usage and social media multitasking on the academic performance of university students. *Computers in human behavior*, 68, 286-291.
- Lavie, N., Hirst, A., De Fockert, J. W., & Viding, E. (2004). Load theory of selective attention and cognitive control. *Journal of experimental psychology: General*, 133(3), 339.
- Lin, L., Lee, J., & Robertson, T. (2011). Reading while watching video: The effect of video content on reading comprehension and media multitasking ability. *Journal of Educational Computing Research*, 45(2), 183-201.
- List, A., & Ballenger, E. E. (2019). Comprehension across mediums: the case of text and video. *Journal of Computing in Higher Education*, 31, 514-535.
- Liu, F. (2009). The effect of three test methods on reading comprehension: An experiment. *Asian Social Science*, 5(6), 147-153.
- Mahalingham, T., McEvoy, P. M., & Clarke, P. J. (2023). Assessing the validity of self-report social media use: Evidence of No relationship with objective smartphone use. *Computers in Human Behavior*, 140, 107567.
- Mangen, A., Walgermo, B. R., & Brønnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International journal of educational research*, 58, 61-68.
- Marsden, E., Thompson, S., & Plonsky, L. (2018). A methodological synthesis of self-paced reading in second language research. *Applied Psycholinguistics*, 39(5), 861-904.

- Mayer, R. (2001). *Multimedia learning*. Cambridge, UK: Cambridge University Press.
- Monica-Ariana, S., & Anamaria-Mirabela, P. (2014). The impact of social media on vocabulary learning case study Facebook. *Annals of the University of Oradea, Economic Science Series*, 23(2), 120-130.
- Nielsen. (2012). *NewsWire | Social Media Report 2012: Social Media Comes of Age*.
- Novakazi, F. (2020). *Perception Creates Reality-Factors influencing the driver's perception and consequent understanding of Driving Automation Systems* (Doctoral dissertation, Chalmers Tekniska Hogskola (Sweden)).
- Noyes, J., & Garland, K. (2005). Students' attitudes toward books and computers. *Computers in Human Behavior*, 21(2), 233-241.
- Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences*, 106(37), 15583-15587.
- Pardede, P. (2019). Print vs Digital Reading Comprehension in EFL. *Journal of English Teaching*, 5(2), 77-90.
- Parry, D. A., & le Roux, D. B. (2021). "Cognitive control in media multitaskers" ten years on: A meta-analysis. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 15(2), Article 2. <https://doi.org/10.5817/CP2021-2-7>
- Perrin, A. (2015). Social media usage. *Pew research center*, 125, 52-68.
- Qualtrics. (2023, April 26). *Qualtrics XM - experience management software*. <https://www.qualtrics.com/>
- Radesky, J. S., Silverstein, M., Zuckerman, B., & Christakis, D. A. (2014). Infant self-regulation and early childhood media exposure. *Pediatrics*, 133(5), e1172-e1178.
- Rahimi, M., & Soleymani, E. (2015). The impact of mobile learning on listening anxiety and listening comprehension. *English Language Teaching*, 8(10), 152-161.
- Raut, V., & Patil, P. (2016). Use of Social Media in Education: Positive and Negative impact on the students. *International Journal on Recent and Innovation Trends in Computing and Communication*, 4(1), 281-285.
- Rodrigues, M. C. A. J., & Martins, R. X. (2008). Digital media performance and reading comprehension: a correlational study with Brazilian students. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT)*, 3(1), 33-42.
- Salmerón, L., Gil, L., & Bråten, I. (2018). Using eye-tracking to assess sourcing during multiple document reading: A critical analysis. *Frontline Learning Research*, 6, 105 – 122. DOI: 10.14786/flr.v6i3.368

- Slade-Silovic, O. (2018, June 26). *5 Reasons Why Video Content Works Better than Text*. covideo. <https://www.covideo.com/why-video-content-works-better-than-text/>
- Stahl, C. C., & Literat, I. (2022). # GenZ on TikTok: the collective online self-Portrait of the social media generation. *Journal of Youth Studies*, 1-22.
- Statista. (2023). *Distribution of TikTok users worldwide as of January 2023, by gender*. <https://www.statista.com/statistics/1299785/distribution-tiktok-users-gender/>
- Subramanian, K. R. (2018). Myth and mystery of shrinking attention span. *International Journal of Trend in Research and Development*, 5(3), 1-6.
- Tafesse, W. (2022). Social networking sites use and college students' academic performance: testing for an inverted U-shaped relationship using automated mobile app usage data. *International Journal of Educational Technology in Higher Education*, 19(1), 1-17.
- Troncoso-Ruiz, A., van de Ven, M., Keuning, J., van Bergen, N., Bakker, A., & Segers, E. (2022). Online reading behavior and readers' attention to source reliability in multiple digital texts. [Poster presentation] at SIG-27 Online Measures of Learning Processes. Southampton.
- Van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., & Valkenburg, P. M. (2020). Exploring the long-term relationship between academic-media multitasking and adolescents' academic achievement. *new media & society*, 22(1), 140-158.
- Verbeij, T., Pouwels, J. L., Beyens, I., & Valkenburg, P. M. (2021). The accuracy and validity of self-reported social media use measures among adolescents. *Computers in Human Behavior Reports*, 3, 100090.
- Waterworth. (2020, July 30). *Celebrating two years of TikTok with \$70 million TikTok Creator Fund*. TikTok. <https://newsroom.tiktok.com/en-gb/eu-creator-fund-blog-post>
- Wickens, C. D. (1980). The structure of attentional resources. *Attention and performance VIII*, 8, 239-257.
- Wolf, M., Barzillai, M., & Dunne, J. (2009). The importance of deep reading. *Challenging the whole child: reflections on best practices in learning, teaching, and leadership*, 130, 21.
- Wood, J. (2018). College students in study spend 8 to 10 hours daily on cell phone. *Psych Central*. Retrieved July, 26, 2019.
- Yadav, A., Phillips, M. M., Lundeberg, M. A., Koehler, M. J., Hilden, K., & Dirkin, K. H. (2011). If a picture is worth a thousand words is video worth a million? Differences in affective and cognitive processing of video and text cases. *Journal of Computing in Higher Education*, 23, 15-37.

Appendix A: Consent form designed by the Faculty of Arts of Radboud University

INFORMATION AND CONSENT

You are invited to participate in a research project in which we are interested in the effects of digital media.

What is going to happen to you?

The procedure involves filling out an online survey. In this survey, you will read texts, watch videos and answer several questions about yourself. Filling out the survey will take approximately 10 minutes.

Voluntary participation

This means that you can withdraw your participation and consent at any time during the research, without giving a reason.

What will happen to my data?

The research data we collect during this study will be used by scientists as part of data sets, articles, and presentations. The anonymized research data is accessible to other scientists for a period of at least 10 years. When we share data with other researchers, this data cannot be traced back to you.

All research and personal data are safely stored following the Radboud University guidelines. Your participation in this research is voluntary. Because the data is immediately anonymized, it is not possible to have your research data removed after the completion of the experiment, but should you want more information or have any complaints regarding this research, please contact the researchers or the supervisor of this study, Aurora Troncoso-Ruiz (email:aurora.troncosoruiz@ru.nl).

If you do not wish to participate in the research study, please decline participation by clicking on the "I do not want to participate" button.

Thank you for participating. On behalf of Hanna Franzkowiak, Mikaella Tryfon, Romy Siehoff, and Yola Amadeo, students of the Communication and Information Science Department of Radboud University.

Clicking on the "I Agree" button below indicates that:

- you have read the above information
- you consent to participating in the research study as described in the above information
- you understand how the data of the research study will be stored and how they will be used
- you voluntarily agree to participate
- you are at least 18 years of age

Appendix B: Background questionnaire

1.1 How old are you?

Slider

1.2 What is your highest achieved level of education?

- a. Primary education
- b. Secondary education
- c. Apprenticeship ('Ausbildung')
- d. Bachelor's or equivalent
- e. Master or equivalent
- f. Doctorate or equivalent

1.3 Do you have a self-assessed English proficiency level of at least B1?

Note: B1 level displays intermediate proficiency in the language.

- a. Yes
- b. No

1.4 How do you describe yourself?

- a. Male
- b. Female
- c. Non-binary / third gender
- d. Prefer to self-describe ___
- e. Prefer not to say

1.5 Where are you from?

Drop-down menu

Appendix C: Information comprehension transcripts

Information comprehension 1: Six ways to burn fat

Six ways to burn fat

Burning fat. Are you trying to burn fat? Well, let me give you the top six tips that are proven to help you burn fat most effectively. Are you ready? Here we go.

Number six: Don't eat late at night. Common sense. The later you eat, the more likely you're going to store instead of burn. Makes sense, right? Number five: Intermittent fasting. Now, I did a video about this, and I also created a pamphlet you can download from my stand store to learn how to do this properly. Number four: Eat slowly. The more slowly you eat, the quicker you get full. And that's essential if you want to cut down calories and not put on fat. Number three: Drink a lot of water. This is really important. It's actually proven to help keep the fat off of you. Drink at least eight glasses a day. Number two: Cut out the carbs. Now this may be common sense to some of you guys out there that are doing low-carb diets, but cutting down carbs, especially refined carbs in simple sugars, is essential so that you don't store all those calories. And number one, and maybe just as important as all the others, weight training. This is correct. Weight training for men and women has been proven to help you burn fat and build muscle. You don't have to get bulky. You can do a lot of reps at low weights, but weight training is essential if you want to do it the most effectively.

Information comprehension 2: Plant versus animal-based protein

Plant versus animal-based protein

You work out. You need protein. What's the best type of protein? Animal protein or plant protein? Well, let's talk about it. First of all, animal protein is more complete. It has more of a variety of amino acids that will help rebuild muscle. But it's also filled with saturated fat and cholesterol, which increases the risk of coronary disease and death.

Now, plant-based protein may not be as complete. You may want to do a little bit more variety. But guess what. Elephants, gorillas, giraffes, rhinos. They all are huge animals and they're all vegetarians. So, they get their protein from plant sources. So, if you do the same, you could also be just as complete. But you need more variety, and you also get the benefit of

more fiber. Which is awesome. There's a lower risk of hypertension, a lower risk of cholesterol, and a lot of other health benefits. So, if those big animals get their protein from plants, you can too.

Information comprehension 3: Five inflammatory foods to avoid

5 inflammatory foods to avoid

Stop scrolling. I'm going to talk about the 5 main categories of inflammatory foods you need to avoid. Now, why do you want to avoid inflammatory foods? Well, a lot of health conditions are actually associated with inflammation. We're talking about diabetes and rheumatoid arthritis. Even cardiovascular disease is now thought to be an inflammatory condition. So, let's get to it.

Number 5: Processed meats. I've talked about this before. Salamis, hot dogs, and so on. Cut them out. These are so inflammatory and they're so bad for you, and they are also linked to cancer, as I've discussed previously. Number 4: Processed carbs. I'm talking about white bread and pastries. Things that are bleached. Really bad for you, and they can also mess up your gut bacteria and increase your glycaemic index. Not good at all. Number 3: Saturated fats. If it's fried, you got to cut it out. We're talking about French fries, fast food, and so on. Grill your food or sauté it. Sometimes it can make all the difference. If you have to cook, cook with olive oil. It's part of Mediterranean diet. Number 2: Alcohol. That is correct. Alcohol. Alcohol has actually been proven to increase your C-reactive protein. But what is CRP? It's an inflammatory marker in the blood, which has actually been used to track inflammation. And number one, are you ready for this? Drum roll. Sugar. That is correct. Sugar and high fructose corn syrup will wreak havoc with your body and increase a whole range of inflammatory markers. This has been clinically proven. Cut sugar out of your diet as much as possible and check the label. If it's added sugar, you want to cut it out of your diet.

Information comprehension 4: Fighting infection with food and supplements

Fighting infection with food and supplements

Fighting infection with food and supplements. Your food and supplements can be a medicine and there are some known proven things that can actually help fight off infections. But let's talk about the two things that get a lot of press that have not been shown to have any benefit.

Number 1: Vitamin C. Sorry guys, there's just no good scientific evidence that Vitamin C has any clinically proven benefit. And Number 2 is echinacea. A lot of people take it, there's nothing wrong with it, but there's no conclusive scientific evidence that these two can actually really fight off infections.

But the five things that have been proven and shown to have a major impact. Number 1: Zinc. Zinc supplementation can reduce the severity and the duration of a lot of viral illnesses. If you feel a sickness coming on, take those Zinc lozenges and supplements. Number 2: Probiotics. If you have a gut infection, a lot of times, just taking probiotics such as a yogurt maybe, there's a lot of things that you can actually get in pill form, can actually reduce a lot of gut bacteria overgrowth. Number 3: Garlic. Yes, it doesn't just fight off vampires. Believe it or not. There's a substance in garlic called allicin, which is actually being shown to be a cofactor that can help the immune system. Number 4: Onions. Onions are great for fighting off infection. They have a compound called quercetin and this is a really funky-sounding chemical but it actually has been shown to have a lot of immune-boosting effects. And finally, protein. Your immune system needs the supplements to help fight off infection and it needs to build antibodies and those antibodies oftentimes are helped when you consume more protein because your body's demand goes up. Finally, of course, you want to stay hydrated. If you have a fever, you're going to lose a lot of water. So, stay hydrated out there. That's going to definitely help you.

Appendix D: Information comprehension questionnaire

Information comprehension 1: Six ways to burn fat

Link to TikTok video:

https://www.tiktok.com/@drreza_t/video/7175278047938252078?_r=1&t=8aFdD4hzxGo

1. According to the video, what is the reason for the association between eating late at night and gaining weight?

- a. Too little time is given for the meal to be digested.
- b. The later you eat, the more likely you're gonna store instead of burn.
- c. The body doesn't utilize late-night food as energy expenditure, which results in a rise in body weight.
- d. Appetite late at night is only cravings that lead to weight gain.

2. According to the video, which of these four statements is TRUE?

- a. The quicker you eat, the quicker you get full.
- b. Cutting down on refined carbs is not essential in order to store all those calories.
- c. Drinking enough water is proven to keep the fat off of you.
- d. Weight training is more effective to burn fat than cardio training.

Information comprehension 2: Plant versus animal-based protein

Link to TikTok video: https://www.tiktok.com/@drreza_t/video/7153787093234502958

1. According to the video, are plant or animal-based proteins more helpful to rebuild muscle?

- a. There is no correlation between rebuilding muscle and the type of protein you eat.
- b. Plant-based proteins are more helpful to rebuild muscle.
- c. Animal-based proteins are more helpful to rebuild muscle.
- d. Both types of protein are equally helpful to rebuild muscle.

2. Which benefits of a high intake of fibers does Dr. Reza give?

- a. It leads to a lower risk of developing hemorrhoids.
- b. Fibers help maintain bowel health.
- c. There is a lower risk of hypertension and cholesterol.
- d. It leads to a lower risk of colorectal cancer.

Information comprehension 3: Five inflammatory foods to avoid

Link to TikTok video: https://www.tiktok.com/@drreza_t/video/7184934070684601646

1. Why is Dr. Reza concerned about inflammatory foods?
 - a. Those eating pro-inflammatory foods are twice at risk of developing cancer.
 - b. Acute inflammation leads to fevers, swelling, and stiffness.
 - c. Inflammatory diets are associated with poor cholesterol profiles.
 - d. A lot of health conditions are associated with inflammation.

2. According to Dr. Reza, what is the main reason you should avoid alcohol as an inflammatory food?
 - a. Alcohol has been proven to increase your sea reactive protein, which is an inflammatory marker in the blood which is used to track inflammation.
 - b. Alcohol as an inflammatory food is related to weight gain.
 - c. Alcohol can suppress the immune response; too much drinking can increase the odds of becoming sick.
 - d. Drinking alcohol disrupts liver and gastrointestinal functioning as well as interactions across many organs, resulting in chronic systemic inflammation.

Information comprehension 4: Fighting infection with food and supplements

Link to TikTok video: https://www.tiktok.com/@drreza_t/video/7129644472354426158

1. According to Dr. Reza, what are the benefits of Zinc supplements in fighting an infection?
 - a. Zinc kills bacteria by starving them of the essential metal manganese.
 - b. Zinc helps infections by tapping brakes in the immune response
 - c. Zinc supplements help the metabolism function in order to fight infections.
 - d. Zinc supplements can reduce the severity and duration of a lot of viral illnesses.

2. According to Dr. Reza, why are onions considered to be helpful when fighting infections?
 - a. They have a medical compound called quercetin that has been shown to have a lot of immune-boosting effects.
 - b. Many substances found in onions are antibacterial and prevent the formation of dangerous germs.

- c. Prebiotics, which boost the amount of beneficial bacteria in your gut and help you develop immunity to viruses, are particularly abundant in onions.
- d. Allicin, an antibiotic compound found in onions, aids the colon in warding off dangerous microorganisms.

Appendix E: TikTok Checklist

Please, indicate the option that continues the sound:

1. Oh, hi, thanks for checking in. I'm still a piece ...
 - a. of stupidity
 - b. of garbage
 - c. of cuteness
 - d. of shit

2. What's your drink of choice? A Negroni. I was about to say the same thing ...
 - a. Sbagliato with prosecco in it
 - b. Gin with tonic in it
 - c. Mojito with mint in it
 - d. Giusto with ginger in it

3. Let me raise a toast, to the girl I love most in the whole world ...
 - a. Please, don't say my name (2x). Darla.
 - b. Please, say my name (2x). Carla.
 - c. He said my name: Carla.
 - d. And her name is, Darla.

4. That's suspicious ...
 - a. That's questionable
 - b. That's weird
 - c. That's tricky
 - d. That's inconvenient

5. Girl, don't do it, it's not worth it. I'm not gonna do it girl, I was just thinking about it.
I'm not gonna do it ...
 - a. I did it
 - b. I'm doing it
 - c. I didn't do it
 - d. I had it

6. 'Cause, I'm in a field of dandelions, wishing on everyone ...
 - a. that you'll be mine, mine.
 - b. that you and I, I.
 - c. that you fly
 - d. that you're on my mind, mind.

7. This rainy day is temporary, the contrast is why we got 'em ...
 - a. 'cause sun shining though is just a cloud away.
 - b. 'cause sun will shine in a cloud today.
 - c. 'cause star shining though is just a cloud away.
 - d. 'cause a star will shine through a cloud today.

8. I really like to party, I really like your body, I really wanna get naughty ...
 - a. I think you're such a cutie.
 - b. I love the way you're a hottie.
 - c. I like the way you're talking.
 - d. I think you're such a hottie.

9. I don't care ...
 - a. how long it takes
 - b. how far away it is
 - c. how long we need
 - d. how much I miss you

10. A little context if you care to listen. I find myself in a shit position.
 - a. The man that I love sat me down last night.
 - b. The man that I love let me down last night.
 - c. The guy that I like put me down last night.
 - d. The guy that I love put me down last night.