

Personalised advertising based on offline conversations

A quantitative study examining people's perceptions of perceived surveillance of conversations through smart devices

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ABSTRACT

Recently, countless stories have been reported in which users claimed that their smart devices are listening to their offline conversations and displaying tailored advertising based on them. In current literature, this perceived surveillance of conversations is still in its infancy and requires additional studies in order to comprehend the phenomenon to the full extent. Ergo, the main objective of this thesis was to fill the research gap and delve deeper into users' perceptions of surveillance through smart devices and conversation-based advertising. Based on this aim, the first research area of this study examined the extent to which people perceived to be surveilled by their smart devices. Other objectives were to analyse behavioural outcomes that the perceived surveillance of conversations might affect; specifically, attitudes towards smart devices, attitudes towards seemingly personalised ads, and purchase intentions of products or services in those seemingly personalised ads. Last, but not least, this thesis focused on personality traits (i.e., openness, extraversion, neuroticism, agreeableness, and conscientiousness) as antecedents of the perceived surveillance of conversations. Guided by these research questions, a survey was created to measure people's perceptions effectively. A total of 187 valid responses were collected. The results show that 76.4% experienced being surveilled by their smart devices strongly or to some extent. Moreover, 86.1% of respondents have already heard similar stories from their acquaintances. Regarding the behavioural consequences of perceived surveillance of conversations, the analysis showed that with higher levels of perceived surveillance, the attitude towards smart devices decreases. No relationship was found between attitude towards personalised advertisement and purchase intention towards the advertised products. Similarly, personality traits did not affect the perceived surveillance of conversations. The results proved that perceived surveillance of conversations is an undeniable issue connected to the use of smart devices and personalised advertising perceived by the majority of social media users. This finding brings out several implications for vendors of smart devices and marketers, such as the need for a better explanation of the data privacy and data collection associated with the smart devices and personalised advertising. Since the topic of perceived surveillance of conversation is still in its novelty, it also offers a plethora of new research possibilities. For

instance, further scrutiny is needed on the possible antecedents of the perceived surveillance, including technical knowledge of the users of smart devices, as well as behavioural outcomes such as users' attitudes towards social media platforms and the companies who are advertising the products.

KEYWORDS:

Surveillance, smart devices, personalised advertising, purchase intention, personality traits

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1. Introduction

Lately, there have been myriads of stories in which people encountered personalised advertising based on their previous real-life conversations (BBC News, 2017). Users never engaged with the topic online by, for instance, searching for it or watching similar content and believe they got targeted based on solely speaking about the topic. Some of the most common examples are discussing holiday destinations and recognizing advertisements about a particular country after that (Kleinman, 2016). The seemingly conversation-based advertisements occur across different domains, from clothing, cars, and home appliances to offering bank services and loans (Kröger & Raschke, 2019). Some people even designed their own experiments in which they regularly repeated phrases such as “going back to the university” on their smartphones which resulted in advertisements for courses at various universities (Nichols, 2018).

The reason for these allegations and fears is that smart devices are powerful personal appliances storing lots of personal data. These devices can range from small tools such as smart watches or smart glasses to more complex monitoring and energy control systems (Duggal, 2022). However, most people use smartphones, tablets and smart speakers which are oftentimes referred to as standard smart devices (Posey, 2021). The usage of smartphones and tablets is wide; from online communication, shopping, accessing news, and entertainment to weather forecasts. Additionally, more and more people have smart speakers integrated into their houses to assist in everyday tasks such as setting up alarms or turning on the lights (Forsey, 2021). This wide range of possibilities means that smart devices capture a lot of information through embedded sensors and store a vast amount of data about their users which can oftentimes lead to privacy concerns (Kröger & Raschke, 2019).

Consumers’ fears may be fueled by several scandals that actually confirmed leaked audio recordings (Verheyden et al., 2019) and affirmed that voice assistants on smartphones are sometimes activated without hearing the wake-up command (Murnane, 2019). Additionally, some studies show how voice assistants, specifically Siri from Apple, can be activated by mistake and false detection of the command “Hey Siri” (Martinez, 2021) and, therefore, listen to conversations when not asked to. The recorded data oftentimes carries personal information and recorded people can be easily identified. However, Facebook, now called Meta, denies any sort of listening or recording, stating that they display advertising based on “people’s interests and other profile information” (Meta, 2016). A similar approach is taken by other tech giants such as Amazon (*Is Alexa Always Listening?*, 2021) or Google

(Monsees, 2019) that renounce any deliberate voice recording and underscore privacy and security as a core feature of their devices.

Despite company claims, it is evident that smart devices have the ability to track and observe us on a wider scope and variety than ever before (Richards, 2013). Moreover, such recordings of personal conversations can be classified under the umbrella term of surveillance, thus, the belief that people are being spied on and listened to (Richards, 2013). The aim of this thesis is to delve into the surveillance through smart devices and the seemingly personalised advertisements that appear after the offline conversations, as previously exemplified on conversations about holiday destinations which led to displaying targeted posts about the specific country.

Furthermore, this thesis builds on a recent study published by Frick and colleagues (2021) that studied people's experiences about the perceived surveillance that results in personalised advertisements. Previous studies examine the tailored advertisements based on online behaviour and people's perception of personalised advertisements based on their past online searches and visited websites (Boerman et al., 2017; Farman et al., 2020) and also examined behavioural outcomes of these advertisements such as purchase intention (Alalwan, 2018; Talih Akkaya et al., 2017). However, in the existing academic literature, little attention has been given to the personalised advertisement that is displayed after an *offline* interaction and what factors might influence the perception of being spied on by smart devices. The article by Frick and colleagues (2021) is "one of the first forays explaining the phenomenon of perceived surveillance of conversations" (p. 2). Frick and colleagues (2021) were also the first ones to name the phenomenon - *the surveillance effect*. Henceforth, there are two existing terms for the same act of smart devices listening to conversations and displaying tailored ads, namely, surveillance effect and perceived surveillance of conversations (also referred to as PSoC). For the sake of clarity, this thesis uses only the latter to refer to the phenomenon.

The main objective of this thesis is to fulfil the research gap and limitations proposed in the article by Frick and colleagues (2021). Specifically, two limitations were chosen: first, how PSoC affects the attitudes and behaviours of the users and second, whether personality traits affect PSoC. These limitations were chosen in a way to examine both antecedents and consequences of PSoC and thus adequately expand the knowledge of the phenomenon and provide a more thorough and comprehensive explanation of PSoC.

Since the current literature requires additional studies dealing with the topic of smart devices eavesdropping on conversations, it is also needed to ascertain the perceived scope of the PSoC. This led to the formation of the following research question:

RQ1: To what extent do people report perceived surveillance of conversations by smart devices?

There is an important marketing perspective to consider when it comes to PSoC. Frick and colleagues (2021) discuss that if people truly believe that they are being recorded by marketers, it is pivotal to examine the effect of PSoC on consumers and whether it can subsequently lead to behavioural and attitudinal changes. The three specific behavioural changes which are examined in this study were derived from various sources. The first, the attitude towards smart devices, is crucial to examine for businesses as it was shown that negative attitudes are connected to higher levels of privacy concerns towards the devices (Huang et al. 2020) and trust towards vendors can substantially decrease (Lau et al., 2018). Thus, further investigation of what effect PSoC can have on the attitude towards smart devices is needed. The second was based on current literature that shows that level of privacy concerns might have an influential negative impact on people's perception of personalised advertising (Bleier and Eisenbeiss 2015; Lina & Setiyanto, 2020). Similarly, it was shown that the higher level of privacy and security people have, the less threatened they feel about sharing private information which leads to personalised advertising (Frick et al., 2021). However, further analysis on whether PSoC can bring out a negative attitude towards the advertisements themselves is required. Thirdly, the literature shows that personalised advertisements can have an impact on the purchase intentions of the consumers (Talih Akkaya et al., 2017; Farman et al., 2020; Martins et al., 2017), however, the topic of PSoC and its relation to purchasing intentions is yet an unexplored area. Based on these research topics, the following research question was derived:

RQ2: To what extent does people's perceived surveillance correlate to their attitudes towards smart devices (RQ2a), their attitudes towards seemingly personalised advertising (RQ2b), and their purchase intentions of products or services in those seemingly personalised advertising (RQ2c)?

While certain individualistic traits, such as trust in smart devices or computer anxiety, were analysed in the article by Frick and colleagues (2021), the authors did not investigate whether certain personality traits are associated with perceived surveillance of conversations. According to previous studies, personality traits can be strong predictors of the perceived level of online privacy concerns (Škrinjaric et al., 2018). To exemplify, people with certain personality traits (i.e. agreeableness, conscientiousness, neuroticism, openness) seem to be more worried about privacy infringement (Korzaan and Boswell, 2016; Osatuyi, 2015) while extraversion was found to have a negative effect (Škrinjaric et al., 2018). Henceforth, the third research question was formed as follows:

RQ3: To what extent do the big five personality traits (i.e., openness, extraversion, neuroticism, agreeableness, and conscientiousness) correlate to people's reported perceived surveillance?

1.1 Scientific relevance

The aim of this thesis is to contribute to the growing topic of personalised advertising by analysing it from a different perspective than the existing academic literature. Numerous studies have identified that personalised advertising might lead to privacy concerns (Aguirre et al., 2015; White et al., 2007), especially when the advertisement is tailored too closely to one's interests. Vice versa, privacy concerns might lower the attitudes towards personalised advertisements (Bleier and Eisenbeiss 2015; Lina & Setiyanto, 2020) and even decrease purchase intention towards the advertised product (Farman et al., 2020). However, most of the previous studies focused on people's experiences with tailored advertisements based on their online behaviour (i.e., past search queries, visited websites etc). Therefore, this thesis, along with the article by Frick and colleagues (2021), is one of the first to study the seemingly personalised ads that occur after having an *offline* conversation with an acquaintance and people's perceptions about this occurrence with possible behavioural changes.

Secondly, this thesis deals with the perceptions of people on PSoC and dissects various factors that might influence it (i.e., personality traits). In the current literature, it was established that there is a relationship between personality traits and users' online privacy concerns (Korzaan & Boswell, 2016; Škrinjaric et al., 2018), however, the significance of personality traits on the levels of PSoC has not been sufficiently studied yet. Only research by

Frick and colleagues (2021) focused on determinants of PSoC and concluded that “trust in smart devices, computer anxiety and prior negative experience are the main predictors of the PSoC” (p.8). Overall, the aim of the thesis is to contribute to the literature by proposing a greater understanding of why PSoC happens to some people, what factors might influence it and what behavioural outcomes it might elicit.

1.2 Societal relevance

Nowadays, digital advertising is growing rapidly and has the ability to reach the desired audience at a relatively low cost. One can argue that it is taking over from traditional advertising on radio, television or in newspapers (Talih Akkaya et al., 2017). The majority of businesses use digital advertising and use social media platforms to promote their products. However, the data collection for the personalisation of advertisements happens covertly and users are oftentimes not aware of it (Boerman et al., 2017) or they do not adequately understand the privacy consent statements, for instance, the use of cookies (Felt et al., 2012), that is supposed to warn them that the data is being collected and stored. As a consequence, users’ trust in the smart devices might decrease and when faced with an advertisement with a product that was mentioned in a preceding offline conversation; users can easily believe that their smart devices are spying on them (Frick et al., 2021). This thesis does not aim to investigate whether such recording of conversations is feasible, rather, the main focus is to place the phenomenon of PSoC into the society and understand why some people are more prone to believe in surveillance.

Additionally, by focusing on attitudes towards the smart device, towards the advertisement and purchase behaviour after being exposed to such personalised advertisements, this thesis offers insights for marketers and businesses. The objective of this thesis is to examine whether higher levels of PSoC can induce behavioural change (i.e., unfavourable attitudes towards smart devices as well as personal advertising and decreased purchase intentions of products advertised). If the hypotheses are confirmed, it can have implications for advertising companies which need to address the issue of PSoC and educate consumers more adequately about the data collection and processing of private information for personalised advertising. Furthermore, for vendors of smart devices, it might imply that there is a pressing need to inform people about the privacy of the devices and their working in a more lucid way. Hence, this thesis provides valuable insight into optimising the

advertisements tailored to the users and contributes to the overall business-to-customer relationship.

1.3 Thesis outline

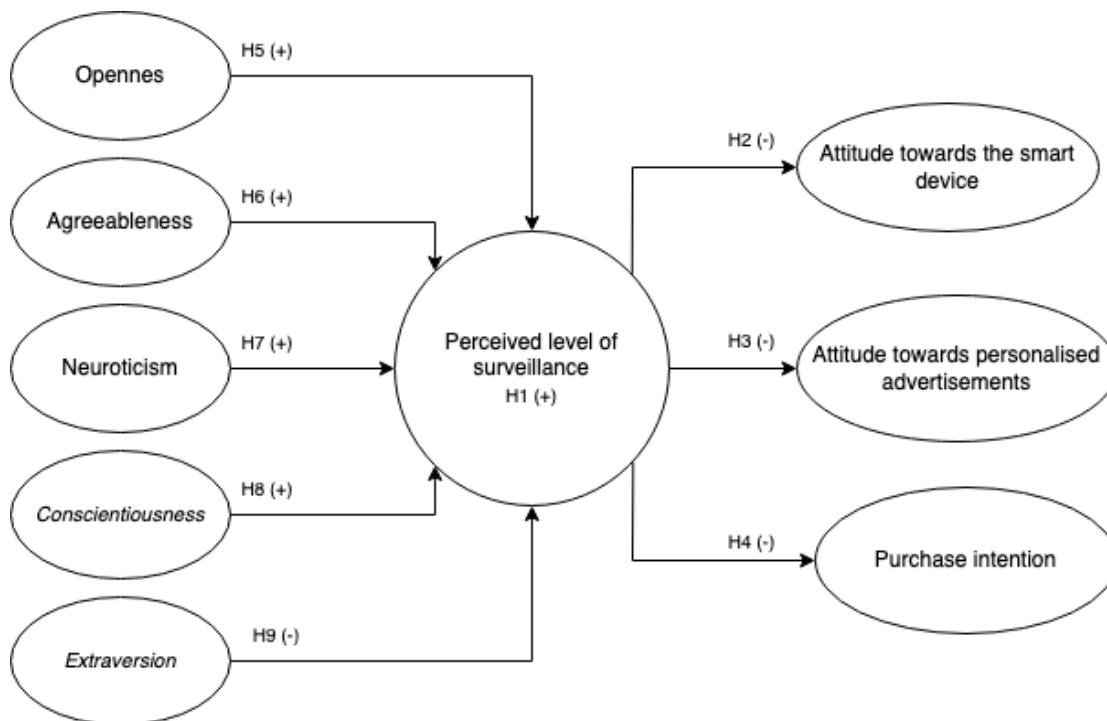
The thesis is structured as follows. The first chapter after the Introduction is the Theoretical framework. The theoretical basis of this research is presented in this chapter since it provides an overview of previous research for the main concepts introduced in the research questions (smart devices, PSoC, personalised advertisements on social media, purchase intention, the big five personality model). Subsequently, after the literature overview for each concept, hypotheses are formulated. The third chapter is the Methodology which dives into why quantitative research is a suitable method for this thesis and introduces the research procedure. More particularly, this chapter discusses samples, including the sampling method, operationalization of variables and control variables of the thesis. The fourth chapter delves into data preparation and main findings. In this section, several linear regressions were conducted to answer the proposed hypotheses. Subsequently, the last chapter is a discussion of these results which also delves into the limitations, strengths, implications of the study and directions for future research.

2. Theoretical framework

This chapter analyses the major theories and concepts introduced in the research questions. Firstly, the definition of smart devices is provided, which is followed by the conceptualization of the perceived surveillance of conversations. The first hypothesis to RQ1 is also presented here. Additionally, in this section, the literature on the technical feasibility of the PSoC is explained. Secondly, in relation to RQ2, the literature about privacy issues commonly associated with smart devices, personalised advertising and purchase intentions is introduced. After every topic, one hypothesis is formed that proposes the relationships between the variables and PSoC and determines the possible attitudes towards the concepts. Thirdly, the theory of the big five personality traits and their implementation in media studies is dissected, followed by the five hypotheses about each of the individual traits. The theoretical model that introduces the tested hypotheses can be seen in Figure 1.

Figure 1

Theoretical Model



2.1 Smart devices

Smart devices can be defined as “devices that automatically gather information about users or their environment to assist them in gaining knowledge about themselves and/or

taking action” (Lazar et al., 2015, p. 635). What distinguishes smart devices from other electronics is their sensorial networks; these devices have embedded sensors, such as a microphone, camera, accelerometer or GPS (Behan et al., 2013). Having these features installed in the device allows for a greater connection and communication of the appliance with the user, therefore, users can instantly pick up on the activity monitored by the smart device and align their actions according to that. To exemplify, a wearable smart device can track a user’s running routine, including the route, distance, time, heartbeat measurements and burned calories. Subsequently, the user can alter his running according to the information by, for instance, running faster, longer or in a different manner. Examples of smart devices include, but are not limited to, smart TVs, fitness trackers, smart locks, smart thermostats, smart glasses, and smart appliances such as refrigerators, microwaves and robotic vacuum cleaners (Forsey, 2021). However, this thesis delves into the smart devices that are considered standard and thus are the most prevalent in the current market, namely, smartphones, smart speakers, tablets and voice assistants installed on them (Posey, 2022).

Smartphones are the most common smart device with the number of users steadily increasing over the years (Xia et al., 2013). The smartphone market is innovative with new and powerful features arising regularly. Nowadays, smartphones have more storage space, various interfaces, stronger processors and operating systems that are more powerful such as Google Android, Apple iOS, Windows Phone and so forth (Islam & Want, 2014). Additionally, smartphones come with a variety of built-in applications but also allow the user to download and choose from an immense amount of diverse applications (Almunawar et al., 2018). The available applications vary from simple games to more complex ones such as monitoring the traffic or sensing the health of the user (Xia et al., 2013). The inevitable feature of smartphones and tablets is their connection to Wi-Fi which allows the user to access any information and do any task at any location. That is why they are becoming more and more popular. The biggest vendors have been for years Samsung and Apple (Statista 2022a).

The use and popularity of smart speakers are on the rise as well; it is predicted that by 2024 there will be 640 million smart speakers (Statista, 2022b). Smart speakers are devices connected to the Internet that have a microphone, speaker and “an integration with a cloud-enabled service (i.e., voice assistants)” (Dubois et al., 2020, p. 255). Some of the most popular voice assistants are Apple’s Siri, Microsoft’s Cortana, Amazon’s Alexa, and Google’s Assistant (Hoy, 2018). By saying a voice command, voice assistants can assist in calling a person, setting up an alarm or searching on the Internet. Smart speakers are

connected to the parent's company services; to exemplify, users can use Google's Assistant to access their Google Calendars or Alexa from Amazon can help shopping on Amazon (Lau et al., 2018). Additionally, voice assistants can be integrated into people's houses, such as Amazon's Echo speakers help with switching on the lights or opening the front door by voice command. Since voice assistance can be installed on both, smart speakers and smartphones, it is forecasted that in 2024, there will be 8.4 billion digital voice assistants - a number higher than the world's population (Statista, 2022c).

The next section builds on the theory of smart devices and discusses people's perception of the smart devices eavesdropping on their personal conversations.

2.2 Perceived surveillance of conversations

The suspicion that smart devices listen to or record their users' conversations to subsequently use the content of these conversations to generate and deliver highly personalised advertisements is expressed by many Internet users. Quite a few online tabloids investigated this topic and shared examples of PSoCs, and hundreds of people share their experiences on social media – either in response to the tabloid content or on their own accord (e.g. BBC News, 2017; Kleinman, 2016). However, in an academic setting, this topic is not widely researched yet. The study by Frick and colleagues (2021) is one of the first articles dealing with the topic of perceived surveillance of conversations that result in personalised advertising and people's perceptions of the phenomenon.

In their research, Frick and colleagues (2021) observed that the vast majority of their participants, specifically 74.4%, were aware of PSoC, while more than half of people actually experienced it themselves (Frick et al., 2021). These findings are substantial and prove that the phenomenon is clearly noticed amongst social media users. However, with regard to RQ1, it must be acknowledged that the topic of perceived surveillance is in its infancy in the current literature and the article by Frick and colleagues (2021) is the only one proposing these figures. Ergo, there is a need for replication research that would measure the perceived scope of PSoC and confirm whether the statistics are equally observed in a different study. Thus, from the study by Frick and colleagues (2021), it could be derived that the number of people who experience perceived surveillance is rather high, therefore, it is hypothesised that:

H1: The majority of users report perceived surveillance through their smart devices.

Regarding the possible psychological explanations, PSoC can be attributable to selective attention and confirmation bias (Frick et al., 2021). Hence, when people are paying attention to salient and coincidental information, it can lead to systematic bias and deceived beliefs because by doing so, they fail to see the full information and are overly impressed by the one stimulus (Schwartzstein, 2014). When users talk about a certain product and subsequently see an advertisement for it, this information becomes more salient and draws the users' attention. This is especially important considering the number of advertisements users consume on social media on a daily basis; not every one of them is relevant and consciously noticed by users. The conversation with another person is what makes the particular advertisement stand out from others, thus, making the users believe that they are being listened to by their smart devices (Frick et al., 2021).

Frick and colleagues (2021) also focused on determinants that can influence the perception of perceived surveillance. The most significant ones were trust in smart devices, computer anxiety, and prior negative experience. Therefore, in order to minimise the PSoC, it is essential that people feel safe with their smart devices and the fact that they might record them, that they feel comfortable around technology in general and that they did not have any major incidents related to data privacy in the past. This thesis aims to delve deeper into the topic of perceived surveillance and personalised ads. While selective attention and confirmation bias might explain the psychology behind the PSoC, further analysis of why certain people report it more than others and what additional forces can drive the surveillance effect is needed (Frick et al., 2021). In the next chapter, a holistic overview of PSoC from a technological perspective and the technical feasibility of the surveillance by smart devices is dissected.

2.2.1 Feasibility of the surveillance through smart devices

Despite the current literature lacking people's perception of PSoC, there are several empirical studies about the feasibility and employment of surveillance through smart devices. In the study from Kröger and Raschke (2019), no evidence for such surveilled procedures has been found, on the other hand, the authors add that there is little to no proof for the opposite claims as well. Similarly, research done by Pan and colleagues (2018) that delves into media leaks and permissions from apps confirms that some data such as images and videos are shared without the users' consent or awareness, however, no proof was found for secret audio recording. Some articles propose that not only microphones but also motion sensors on

smartphones could capture sounds (Ba et al., 2020). This was disregarded in the previous research as it was believed that the typical frequency for adult speech is between 85-255 Hz (Baken & Orlikoff, 2000), nevertheless, a recent study confirmed that the newest smartphones' sampling rates can go up to 500 Hz which could theoretically result in capturing "speech signals through zero-permission motion sensors" (Ba et al., 2020, p. 1).

Nowadays, mobile applications should request permission to access the microphone (Kröger & Raschke, 2019), however, research shows that only 43% of Android apps do so (Pan et al., 2018). Despite the fact that Android has a permission request system that makes the user aware of for instance the use of the microphone, it was shown that the number of people who actually pay attention to these permissions is remarkably low (i.e., 17%) (Felt et al., 2012). Additionally, a study asked three questions related to the comprehension of the warning, which resulted in only 3% of people who truly understood the security warning (Felt et al., 2012) that was shown to them. Other operating systems, including iOS, have a manual process to inspect the app's request permission, however, this process is still rather unclear and not thoroughly transparent to the users (Quattrone, 2016).

In the case of voice assistants, their main feature is to address the vocal commands of the users, therefore, the users' awareness that they are being recorded is higher. Nonetheless, users might be still oblivious to the permission to use a microphone and only agree to them because it is mandatory in order to use the voice assistants. Huang and colleagues (2020) add that some users of smart devices might even feel that they were tricked by the vendors to accept their permissions because they know that users do not read the long conditions but must agree to them to use the device. Moreover, due to the vast data that these devices store and know about their users, there is always a threat that these data can be leaked, stolen or used to blackmail (Hoy, 2018). Despite the tech companies claiming to protect users at all costs, some instances demonstrated smart speakers' hardware flaws, for instance, when it was listening to the user constantly and sending the recordings to the main servers (Tung, 2017). Some studies prove that wrong misactivation of the smart speaker is feasible and usually happens when a voice assistant hears a similar word to the activation keyword (Dubois et al., 2020). Although the smart device is recording for a small fraction of time (5 to 10 seconds) it is "still high enough to expose some of the context of a conversation" (Dubois et al., 2020, p. 267). Additionally, some companies, such as Google, confirmed that a fraction of interactions with the voice assistants (approximately 0.2%) are indeed being recorded to improve the services and review the language (Monsees, 2019). However, the leak of one of the Google language reviewers, in which more than one thousand audio recordings were made public

(Murnane, 2019), implies that the data that emerged from the voice assistants are still not adequately protected and secured.

Equally important as actual technical feasibility and security are users' perspectives on whether they feel threatened and spied on by their smart devices. As a matter of fact, users might mistrust big tech companies when evaluating privacy and security claims (Kelly & Guskin, 2021) and rely on their own perceptions. Thus, the next section discusses the most common privacy threats that users of smart devices face.

2.3 Privacy concerns associated with smart devices

Smart speakers have sensors embedded in them that help detect when a user says the activation keyword (e.g., “Hey Siri” or “Alexa”) (Lau et al., 2018). This comes with privacy risks since the smart devices need to “constantly listen in” (Dubois et al., 2020, p. 255) and wait for the keyword to be said. Thus, it brings up numerous concerns regarding the ubiquitous presence of a smart speaker. Lau and colleagues (2018) interviewed both users and non-users of smart speakers and concluded that non-users tend to distrust vendors of smart speakers, and in addition they question the security and privacy of smart devices more than the users. Some of the non-users even denied considering having a smart speaker at home, while some were hesitant and would only use it if the privacy concerns were sufficiently addressed. Lau and colleagues (2018) suggest that users of such devices have more trust in the protection of their privacy by the smart speakers' companies and oftentimes they did not believe in the feasibility to record them through the speakers. However, even amongst users of smart speakers, other research noticed an avoiding behaviour; some people refrain from utilising certain features that have personal information (such as voice purchasing that involved credit card numbers) (Huang et al., 2020) or some people turn off the speaker when not actively using it and/or when engaged in a sensitive conversation (Ammari et al., 2019).

Zeng and colleagues (2017) who interviewed smart home users came to the conclusion that most participants trust companies and their data protection laws. Additionally, most of the interviewees did not feel concerned about data privacy because they did not perceive themselves to be “interesting enough” to be personally targeted by the big companies. However, their study also suggested that users whose technical knowledge about smart devices is limited might fail to understand the threats and vulnerabilities of using smart devices (Zeng et al., 2017). The finding is confirmed by other research that shows that the

users of smart devices are oftentimes unaware of how their information is shared with third-party devices and that some are even unfamiliar with the fact that data is being shared in the first place (Ammari et al., 2019; Huang et al., 2020).

Another common concern of the users of smart devices is their activation by a different user that can, therefore, impersonate them and gain access to their private information or perform actions in their name. For instance, a 6-year-old girl asked Amazon's Echo device if it could get her a dollhouse, which resulted in the Echo device ordering said dollhouse (Liptak, 2017). Because of other similar past incidents, recent smart devices have so-called voice profiles installed that can recognise the user's voice (Schönherr et al., 2020) to prevent the misuse of the voice assistant and its features by another person. There are still some concerns regarding this feature and its reliability, especially when it comes to people with very similar voices (Huang et al., 2020).

Overall, it can be derived from the literature that there is a privacy threat regarding the malfunctioning of smart devices. This might have a negative influence on the users' attitudes towards them. Thus, if smart devices are listening to the users to gather information and tailor the advertisement, the attitude towards smart devices is to be perceived unfavourably. This led to the formation of the following hypothesis:

H2: Perceived surveillance of conversations by smart devices is negatively associated with attitudes towards those smart devices.

The aim of this thesis is to examine whether PSoC can lead to behavioural changes of social media users. Hence, on top of the possible shift in attitude towards smart devices, it is also important to analyse users' attitude towards the personalised advertisements that occurs after the smart devices allegedly listen to conversations. The next section delves into this issue in greater detail.

2.4 Personalised advertisements on social media

Personalisation can be explained as a marketing strategy that tries to deliver the right content to the specifically targeted person at the most convenient time (Dāvida, 2020; Lee & Cranage, 2011; Tam & Ho 2006). With the advance in social media, advertisers can target specific people at any time and place based on their demographics or interests. This brings a lot of benefits compared to traditional media advertisements, such as having customised

content befitting each consumer and the ability to start a two-way conversation with the customers. When an advertisement on social media is successful, companies can gain new followers and likes on their profiles, henceforth, the whole communication between business and client becomes more personal, quicker and more interactive (Talih Akkaya et al., 2017). The targeting of customers is based on users' previously visited websites, the videos that the users watched, the articles they read, and everything that they ever searched for on search engines (Boerman et al., 2017). With this wide range of information, the personalisation of advertisements can be done in a more efficient and relevant way. Online personalised advertising is very successful in promoting the desired product and creating engagement with the targeted audience (Alalwan, 2018; Boerman et al., 2017; Cordero-Gutiérrez & Lahuerta-Otero 2020). Dāvida (2020) adds that since the relevant audience is engaged, the chances that the product will be bought are higher. Since personalised advertisements serve content relevant to one's prior interests and activities and filter out content that is not, online advertisements may bring several benefits to consumers such as displaying highly relevant content, decreased time spent on search and lower transaction costs (Dāvida, 2020).

However, it is argued that personalisation can be inefficient and invasive when advertising websites tend to possess more information than users were aware of sharing (Anand & Shachar, 2009; White et al. 2007). The process of targeting a user involves "collecting, using, and sharing personal data" (Boerman et al., 2017, p. 363) and that can lead to concerns about how one's data is being handled and by whom. Consumers express feelings of manipulation or privation of the freedom to choose what information to disclose when being exposed to a personalised advertisement that matches their preferences too closely (Bleier & Eisenbeiss, 2015; Conti et al., 2012). Aguirre and colleagues (2015) call this phenomenon of consumers' unwillingness to engage with the brand and discomfort when seeing a highly personalised advertisement *a personalisation paradox*. However, the authors add that the context in which the personalisation occurs is crucial. For instance, the more credible the website is, the more likely it is that a person will click on the ad (Aguirre et al, 2015). Similarly, the trust that the person has towards the brand increases the likelihood to engage with the advertising (Bleier & Eisenbeiss, 2015). Therefore, there are several factors that might minimise privacy concerns.

Research shows that the way the data was collected about the user, and whether they were aware of the collection, plays a crucial role in privacy concerns (Aguirre et al, 2015; Boerman, 2017). When users engage in a conversation with their acquaintances, they are not mindful that their smart device is recording them at the moment. White and colleagues (2007)

even argue that if people are not conscious of the data collection, it might cause negative behavioural outcomes towards the advertisement and consumers do not engage with it at any cost. Ergo, due to the users' unawareness of data collection in PSoC, their attitude is expected to be unfavourable. This led to the formation of the following hypothesis:

H3: Perceived surveillance of conversations by smart devices is negatively correlated with attitudes toward seemingly personalised advertising.

2.5 Purchase intention

The previous sections have shown that advertisements that are too personal and do not explicitly warn about the data collection process might yield negative results for marketers and elicit feelings of invasion and privacy threats in their customers. However, it is important to further analyse to what extent the advertisement can influence the customer; whether it solely creates unfavourable opinions or can also have an unfavourable impact on the actual buying decisions.

The main objective of advertisements is to enhance the brand's awareness, inform customers about their product service and ultimately, make them purchase the advertised product (Martins et al., 2017; Talih Akkaya et al., 2017). To measure the likelihood to buy the product, purchase intention is the best indicator since it is informative of whether or not the consumer desires to purchase the product. If consumers have a positive purchase intention, it was demonstrated that the increase in the purchase of the product is higher as well (Martins et al., 2017). Advertisements can directly influence the intention to purchase. Several studies showed the benefits of social media advertising and that it leads to an increased likelihood to buy the advertised product (Talih Akkaya et al. 2017; Dehghani & Tumer, 2015). Similarly, Alalwan (2018) argues that "as long as customers feel social media ads are related to their own preferences and interests, they will be more inclined to buy the products presented in social media ads" (p. 69).

Interestingly enough, though research done by Lina and Setiyanto (2021) confirms that relevant and tailored advertisements can increase the purchase intention, this study also proves that a user's level of privacy concerns negatively influences the relationship: When users displayed high levels of concern, their purchase intention towards the displayed advertisement decreased, despite the advertisement being tailored and personalised. A similar

conclusion was drawn in research by Farman and colleagues (2020) who suggest that perceived surveillance of the user can decrease the intention to buy the product by 4.5%.

Therefore, despite the personalised advertisement having a positive effect on purchase intention, it is hypothesised that the surveillance of conversations plays an influential role in the relationship and decreases the likelihood to purchase.

H4: Perceived surveillance of conversations by smart devices is negatively correlated with purchase intentions toward seemingly personalised advertising.

The previous sections 2.3 to 2.5 focused on the behavioural outcomes and consequences of PSoC. However, as mentioned previously, this thesis aims to look at possible antecedents of the phenomenon and analyse what individual factors might contribute to the perceived surveillance. Therefore, the next section analyses the big five personality model that is widely used in media studies and showcases that personality traits might have an impact on privacy perception in general.

2.6 Personality traits and their effect on the perceived surveillance

In order to establish whether certain personality traits have an impact on the perceived surveillance, the big five personality model, or the five factors model by McCrae and John (1992) is the most suitable measure. The trait theory argues that traits can be quantitatively measured and allow the researchers to assess how similar personality traits behave and act (McCrae & John, 1992). It is argued that there are five robust personality traits that reoccur within different psychological studies, namely, neuroticism, extraversion, openness, agreeableness and conscientiousness. These personalities are defined in Table 1. It is important to note that these personalities are not exclusive, thus, one person possesses multiple traits. Moreover, these personalities are measured on a scale and that means that a person is usually not thoroughly extroverted or introverted, but rather falls within these two extreme opposites.

Table 1

Description of the Personality Traits in the Five-Factor Model (Copied from McCrae & John, 1992)

Personality trait	Description
Extraversion	Talkative, assertive, energetic, outgoing, enthusiastic
Agreeableness	Appreciative, forgiving, generous, kind, sympathetic, trusting, warm, compassionate
Conscientiousness	Efficient, organised, planful, reliable, responsible, thorough
Neuroticism	Anxious, self-pitying, tense, touchy, unstable, worrying
Openness	Artistic, curious, imaginative, insightful, original, wide interest

Within media studies, the big five personality model was used to study, for instance, the effects of personality on usage or non-usage of Facebook (Ryan & Xenos, 2011), or the motives to use social media (Kircaburun et al., 2018). It was also investigated whether personality traits can shape the level of privacy concern. PSoC is closely linked to privacy threats, due to the fact that people perceive that their conversations are being listened to, recorded and targeted by online advertising agencies without their explicit consent. Junglas and colleagues (2008) were one of the first to examine a relationship between individual characteristics and agitation towards online privacy. It was established that conscientiousness and openness have a positive impact on online privacy concerns, agreeableness affects it negatively and no significant relationship was found between neuroticism and extraversion. On the contrary, a study by Škrinjarić and colleagues (2018) indicates that the more extroverted characteristics people have, the less likely they are to be concerned about online privacy, while neuroticism has the opposite effect and the more neurotic people are, the more they are worried about online privacy. Similar research dealing with privacy concerns on social media platforms revealed that agreeableness and conscientiousness are the most important in assessing the level of concern and people with these characteristics are more likely to be distressed about online infringement of privacy (Osatuyi, 2015). A study by Korzaan and Boswell (2016) supports this finding and argues that agreeableness is positively related to online privacy concerns. Therefore, the initial finding of Junglas and colleagues (2008) that agreeableness has a negative effect seemed to be disproved in the more recent literature.

The previous studies show that personality traits are related to the level of concern towards online privacy. However, as suggested by Frick and colleagues (2021), the current literature lacks the impact of personality traits on surveillance perceptions. Therefore, this thesis offers a trailblazing insight into the direct effects of the big five personality threats on PSoC. Based on the previous findings and associations of privacy concerns with personality traits, this thesis proposes the following hypotheses:

Perceived surveillance of conversations by smart devices is positively associated with openness (H5), agreeableness (H6), neuroticism (H7), and conscientiousness (H8) and negatively associated with extraversion (H9).

This chapter provided a theoretical examination of the studied concepts and proposed nine hypotheses. To study the relationships between these concepts and test the hypotheses, an online survey was created. The next chapter delves into the specifics of the survey and research method.

3. Methodology

This chapter discusses the choices made regarding the research design, sampling strategy, data collection, and finally, data analysis. First, the choice for a quantitative method is justified. After that, the sampling strategy including a description of the sample and descriptives is presented, followed by a thorough explanation of the survey. The subsequent section discusses the operationalisation of the variables. Finally, control variables are dissected.

3.1 Choice of research method

To gather and analyse data, a quantitative research method was used. Quantitative research focuses on facts about the targeted population and aims to provide a true representation of this targeted group, and their way of thinking or behaving (Barnham, 2015). Moreover, the main objective of quantitative research is to represent the world in a systematic and numerical way (Neuman, 2014). A quantitative methodology is suitable for the purposes of this thesis which also aims to systematically analyse the way people think and behave when they are exposed to seemingly personalised advertisements that are based on their offline conversations.

To further specify, survey questionnaires were used to assess these perceptions. Surveys are appropriate when the research objective is to explore “people’s knowledge, beliefs, attitudes and behaviours” on a large scale (Boynton & Greenhalgh, 2004, p. 1312). Since the aim of this thesis is to analyse perceptions of people on the newly defined phenomenon of PSoC, the survey is a suitable method. The survey was conducted online and designed through an online platform Qualtrics, which is accessible to students of Erasmus University Rotterdam for free. According to Wright (2017), online surveys’ major advantage is that they enable to reach large numbers of people in a short amount of time, without being restricted by geographical distances. Furthermore, surveys allow the researcher to conveniently collect the data in a time-efficient manner while directing their attention to different tasks at the same time.

On the other hand, Neuman (2014) points out that respondents who fill out the survey online might be concerned about the privacy and anonymity of their responses. To prevent the respondent from worrying about privacy, an informative text was incorporated on the first page of the survey stating that the personal information will be kept confidential and the findings will be used solely for thesis purposes, hence anonymity is guaranteed. Moreover, to

strengthen the confidentiality and credibility of the research, contact information in the form of an e-mail account made solely for the purposes of this thesis was given to participants along with an invitation to write to the researcher if any questions about the research have arisen. Finally, respondents received a general description of the survey, which is also important in online-based surveys (Wright, 2017) and allows them to decide whether they want to participate in the study.

Another common concern that is associated with online surveys is design flexibility and compatibility with various kinds of software and hardware (Neuman, 2014). This disadvantage was addressed by having the survey optimised in a way that is compatible with laptops, tablets, and mobile screens to ensure that participants can use any device to fill in the survey. However, even such optimisation to different devices does not prevent low response rates and the fact that participants oftentimes quit during the process of filling the questionnaire. Rice and colleagues (2017) state that it depends on various factors whether participants finish the survey, such as their personal interest in the researched topic, whether they can see the progression bar and the length of the survey. In order to ensure that the survey was finished by participants, the survey made for this thesis had a progression bar and its length was under 10 minutes.

The survey tried to achieve internal validity, which encompasses that the results are truthful and not caused by possible errors in the research design (Neuman, 2014). This was done by pre-testing the survey with three people who ensured that there were no issues in the content of the questions, survey flow and so on. Matthews and Ross (2010) argue that piloting the survey before publication can be an efficient way to ensure validity. External validity, on the other hand, refers to the generalisability of the study to a wider range of participants and different populations that were not included in the thesis sample (Neuman, 2014). This thesis tried to increase the external validity by gathering a sufficient number of respondents that could be representative of larger populations. However, some demographic groups might be unbalanced, for instance, it was more common for female respondents to answer the survey. This might threaten external validity, however, analysis tried to counterbalance this fact and further testing was conducted to make sure that the control variables such as gender did not affect the results.

3.2 Sampling

The sampling process chosen for this thesis is non-probability sampling, which can be used in academia because of its “low cost and convenience advantages” (Sarstedt et al., 2017, p. 651). That is, non-probability sampling allows the researcher to target the population that meets specific requirements for the study. Specifically, this thesis utilised the convenience sampling method and was aimed at adults between 18-34 years old. The main reason for choosing this sampling method and sample is due to the fact that the largest population who owns smartphones are people aged 16-34 (Statista, 2021). In addition, the age group of 18-29 is the most likely to use social media (Auxier & Anderson, 2022). It needs to be acknowledged that non-probability sampling might not lead to as high representativeness of the respondents as other types of sampling (Sarstedt et al., 2017). However, considering the aforementioned age requirement and the fact that respondents needed to be familiar with smart devices and social media sites in order to be able to answer the proposed questions, non-probability sampling was the most suitable method.

Convenience sampling might come in different ways, however, for this research, a snowball sampling method was used (Sarstedt et al., 2017). The sample starts with a few people from the researcher’s network. Subsequently, these connections spread the survey and more and more people joined to participate in the research until the desired number of responses was gathered. The survey was spread on social networking sites such as Facebook and Instagram. Therefore, the sample consists of the researcher’s network as well as the subsequent network’s connections. Additionally, to limit the use of a personal network to the minimum and avoid any personal biases, several Facebook groups related to either survey exchanges or similar topics to this thesis’ interests (i.e., advertising, digital marketing) were contacted and asked to publish the survey. The researcher was not part of these groups before conducting the survey, therefore, they helped to extend the already existing networks.

To further spread the survey and contribute to the larger generalisability of the results, the link was posted on various websites for survey exchanges, such as SurveyCircle.com and SurveySwap.io. The main idea of these websites is to fill in other people’s surveys and collect points by doing so. These points act as indicators in the ranking system, thus, the more points you collect, the higher your position in the ranking. The surveys that are amongst the top ones are, naturally, the ones that get the most respondents, since they also offer the highest number of points for every completion. In the next section, further details about the survey are provided.

3.3 Measurements

3.3.1 Survey procedure

The survey began with fundamental information such as the purpose of the study, its length, and contact information. Additionally, participants were informed that their contribution is voluntary, and they have the right to withdraw at any time during the participation. As previously mentioned, it was also emphasised that the information is kept confidential and used only for the purposes of this thesis. In case of any questions or concerns, the e-mail address was included at the end of the first page. Despite that, no respondents used the e-mail to send any additional remarks. To proceed to the next page, participants had to tick the box and confirm that they understood the information and wished to participate. In total, all 227 participants who opened the survey also agreed to this condition.

Firstly, respondents answered demographic questions related to their age, gender and education. The sample of this thesis is 18-34 years old, therefore, participants who did not fulfil this requirement were directed to the final page stating: "Thank you for your interest in our study. Regrettably, you do not fit the target group of interest." Altogether, eight responses were filtered out due to the age requirement. Similar filtering was done with the next two questions, in which participants were asked how many hours per day they spend on social media and how long they have been using a smart device. Prior to asking the latter question, a definition of smart devices was given along with examples, to ensure that participants understood the term. If respondents chose the options "I do not use social media" or "I am not using any smart device" they were redirected to the final page and excluded from the study since the sampling requires social media users as well as owners of a smart device. Overall, six responses were filtered out in this question: two participants did not use social media and four were not using any smart device.

After filtering participants who met the requirements, which resulted in 213 respondents, a scale measuring overall attitude towards smart devices was shown. That was followed by a brief description of what PSoC means and respondents were asked to answer statements related to the PSoC scale. Similarly, the next two scales were related to purchase intentions of the advertisement based on offline conversation and the attitude towards the advertisement itself. All of the scales were based on the main concepts related to the research questions.

On the next page, participants were asked whether they have encountered personalised advertisements on social media feeds that were based on their offline conversations. If the response was positive, the next question asked to recollect a concrete example of such an encounter. If they responded negatively, this question was skipped and led to two other questions inquiring whether participants heard stories about the personalised advertisement based on offline conversations from friends/family or from the news. This was followed by a question of whether they perceive the eavesdropping of smart devices as a privacy threat.

The survey was finalised by asking participants to fill in the scale related to their personality traits. After that, the final screen thanked the participants for participation and invited them to fill in any questions or comments. The whole survey is included in Appendix A. Only the 187 respondents that completed the full questionnaire were included in the analytical sample. The next section delves into the scales that were used to measure and operationalise the main variables of this thesis.

3.3.2 Operationalisation of variables

To collect the data about the variables proposed in the previous sections, several Likert scales that were used by previous studies were implemented. Below, they are introduced in the same order as they are used in the hypotheses. For the sake of clarity, the survey included the same 5-point Likert scale in all of the measured items (1 = “strongly disagree” to 5 = “strongly agree”), due to its simplicity, accuracy and reliability.

Firstly, to adequately measure the main concept of **perceived surveillance of conversations through smart devices**, the scale of Frick and colleagues (2021) was used, because its reliability in the original study was high (Cronbach’s $\alpha = 0.88$). No alterations have been made to the questions. Example items are “I am concerned that smart devices record conversations to provide personalised advertising on websites and social media” and “I am concerned that my smart device is capturing information even though I am not actively using it.” The reliability in the current sample remained high (Cronbach’s $\alpha = 0.89$) and the mean score of 3.64 shows that people tended to agree with the statements ($M = 3.64$, $SD = 0.93$).

To assess respondents' **attitudes towards smart devices**, a scale by Keng and Ting (2009) on attitudes towards blogs was adopted. The scale consisted of 3 items, using a seven-point Likert scale (1 = "strongly disagree" to 7 "strongly agree"). Firstly, the items were changed to a five-point scale. Then, the three items were adjusted to fit the purpose of this thesis. In each item, the word blog was replaced with the word smart device. For instance, one of the original items from Keng and Ting (2009) stated: "The return gained from the blog outweighs the loss." This was altered into: "The return gained from using the smart device outweighs the loss". The reliability of the original scale was high (Cronbach's $\alpha = 0.94$). With the current alterations, reliability lowered (Cronbach's $\alpha = 0.74$), however, it was still acceptable and could not be improved by removing one of the items. On average, people agreed with the items in the scale ($M = 3.90$, $SD = 0.62$).

The same adjustment was applied to measure the **attitude towards seemingly personalised advertisements**. Seven items from the original scale of Bruner and Kumar (2007) were used that measured attitude towards location-based advertising. The original scale consisted of a total of 9 items and had a Cronbach's alpha of .94. However, two items had Cronbach Alpha below the required level for acceptability, thus Bruner and Kumar (2007) suggested that if a shorter version is required, these two items can be removed. Since this thesis aimed for efficient data collection and adequate length of the survey, it was decided that the two items were excluded from this study. The remaining seven items were adjusted in a way that the "location-based advertising" was replaced by "advertisement based on offline conversations". To exemplify, the original item "I would be favourable towards location-based advertising" was changed to "I would be favourable towards advertisement based on my offline conversations". The scores on negative items such as "In general, advertisements based on my offline conversations would be irritating" were reverse coded prior to analysis (i.e., 5 = 1, 4 = 2, 3 = 3, 2 = 4, and 1 = 5). In the current study, Cronbach's alpha was 0.76. Removing one of the items would improve Cronbach's alpha to 0.82, however, to maximise the comparability of the results with the prior study, the item was kept, and all seven items were used for analysis. The mean score showed that respondents mostly disagreed with the sentences ($M = 2.65$, $SD = 0.56$).

The items to assess **purchase intention** were adjusted from Duffet (2015) who analysed Facebook's advertising and the purchase intentions of the Facebook users. This scale used a 5-point Likert scale and had Cronbach's alpha of 0.84. The items were rephrased in a way that is suitable for the context of this thesis, therefore, advertisements are based on offline conversations of their users. To exemplify, the original statement was "I desire to buy products that are advertised on Facebook" (Duffet, 2015). This statement was altered so it matches the description of the question in which people are asked to imagine that they found a product advertised on social media based on their previous conversations about the same product. Therefore, it was not needed to specify that participants found this product "on Facebook". The altered item was as follows: "I desire to buy the product that is advertised". The reliability in the current sample remained high and had Cronbach's alpha = 0.85. On average, people did not agree with the sentences ($M = 2.84$, $SD = 0.48$).

Lastly, this thesis aims to research whether certain **personality traits** are more inclined to believe in claims of smart devices spying and listening to their users. For this purpose, the big five personality assessments will be used. Research by Rammsted and John (2007) proposed a shortened, 10-item scale to measure personality traits. The shortened scale does have some losses in terms of reliability and correlations of items compared to the original one which included 44 items. However, if the research setting is limited, as it is in this case, "the BFI-10 offers an adequate assessment of personality" (Rammsted & John, 2007, p. 117). Each personality trait was therefore measured with 2 items on a 5-point Likert scale. Some items were negative and needed to be reversed prior to the analysis. To exemplify, the extraversion scale consisted of two items, "I see myself as someone who is outgoing, sociable" and "I see myself as someone who is reserved". The latter carries the opposite meaning than the first item, thus, it was required to reverse the relationship in order for the items to be correlated. The strength of the correlations between the variables was measured by conducting Pearson's correlation. The scale for extraversion had Pearson's correlation .399 ($p < .001$); neuroticism had correlation .449 ($p < .001$); conscientiousness had correlation .240 ($p = .002$). The correlations are significant and both of the items were used. However, the items of the two remaining scales, namely agreeableness and openness were negative and insignificantly correlated (-.010 with $p = .896$ and -.101 with $p = .189$ respectively), which indicated negative and insignificant correlations. Therefore, only one of the items was used for further analysis that fit the measured construct better. Specifically, for agreeableness, the item "I see myself as someone who tends to find fault with others" was

selected and for the openness, it was the item “I see myself as someone who has an active imagination”.

3.3.3 Control variables

Additionally, to control any variable that could influence the outcome of the survey, several demographics were collected. The demographics were based on the article from Frick and colleagues (2021). To be specific, **age, gender, education, and duration of use of the smart device** were measured to ensure that the dependent variable is not affected by these factors. However, even though Frick and colleagues (2021) included these variables in their study, they did not specify the extent to which these variables affected the perceptions of PSoC. Moreover, an additional control variable that was not included in the article by Frick and colleagues (2021), the **time spent on social media** was added. The decision was done based on the fact that the more time users spend on social media, the more likely they are to encounter tailored advertising attributed to their offline conversations.

Overall, 119 respondents identified as female (63.6%), 64 as male (34.2%), three people as non-binary (1.6%) and one person preferred not to say their gender (0.5%). For the purpose of the subsequent analysis, gender was recoded in a dummy variable with the score 0 representing males and the score 1 representing females. Age was measured as a continuous variable, and the average age of participants was 23.90 (SD = 3.10; range 18-34). The most frequent educational level obtained by 43.3% of participants was a bachelor's degree, followed by a master's degree (41.2%), secondary/high school diploma (9.6%), vocational degree (2.7%) and PhD, MBA or equivalent (2.7%). For the purpose of the analysis, a dummy variable was constructed. Respondents with a bachelor's degree and lower scored 0 and respondents with a master's degree or higher education scored 1.

In the article from Frick et al. (2021), the duration of usage was also measured in years: from less than one year to more than 5 years. However, 75% of the participants in their study indicated that they have been using the device for more than 5 years. Therefore, the options for this question were altered in a way that an even greater span of time is incorporated to specifically determine whether long duration can influence the perception of PSoC. The options in this study were as follows: “less than 5 years, 5-10 years, 10-15 years, 15 years and more”. The most common answer was 5-10 years (54.5%), followed by 10-15 years (34.8%), 5 years or less (6.4%) and 8 participants have used smart devices for more than 15 years (4.3%). For the analyses that follow next, a dummy variable was constructed

with a score of 0 representing participants who have used smart devices for 10 years or less, and a score of 1 representing participants who have used smart devices for more than 10 years.

Regarding the time spent on social media per day, the most frequent answer was between 2-3 hours (33.2%). Other common answers were between 3-4 hours (23.5%), 1 to 2 hours (23%), between 4 to 5 hours (7.5%) and more than 5 hours (7.5%). The least frequent option was up to one hour (5.3%). This variable is included as a continuous variable in the subsequent analyses.

3.4 Data analysis

The hypotheses that were introduced in the theoretical framework were tested by conducting data analysis in IBM SPSS (version 28). Prior to the analysis, the data cleaning was done. The incomplete responses were deleted, along with the responses that did not meet the target sample's requirements. Altogether, the final dataset consisted of 187 responses.

Firstly, to assess the first hypothesis, descriptive statistics were used since the hypothesis examines the number of people who have experienced PSoC. Next, to test hypotheses H2-H4, a linear regression analysis was conducted. Linear regression is suitable because all of the tested variables are continuous and the aim is to test the relationship between an independent variable (perceived level of surveillance) and one dependent variable per each hypothesis (i.e., attitude towards smart devices (H2), attitude towards advertisement based on offline conversation (H3) or purchase intention (H4)).

Similarly, to test hypotheses H5-H9, a linear regression analysis was conducted. However, in this case, the perceived level of surveillance was the dependent variable and the five personality traits were independent variables (i.e., openness (H5), agreeableness (H6), neuroticism (H7), and conscientiousness (H8) and extraversion (H9)). In addition, control variables were added in every linear regression as independent variables to test whether they had any effect on the examined relationships.

4. Results

This chapter presents the main findings of the study based on the previous analysis. The results are organised in the order of hypotheses. Firstly, descriptive statistics provide the scope of PSoC and thus answer the first research question. Secondly, behavioural outcomes of PSoC, connected to the second research question, are discussed. Last but not least, this chapter discusses personality traits and their effect on PSoC, which constitutes the third research question.

4.1 Perceived surveillance through smart devices (RQ1, H1)

The first hypothesis stated that the majority of users report perceived surveillance through smart devices. Descriptive statistics, namely frequencies, were conducted to find out the percentage of people who have experienced the PSoC. The exact frequencies can be found in Table 2 below this section. The 5-point Likert scale had the following options: 1 - Strongly disagree, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Strongly agree. There were 44 people (23.5%) who scored 3 or lower and do not agree with the perceived surveillance; 90 people (48.1%) who gave a score of 3.20 to 4.00 and thus indicated that they perceive the surveillance to some extent; and 53 participants (28.3%) with scores from 4.20 to 5.00 agreed with the items, thus, strongly perceived to be surveilled. Excluding the people who did not perceive to be surveilled by smart devices at any cost results in 76.4% who experienced it strongly or to some extent. It was hypothesised that the majority of people experience the PSoC. Thus, the H1 is accepted.

To gain further insight into the PSoC, additional questions were asked. The first question inquired whether people encountered personalised advertisement on their social media that they thought was based on their offline conversations: 72 respondents (38.5%) answered “definitely yes”, 79 respondents (42.2%) said “probably yes”, “probably not” was chosen by 30 participants (16%) and “definitely not” by 6 respondents (3.2%). Overall, 80.7% of respondents had the suspicion that they have seen the advertisements based on their offline conversations. This question differed from the above-mentioned PSoC scale because it only measures people’s opinions and whether they have seen such an advertisement. The PSoC scale has also focused on fear of surveillance through smart devices and distrust towards advertising companies, therefore, the results are slightly different.

In the next question, respondents were asked to provide an example of such an encounter. The stories vary from discussing a specific product with acquaintances such as a red dress or a trip to the Maldives and immediately seeing an advertisement promoting the dress or Maldives travel packages. The examples of advertisements also included specific brands, such as talking about Dyson, Ben & Jerry's or KFC and seeing advertisements from them. One respondent stated he tested the smart device by talking about dogs and dog-related products, something he never searched for and had no relationship with, and that later he noticed advertisements about dog houses on Facebook.

The survey also included questions about whether participants heard stories about smart devices eavesdropping and showing personalised advertisements from other sources, specifically from friends/family or from the news. Results showed that people are more likely to hear stories about PSoC from friends/family since 161 people (86.1%) answered this question positively while only 26 people (13.9%) have never heard similar stories from acquaintances. The news was the less frequent source since only one-third of people (33.2%) indicated that they encountered stories about PSoC there, while the majority (66.8%) had never heard these stories on the news.

The next question asked whether participants perceive the eavesdropping of smart devices as a privacy threat. 89.3% (167 respondents) think that it is a privacy threat when a smart device is listening to their conversations while 10.7% (20 respondents) do not believe that it should be considered as a threat.

Table 2*Frequency table PSoC*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	1.1	1.1	1.1
	1.40	4	2.1	2.1	3.2
	1.60	2	1.1	1.1	4.3
	1.80	3	1.6	1.6	5.9
	2.00	7	3.7	3.7	9.6
	2.20	3	1.6	1.6	11.2
	2.40	5	2.7	2.7	13.9
	2.60	2	1.1	1.1	15.0
	2.80	8	4.3	4.3	19.3
	3.00	8	4.3	4.3	23.5
	3.20	10	5.3	5.3	28.9
	3.40	12	6.4	6.4	35.3
	3.60	14	7.5	7.5	42.8
	3.80	22	11.8	11.8	54.5
	4.00	32	17.1	17.1	71.7
	4.20	15	8.0	8.0	79.7
	4.40	3	1.6	1.6	81.3
	4.60	10	5.3	5.3	86.6
	4.80	9	4.8	4.8	91.4
5.00	16	8.6	8.6	100.0	
Total		187	100.0	100.0	

4.2 Outcomes of PSoC (RQ2, H2-4)*4.2.1 The influence of PSoC on attitudes towards smart devices*

The second hypothesis tested the relationship between perceived surveillance of conversations and people's attitudes towards smart devices. A linear regression showed that the model was significant, $F(6, 176) = 2.99, p = .008, R^2 = .093$. Thus, 9.3% of the variance was explained by the attitude towards smart devices. The PSoC had a negative influence on attitude towards smart devices ($\beta = -.14, p = .056, B = -.09$). Additionally, for every increasing step on PSoC, the attitude towards the smart devices decreased by 0.09. The scales were measured on a 5-point Likert scale. To calculate the difference between the lowest and highest score, the unstandardized B was multiplied by four. Accordingly, there was a

difference of 0.36 points between the person who did not perceive to be surveilled at all and the one who perceived it strongly. Since the hypothesis predicted that the relationship was negative, the H2 is accepted.

Furthermore, some control variables had an impact on the relationship. Namely, the duration of the use of smart devices ($\beta = .19, p = .013, B = .25$) and the educational level ($\beta = .14, p = .049, B = .18$) positively influenced people's attitudes towards smart devices. Specifically, people who used the smart devices longer scored 0.25 points higher in their attitudes towards smart devices, which means their overall relationship was more positive than for people with shorter usage of smart devices. The same applies to people with a master's degree and higher educational background, who scored higher by 0.18 points on their attitude towards smart devices than people with bachelor's degrees and lower. Other control variables, namely gender ($\beta = -.03, p = .699, B = -.04$), age ($\beta = -.08, p = .287, B = -.02$) and time spent on social media ($\beta = .09, p = .247, B = .04$) had no significant impact on the relationship between PSoC and attitude towards smart devices.

4.2.2 The influence of PSoC on attitudes towards personalised advertisements

In the third hypothesis, it was tested whether the level of PSoC had an influence on people's attitudes towards personalised advertisements. The linear regression showed that the model was not significant $F(6, 176) = 1.38, p = .227, R^2 = .05$. The PSoC had no influence on the attitude towards personalised advertisements ($\beta = .01, p = .884, B = .01$). The hypothesis predicted a significant and negative relationship, however, the results were found to be insignificant. Therefore, H3 is rejected.

Regarding the control variables, only the time spent on social media had a significant impact ($\beta = .20, p = .009, B = .09$). For each step increase in the time spent on social media, respondents scored .09 higher on the attitudes towards personalised ads. Overall, there was a difference of .36 between people who spent more time on social media and their attitudes towards personalised advertisements than people who spent less time. With regards to gender ($\beta = -.09, p = .260, B = -.10$), education ($\beta = .07, p = .323, B = .08$), age ($\beta = -.01, p = .871, B = .00$) or the duration of the use of smart devices ($\beta = -.05, p = .538, B = -.06$) no significant effect has been found.

4.2.3 The influence of PSoC on purchase intention

The fourth hypothesis focused on the impact of PSoC on the purchase intention of the product that is advertised based on the offline conversation that the users had. The model was found to be insignificant $F(6, 176) = 1.78, p = .106, R^2=.06$. Similarly, PSoC had no significant effect on the purchase intention ($\beta = -.06, p = .445, B = -.03$) and because of these reasons, H4 is rejected.

Considering the control variables, only the time spent on social media per day had a significant effect ($\beta = .18, p = .017, B = .07$). Hence, the more time people spend on social media, the more likely they are to purchase the advertised product. Other control variables, specifically gender ($\beta = .12, p = .132, B = .12$), education ($\beta = .01, p = .866, B = .01$), age ($\beta = .03, p = .744, B = .00$) and the duration of the use of the smart device ($\beta = -.02, p = .791, B = -.02$) had no significant effect.

4.3 The influence of personality traits on PSoC (RQ3, H5-9)

In the next step of the analysis, a linear regression was conducted to study whether personality traits have an impact on the perception of PSoC. The overall model was found not to be significant $F(10, 118) = 0.58, p = .830, R^2=.05$. Similarly, specific personality traits had no effect on PSoC: openness ($\beta = .14, p = .123, B = .14$), agreeableness ($\beta = .06, p = .549, B = .06$), neuroticism ($\beta = -.06, p = .534, B = -.07$), conscientiousness ($\beta = -.08, p = .403, B = -.10$) and extraversion ($\beta = -.07, p = .468, B = -.09$). The hypotheses H5-H9 are rejected.

With regards of control variables, no significant effect was found either, thus gender ($\beta = .05, p = .610, B = .09$), education ($\beta = .01, p = .931, B = .02$), age ($\beta = .04, p = .690, B = .01$), duration of the smart device use ($\beta = -.08, p = .413, B = -.15$) and time spent on social media per day ($\beta = -.07, p = .477, B = -.05$) did not influence the relationship between personality traits and PSoC.

4.4 Summary of results

To conclude, this chapter tested hypotheses presented in the Theoretical framework. Out of nine hypotheses, two had a significant effect and thus were accepted (i.e., H1 and H2). First, regarding the H1, descriptive statistics showed that three-quarters of people (76.4%) perceive to be surveilled entirely or to some extent. It was hypothesised that at least 50% of the participants will perceive the PSoC, hence the H1 was accepted. For the second

hypothesis, linear regression showed that with an increase in PSoC, the attitude towards smart devices decreases. This finding supported H2.

However, all of the next hypotheses H3-H9 were rejected. In H3, it was tested by conducting a linear regression whether an increase in PSoC can lead to a decreased attitude towards the personalised advertisement, however, no significant relationship was found. Similarly, no effect was observed between PSoC and purchase intention (H4).

In H5-H9, it was tested whether personality traits can have an impact on the level of PSoC. However, the overall model and specific personality traits were found to be insignificant. Thus, openness (H5), agreeableness (H6), neuroticism (H7), conscientiousness (H8) and extraversion (H9) had no effect on the PSoC.

An overview of the summary can be found in Appendix B. In Appendix C, the results from SPSS are included.

5. Conclusion & Discussion

The final chapter encompasses an in-depth analysis of the findings presented in the previous sections. Firstly, the research questions proposed at the beginning of this thesis are answered to provide a clear overview of the main conclusions. Subsequently, the findings are dissected and connected to the theory and prior studies. This section is followed by the limitations, strengths and suggestions for future research. Finally, the findings of this study have a number of significant scientific and societal implications which are presented in the last section.

5.1 Conclusion

This thesis made a valuable contribution to the field of perceived surveillance of conversations. To illuminate this uncharted area, a survey was created that helped to answer three main research questions. In the first research question, it was asked: *To what extent do people report perceived surveillance of conversations by smart devices?* A simple descriptive statistic revealed that approximately three-quarters of people perceive to be surveilled through their smart devices to some extent or strongly. This finding is aligned with the previous study in this area (Frick et al., 2021) and signifies that PSoC is indubitably an issue connected to the use of smart devices and social media.

The second research question had three subquestions. The first one: *To what extent does people's perceived surveillance correlate to their attitudes towards smart devices?* was answered using linear regression. It was shown that the more people perceive being surveilled by their smart devices, the more their attitude towards them decreases. However, after conducting linear regressions for the next two subquestions (i.e. *To what extent does people's perceived surveillance correlate to their attitudes towards seemingly personalised advertising, and their purchase intentions of products or services in those seemingly personalised advertising?*), the analysis did not reveal any significant relationships. Ergo, it can be concluded that people's perceived surveillance correlates to neither their attitudes towards personalised ads nor their purchase intention of products/services advertised.

A similar conclusion can be drawn from the third research question in which it was investigated *To what extent do the big five personality traits (i.e., openness, extraversion, neuroticism, agreeableness, and conscientiousness) correlate to people's reported perceived surveillance?* No significant correlation was found between any of the personality traits and

the perceived surveillance. In other words, personality traits do not predict the level of perceived surveillance that a person holds.

To conclude, as the above points have shown, perceived surveillance of conversation is noticed amongst the majority of social media users. Consequently, the belief that a smart device is eavesdropping on their conversations leads to a decreased attitude towards the smart devices. These findings contributed to the general topic of smart devices and online privacy concerns as well as elucidated the novel phenomenon of PSoC.

5.2 Discussion of findings

In this section, findings are explained with regard to the previous literature and the research design. The discussion follows the order of the hypotheses; firstly, the results of PSoC are dissected, along with its behavioural consequences, namely, attitude towards the smart device, attitude towards personalised advertisements and purchase intention. Subsequently, the personality traits as predictors of PSoC are elaborated on.

5.2.1 Perceived surveillance of conversations

One of the main findings of this thesis was that the majority of people perceived PSoC. To further specify, 76.4% of people perceive their smart devices to record their conversations and display personalised advertisements based on these conversations. 80.7% of respondents were slightly or definitely sure that they have seen such advertisements on social media. Additional questions revealed that the majority of people (86.1%) have heard about the phenomenon from friends/family and a third of respondents also heard stories from the news. This suggests that even if respondents did not personally experience the PSoC or have seen conversation-based advertising, they are at least familiar with it and acknowledged that it happens to others.

Frick and colleagues (2021) also identified PSoC as an important issue connected to the use of smart devices and found that 48.8% of respondents experienced PSoC while 74.4% heard about it. The figures in this thesis are higher than the results provided by Frick and colleagues (2021) which might imply that the issue was belittled in their study. Nevertheless, it can be concluded that in both, this thesis and the article by Frick and colleagues (2021), the majority of people experienced the surveillance on their own and it is essential to acknowledge that the PSoC is a widespread phenomenon.

Most importantly, almost 90% of all respondents perceived the seemingly recording of conversations as a privacy threat. The instances in which leaks of recorded data were published online (Murnane, 2019) or Google admitting to listening to a fraction of recorded conversations (Monsees, 2019) might explain the high number of people who perceived PSoC and contribute to an even greater fear of privacy and security. Thus, in the words of Frick and colleagues “the fear of being surveilled should not be discounted as an urban myth too quickly” (p. 8) and organisations should start recognising the PSoC as a real privacy issue connected to the use of social media and smart devices.

5.2.2 Attitude towards smart devices

The first studied behavioural outcome was the effect of PSoC on the attitude towards smart devices. The analysis showed that there is a significant relationship between the two concepts and added control variables. However, despite the findings being significant it is essential to note that the model explained only 9.3% of the variance of the attitude towards smart devices, which refers to a relatively small effect (Pallant, 2005).

Regarding the specific variable of PSoC, the analysis discovered that the more people perceived being surveilled, the lower was their attitude towards smart devices. This finding is aligned with the previous research that also concluded that the attitude towards smart devices might decrease with higher levels of privacy concerns. The negative attitude was observed in avoidance of talking about certain topics in front of the smart device (Ammari et al., 2019) or restraint from using certain features of smart devices the users do not trust (Huang et al., 2020).

In addition, the decreased attitude towards smart devices due to the belief that the smart device is spying on us might be connected to the insufficient understanding of the smart devices' functioning in general. Numerous studies have shown that people with a limited understanding of the way smart devices operate, might have greater privacy concerns and distrust the smart devices (Ammari et al., 2019; Huang et al., 2020; Zeng et al., 2017). The trust in smart devices plays a crucial role in determining the levels of PSoC (Frick et al., 2021), therefore, it is an important factor to consider when it comes to the attitudes related to the PSoC as well. It was not in the scope of this thesis to assess the levels of technical knowledge of respondents, however, it might be a recommendation for future research to study the relationship between the technical capabilities of individuals and their perceptions of PSoC.

5.2.3 Attitude towards personalised advertisements

The third hypothesis dealt with the relationship between PSoC and attitude towards personalised advertisement that appears after having an offline conversation about a certain product/brand. It was hypothesised that the relationship will be negative, and thus, the more people perceive being surveilled by smart devices, their attitude towards the personalised advertisements will worsen. However, the linear regression did not establish any significant relationship between the two variables.

This finding is not aligned with the current literature review which showed that the relationship between the privacy levels is closely intertwined with the attitude towards personalised advertisements (Bleier & Eisenbeiss, 2015; Dāvida, 2020). Studies showed that tailored advertisements raise privacy questions especially when the users did not explicitly consent to data collection or were not aware of it (Anand & Shachar, 2009; Conti et al., 2012; White et al. 2007). This thesis proved that people perceive the eavesdropping of smart devices as a privacy threat, thus, the attitude towards the advertisement should have been affected. The possible explanation might be that although people perceive PSoC as a privacy infringement, they do not associate it with the advertisements themselves, but rather with the smart devices that are allegedly responsible for recording the conversation and displaying the personalised advertisements. This interpretation would be also aligned with the previous finding of this thesis, in which it was established that with the increased level of PSoC, the attitude towards smart devices decreases.

5.2.4 Purchase intention

Another behavioural outcome investigated in this thesis was the purchase intention of the advertised product. The main idea was to examine the situation when people see an advertisement about a product after having a conversation about the exact same product, whether the likelihood of them buying the product is higher or whether they are put off by the fact that it was based on their conversation. However, no significant relationship was found, and PSoC had no effect on the purchase intention of the advertised product.

The literature review showed that privacy concerns have a negative effect on purchase intention because people perceived the advertisement as less effective when they feel threatened by personalisation (Lina & Setiyanto, 2021). Consequently, it was expected that there is a relationship between PSoC and purchase intention. Nevertheless, current literature also suggests numerous different predictors of purchase intention such as informativeness of

the advertisement (Alalwan, 2018), perceived relevance (Dodoo & Wu, 2019), and brand awareness (Martins et al., 2017). These factors were not considered in this thesis, in which the situation was introduced hypothetically. Respondents were asked to imagine that they are scrolling on social media and are exposed to the advertisement based on offline conversations. It is possible that if the survey included an exact example of tailored advertising, the purchase intention might have differed, and the relationship would be significant. On the other hand, the finding of this thesis that the more time people spend on social media, the more likely they are to purchase advertised products is supported in the literature (Duffet, 2015).

5.2.5 Personality traits

It was studied whether personality traits can influence the levels of PSoC. No significant relationship has been found despite the opposite claims of the previous literature. For instance, the more people score on neuroticism, agreeableness or conscientiousness scales, the more prone they are to be concerned about online privacy (Korzaan & Boswell, 2016; Osatuyi, 2015; Škrinjarić et al., 2018).

The discrepancy between finding in the present study and previous literature might be accountable to the Likert scale used to assess the personality traits. This thesis used a shortened version of personality traits that consists of 10 items rather than the Big Five Inventory comprised of 44 items (Rammstedt & John, 2007). The main reason for this shortened version was the time constraint and the longer version would substantially prolong the duration of this thesis. Rice and colleagues (2017) argue that the length of the survey has a considerable impact on the dropout rate and general satisfaction of respondents. Specifically, “a short one to five-minute study might retain 95% of participants; whereas a fifteen-minute or longer study might retain only 50% of participants” (Rice et al., 2017, p. 63). Thus, it was of the utmost importance to minimise the time of the study and engage as many respondents as possible in a limited period of time assigned to data collection.

Still, the two items to measure openness and agreeableness had no significant Pearson’s correlation. For this reason, only one of the two items used to measure the personality trait was chosen for subsequent analysis. The relationship might have been different if a longer scale comprising of more items had been used.

5.3 Limitations, strengths and suggestions for future research

The aim of this thesis was to contribute to the current literature about PSoC, its determinants and behavioural outcomes. While this objective was met, it is also requisite to acknowledge the limitations of the research and areas for further improvement. Firstly, a discussion about the limitations and strengths of this research is provided. Subsequently, I will reiterate suggestions from the theory and discussion section.

The first limitation is that this research used a non-probability convenience sampling method which has its losses in terms of generalisability and credibility of the results (Sarstedt et al., 2017). This is due to the fact that the survey was distributed through the researcher network and can lead to a biased sample of responses. This limitation was tried to be eliminated by posting the survey to the Facebook groups in which the researcher did not have membership before and by other people from the researcher's network who re-shared the survey to their social circles. Despite the attempts to minimise the limitations in the sampling method, the final sample was partially homogenous. There was a high prevalence of female respondents with a bachelor's degree or master's degree and an average age of around 24 years. However, the effect of gender and age was carefully controlled for and no significant relationship between these control variables and measured concepts was found. Education had significance at a borderline level ($p = .049$) and only in the relationship between PSoC on attitudes toward smart devices. Henceforth, it can be concluded that the demographics in which the sample was homogenous did not affect the studied relationships substantially.

The second limitation concerns the research design, specifically the choice of a shortened version of the big five personality traits. Since the shortened version showed some impairment in correlations between the items, the results of this section need to be interpreted with caution. As mentioned previously, the two scales with insufficient correlations were accounted for by choosing an item that fits the measured concept better. Thus, the issue was adequately overcome, and the analysis could be conducted. However, it is recommended for future research that aims to explore the relationship between PSoC and personality traits to use the original 44-item scale or a different scale with fewer items that will measure personality traits without losses in correlations and reliability. Despite the scale used for personality traits, all other chosen scales in this thesis had high and acceptable levels of Cronbach's alpha between 0.74 to 0.89 which signifies high internal consistency. Another strong point of this thesis is that by conducting a quantitative study, it was possible to gather a large number of responses and apprehend the opinions of the targeted sample population on

a broader scale. Altogether, 187 respondents completed the survey which is considered to be a sufficient number. Therefore, this thesis and its insights can provide a stepping stone for further research.

Some of the suggestions for future studies were already presented in the previous sections 5.2.1 - 5.2.5. For instance, the findings showed that there is a significant relationship between the levels of PSoC and attitude towards smart devices. However, further investigation about this correlation is required to understand more deeply what exactly determines this relationship. Is it true that the people with more technical knowledge who understand how smart devices work are less worried about PSoC? And how exactly is the negative attitude towards smart devices expressed? More elaborate research on whether negative attitude can lead to avoidance of smart device usage altogether or simply refraining from certain features is essential for both researchers and vendors of smart devices. Additionally, as the theoretical sections proposed, it could be interesting to investigate whether the content of the advertisement and its perceived usefulness have any impact on the perception of PSoC since numerous studies have shown that it does impact the overall attitude towards advertisements (Alalwan, 2018; Martins et al., 2017; White et al., 2007).

Furthermore, this thesis found no relationship between PSoC and attitude towards the advertisement itself or purchase intention towards the advertised product, but other behavioural outcomes of PSoC need to be determined. For instance, whether PSoC has a negative impact on the attitude and trust towards the company or social media platform that is promoting the advertisement based on offline conversations. The next section presents broader implications of these findings for science and society.

5.4 Scientific and societal implications

The main objective of this thesis was to dive deeper into the phenomenon of PSoC and fill the gap in the current literature. Plenty of research has been done concerning tailored advertisements based on the online behaviour of the users (e.g. Boerman et al., 2017; Martins et al., 2019). However, as this thesis also proved, users perceive to be targeted beyond their online behaviours and they are concerned about their smart devices listening to their offline conversations with acquaintances. Thus, the current research should shift the focus from solely online behaviour and examine offline or real-life situations that can influence consumers' perceptions about personalised advertising. This research offered insights into the

yet unexplored area of perceived surveillance of conversations and can act as a stepping stone for the plethora of new research ideas.

One of the most important implications of this thesis regards vendors of smart devices. It was proven that when people perceive being surveilled by their smart devices, their attitude towards them decreases. Thus, it should be of the utmost importance for vendors to ensure that their users are feeling comfortable and safe while using the devices. More attention and emphasis should be given to lucid explanations of the way smart devices work and process data. In this way, a fully informed consumer would not need to worry whether vendors of smart devices are selling their conversations to marketers to be targeted based on them. However, in the current situation, 76% of respondents believed that this is the case. The alarming number should alert sellers of smart devices to adjust their business to customer communications accordingly.

Another crucial point that concerns marketers and advertisers is that there is no association between PSoC and personalised advertising. Thus, people's attitudes towards the advertisements do not change, even when they perceive to be surveilled. Similarly, their purchase intention towards the advertised product is unaffected by PSoC. Regardless, this thesis proved that PSoC deserves real attention, and the majority of people perceive to be surveilled and targeted based on their offline conversations. This finding should be a call to action for marketers to make the process of the data collection clearer and more transparent for the consumers. The previous studies also showed that some users do not adequately understand the use of cookies and are oftentimes not aware that their data is being collected. Thus, it remains important to educate consumers about their online privacy and the exact process of how advertising companies gather data, including what sources are used and which of the users' activities are monitored.

References

- Aguirre, E., Mahr, D., Grewal, D., de Ruyter, K., & Wetzels, M. (2015). Unraveling the personalization paradox: The effect of information collection and trust-building strategies on online advertisement effectiveness. *Journal of Retailing*, 91(1), 34–49. <https://doi.org/10.1016/j.jretai.2014.09.005>
- Alalwan, A. A. (2018). Investigating the impact of social media advertising features on customer purchase intention. *International Journal of Information Management*, 42, 65–77. <https://doi.org/10.1016/j.ijinfomgt.2018.06.001>
- Almunawar, M. N., Anshari, M., Susanto, H., & Chen, C. K. (2018). How people choose and use their smartphones. In P. Ordóñez de Pablos (Ed.), *Management Strategies and Technology Fluidity in the Asian Business Sector* (pp. 235-252). IGI Global. <https://doi.org/10.4018/978-1-5225-4056-4.ch014>
- Ammari, T., Kaye, J., Tsai, J. Y., & Bentley, F. (2019). Music, search, and IoT. *ACM Transactions on Computer-Human Interaction*, 26(3), 1–28. <https://doi.org/10.1145/3311956>
- Anand, B. N., & Shachar, R. (2009). Targeted advertising as a signal. *Quantitative Marketing and Economics*, 7(3), 237–266. <https://doi.org/10.1007/s11129-009-9068-x>
- Auxier, B., & Anderson, M. (2022, May 11). Social media use in 2021. Pew Research Center: Internet, Science & Tech. <https://www.pewresearch.org/internet/2021/04/07/social-media-use-in-2021/>
- Ba, Z., Zheng, T., Zhang, X., Qin, Z., Li, B., Liu, X., & Ren, K. (2020). Learning-based practical smartphone eavesdropping with built-in accelerometer. *Proceedings 2020 Network and Distributed System Security Symposium*. <https://doi.org/10.14722/ndss.2020.24076>
- Baken, R. J., & Orlikoff, R. F. (2000). Clinical measurement of speech & voice (speech science) (2nd ed.). San Diego Singular Thomson Learning.
- Barnham, C. (2015). Quantitative and qualitative research: Perceptual foundations. *International Journal of Market Research*, 57(6), 837–854. <https://doi.org/10.2501/ijmr-2015-070>
- BBC News. (2017, October 30). *Is your phone listening in? Your stories*. <https://www.bbc.com/news/technology-41802282>

- Behan, M., Krejcar, O., Sabbah, T., & Selamat, A. (2019). Sensorial network framework embedded in ubiquitous mobile devices. *Future Internet*, *11*(10).
<https://doi.org/10.3390/fi11100215>
- Bleier, A., & Eisenbeiss, M. (2015). The importance of trust for personalized online advertising. *Journal of Retailing*, *91*(3), 390–409.
<https://doi.org/10.1016/j.jretai.2015.04.001>
- Boerman, S. C., Kruikemeier, S., & Zuiderveen Borgesius, F. J. (2017). Online behavioral advertising: A literature review and research agenda. *Journal of Advertising*, *46*(3), 363–376. <https://doi.org/10.1080/00913367.2017.1339368>
- Boynton, P. M., & Greenhalgh, T. (2004). Selecting, designing, and developing your questionnaire. *British Medical Journal*, *328*(7451), 1312–1315.
<https://doi.org/10.1136/bmj.328.7451.1312>
- Bruner, G. C., & Kumar, A. (2007). Attitude toward location-based advertising. *Journal of Interactive Advertising*, *7*(2), 3–15. <https://doi.org/10.1080/15252019.2007.10722127>
- Conti, N., Jennett, C., Maestre, J., & Sasse, M. A. (2012). When did my mobile turn into a ‘Sellphone’? A study of consumer responses to tailored smartphone ads. *Electronic Workshops in Computing*. <https://doi.org/10.14236/ewic/hci2012.27>
- Cordero-Gutiérrez, R., & Lahuerta-Otero, E. (2020). Social media advertising efficiency on higher education programs. *Spanish Journal of Marketing - ESIC*, *24*(2), 247–262.
<https://doi.org/10.1108/sjme-09-2019-0075>
- Dāvida, Z. (2020). Consumer rights and personalised advertising: Risk of exploiting consumer vulnerabilities. *Scientific Journal of Law*, *1*(16), 76–86.
<https://doi.org/10.25143/socr.16.2020.1.076-086>
- Dehghani, M., & Tumer, M. (2015). A research on effectiveness of Facebook advertising on enhancing purchase intention of consumers. *Computers in Human Behavior*, *49*, 597–600. <https://doi.org/10.1016/j.chb.2015.03.051>
- Dodoo, N. A., & Wu, L. (2019). Exploring the antecedent impact of personalised social media advertising on online impulse buying tendency. *International Journal of Internet Marketing and Advertising*, *13*(1), 73–95.
<https://doi.org/10.1504/ijima.2019.097905>
- Dubois, D. J., Kolcun, R., Mandalari, A. M., Paracha, M. T., Choffnes, D., & Haddadi, H. (2020). When speakers are all ears: Characterizing misactivations of IoT smart speakers. *Proceedings on Privacy Enhancing Technologies*, *2020*(4), 255–276.
<https://doi.org/10.2478/popets-2020-0072>

- Duffett, R. G. (2015). Facebook advertising's influence on intention-to-purchase and purchase amongst millennials. *Internet Research*, 25(4), 498–526.
<https://doi.org/10.1108/intr-01-2014-0020>
- Duggal, N. (2022, March 29). *What are IoT devices: Definition, types, and 5 most popular ones for 2022*. Simplilearn.Com. <https://www.simplilearn.com/iot-devices-article>
- Farman, L., Comello, M. L. N., & Edwards, J. R. (2020). Are consumers put off by retargeted ads on social media? Evidence for perceptions of marketing surveillance and decreased ad effectiveness. *Journal of Broadcasting & Electronic Media*, 64(2), 298–319. <https://doi.org/10.1080/08838151.2020.1767292>
- Felt, A. P., Ha, E., Egelman, S., Haney, A., Chin, E., & Wagner, D. (2012). Android permissions. Symposium on Usable Privacy and Security - SOUPS '12, 8(3), 1–14.
<https://doi.org/10.1145/2335356.2335360>
- Forsey, C. (2021, February 24). *The 13 best smart home devices & systems of 2021*. Hub Spot. <https://blog.hubspot.com/marketing/smart-home-devices>
- Frick, N. R., Wilms, K. L., Brachten, F., Hetjens, T., Stieglitz, S., & Ross, B. (2021). The perceived surveillance of conversations through smart devices. *Electronic Commerce Research and Applications*, 47. 101046. <https://doi.org/10.1016/j.elerap.2021.101046>
- Hill, S. (2017, January 15). *Is your smartphone listening to everything you say? We asked the experts*. Digital Trends. <https://www.digitaltrends.com/mobile/is-your-smartphone-listening-to-your-conversations/>
- Hoy, M. B. (2018). Alexa, Siri, Cortana, and more: An introduction to voice assistants. *Medical Reference Services Quarterly*, 37(1), 81–88.
<https://doi.org/10.1080/02763869.2018.1404391>
- Huang, Y., Obada-Obieh, B., & Beznosov, K. K. (2020). Amazon vs. My brother: How users of shared smart speakers perceive and cope with privacy risks. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*.
<https://doi.org/10.1145/3313831.3376529>
- Is Alexa always listening?* (2021). Amazon. <https://www.amazon.com/is-alexa-always-listening/b?ie=UTF8&node=21137869011>
- Islam, N., & Want, R. (2014). Smartphones: Past, present, and future. *IEEE Pervasive Computing*, 13(4), 89–92. <https://doi.org/10.1109/mprv.2014.74>
- Junglas, I. A., Johnson, N. A., & Spitzmüller, C. (2008). Personality traits and concern for privacy: An empirical study in the context of location-based services. *European Journal of Information Systems*, 17(4), 387–402. <https://doi.org/10.1057/ejis.2008.29>

- Kelly, H., & Guskin, E. (2021, December 22). *Americans widely distrust Facebook, TikTok and Instagram with their data, poll finds*. Washington Post.
<https://www.washingtonpost.com/technology/2021/12/22/tech-trust-survey/>
- Keng, C., & Ting, H. (2009). The acceptance of blogs: Using a customer experiential value perspective. *Internet Research*, 19(5), 479–495.
<https://doi.org/10.1108/10662240910998850>
- Kircaburun, K., Alhabash, S., Tosuntaş, U. B., & Griffiths, M. D. (2018). Uses and gratifications of problematic social media use among university students: A simultaneous examination of the big five of personality traits, social media platforms, and social media use motives. *International Journal of Mental Health and Addiction*, 18(3), 525–547. <https://doi.org/10.1007/s11469-018-9940-6>
- Kleinman, B. Z. (2016, March 2). *Is your smartphone listening to you?* BBC News.
<https://www.bbc.com/news/technology-35639549>
- Korzaan, M. L., & Boswell, K. T. (2016). The influence of personality traits and information privacy concerns on behavioral intentions. *Journal of Computer Information Systems*, 48(4), 15–24. <https://doi.org/10.1080/08874417.2008.11646031>
- Kröger, J. L., & Raschke, P. (2019). Is my phone listening in? On the feasibility and detectability of mobile eavesdropping. *Data and Applications Security and Privacy XXXIII*, 102–120. https://doi.org/10.1007/978-3-030-22479-0_6
- Lau, J., Zimmerman, B., & Schaub, F. (2018). Alexa, are you listening? *Proceedings of the ACM on Human-Computer Interaction*, 2(Computer-Supported Cooperative Work and Social Computing), 1–31. <https://doi.org/10.1145/3274371>
- Lazar, A., Koehler, C., Tanenbaum, J., & Nguyen, D. H. (2015). Why we use and abandon smart devices. *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing - UbiComp '15*.
<https://doi.org/10.1145/2750858.2804288>
- Lee, C. H., & Cranage, D. A. (2011). Personalisation–privacy paradox: The effects of personalisation and privacy assurance on customer responses to travel websites. *Tourism Management*, 32(5), 987–994. <https://doi.org/10.1016/j.tourman.2010.08.011>
- Lina, L. F., & Setiyanto, A. (2021). Privacy concerns in personalized advertising effectiveness on social media. *Sriwijaya International Journal of Dynamic Economics and Business*, 1(2), 147–156. <https://doi.org/10.29259/sijdeb.v1i2.147-156>
- Liptak, A. (2017, January 7). Amazon’s Alexa started ordering people dollhouses after hearing its name on TV. The Verge.

- <https://www.theverge.com/2017/1/7/14200210/amazon-alexa-tech-news-anchor-order-dollhouse>
- Martínez, A. G. (2017, November 10). *Facebook isn't listening through your phone's microphone. It doesn't have to*. Wired. <https://www.wired.com/story/facebooks-listening-smartphone-microphone/>
- Martinez, C. (2021, March 19). *How to test if your phone is spying on you*. NordVPN. <https://nordvpn.com/blog/phone-listening-test/>
- Martins, J., Costa, C., Oliveira, T., Gonçalves, R., & Branco, F. (2019). How smartphone advertising influences consumers' purchase intention. *Journal of Business Research*, 94, 378–387. <https://doi.org/10.1016/j.jbusres.2017.12.047>
- Matthews, B., & Ross, L. (2010). *Research methods: A practical guide for the social sciences* (1st ed.). Pearson Education Canada.
- McCrae, R. R., & John, O. P. (1992). An introduction to the Five-Factor Model and its applications. *Journal of Personality*, 60(2), 175–215. <https://doi.org/10.1111/j.1467-6494.1992.tb00970.x>
- Meta. (2016, June 2). *Facebook does not use your phone's microphone for ads or news feed stories*. <https://about.fb.com/news/h/facebook-does-not-use-your-phones-microphone-for-ads-or-news-feed-stories/>
- Monsees, D. (2019, July 11). *More information about our processes to safeguard speech data*. Google. <https://www.blog.google/products/assistant/more-information-about-our-processes-safeguard-speech-data/>
- Murnane, K. (2019, July 14). *These are the real problems revealed by the Belgian leak of Google assistant voice recordings*. Forbes. <https://www.forbes.com/sites/kevinmurnane/2019/07/14/these-are-the-real-problems-revealed-by-the-belgian-leak-of-google-assistant-voice-recordings/?sh=1aa7feea14e7>
- Neuman, L. W. (2014). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Pearson Education Limited.
- Nichols, S. (2018, June 4). *Your phone is listening and it's not paranoia*. Vice. <https://www.vice.com/en/article/wjbzzy/your-phone-is-listening-and-its-not-paranoia>
- Osatuyi, B. (2015). Personality traits and information privacy concern on social media platforms. *Journal of Computer Information Systems*, 55(4), 11–19. <https://doi.org/10.1080/08874417.2015.11645782>
- Pallant, J. (2005). *SPSS survival manual*. Allen & Unwin.

- Pan, E., Ren, J., Lindorfer, M., Wilson, C., & Choffnes, D. (2018). Panoptispy: Characterizing audio and video exfiltration from android applications. *Proceedings on Privacy Enhancing Technologies*, 2018(4), 33–50. <https://doi.org/10.1515/popets-2018-0030>
- Posey, B., & Shea, S. (2022, March 7). *IoT devices (internet of things devices)*. IoT Agenda. <https://www.techtarget.com/iotagenda/definition/IoT-device>
- Quattrone, A. (2016). *Inferring sensitive information from seemingly innocuous smartphone data* (PhD thesis). The University of Melbourne, Australia
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the big five inventory in English and German. *Journal of Research in Personality*, 41(1), 203–212. <https://doi.org/10.1016/j.jrp.2006.02.001>
- Rice, S., Winter, S. R., Doherty, S., & Milner, M. (2017). Advantages and disadvantages of using internet-based survey methods in aviation-related research. *Journal of Aviation Technology and Engineering*, 7(1). <https://doi.org/10.7771/2159-6670.1160>
- Richards, N. M. (2013). The dangers of surveillance. *Harvard Law Review*. <https://ssrn.com/abstract=2239412>
- Ryan, T., & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the big five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27(5), 1658–1664. <https://doi.org/10.1016/j.chb.2011.02.004>
- Sarstedt, M., Bengart, P., Shaltoni, A. M., & Lehmann, S. (2017). The use of sampling methods in advertising research: A gap between theory and practice. *International Journal of Advertising*, 37(4), 650–663. <https://doi.org/10.1080/02650487.2017.1348329>
- Schönherr, L., Golla, M., Eisenhofer, T., Wiele, J., Kolossa, D., & Holz, T. (2020). Exploring accidental triggers of smart speakers. *Computer Speech & Language*, 73. 101328. <https://doi.org/10.1016/j.csl.2021.101328>
- Schwartzstein, J. (2014). Selective attention and learning. *Journal of the European Economic Association*, 12(6), 1423–1452. <https://doi.org/10.1111/jeea.12104>
- Škrinjarić, B., Budak, J., & Žokalj, M. (2018). The effect of personality traits on online privacy concern. *Ekonomski Pregled*, 69(2), 106–130. <https://doi.org/10.32910/ep.69.2.2>
- Statista. (2021, December 6). *Smartphone OS by age group in 2019*. <https://www.statista.com/statistics/1133193/smartphone-os-by-age/>

- Statista. (2022a, May 4). *Smartphone market share worldwide 2009–2022, by vendor*.
<https://www.statista.com/statistics/271496/global-market-share-held-by-smartphone-vendors-since-4th-quarter-2009/><https://www.statista.com/statistics/878650/worldwide-smart-speaker-installed-base-by-country/>
- Statista. (2022b, March 10). *Smart speaker installed base worldwide 2020 and 2024*.
- Statista. (2022c, March 14). *Number of digital voice assistants in use worldwide 2019–2024*.
<https://www.statista.com/statistics/973815/worldwide-digital-voice-assistant-in-use/>
- Talih Akkaya, D., Akyol, A., & Gölbaşı Şimşek, G. (2017). The effect of consumer perceptions on their attitude, behavior and purchase intention in social media advertising. *Marmara University Journal of Economic & Administrative Sciences*, 361–388. <https://doi.org/10.14780/muiibd.384073>
- Tam, K. Y., & Ho, S. Y. (2006). Understanding the impact of web personalization on user information processing and decision outcomes. *MIS Quarterly*, 30(4), 865.
<https://doi.org/10.2307/25148757>
- Triggs, R. (2018, July 18). *No, your phone is not always listening to you*. Android Authority.
<https://www.androidauthority.com/your-phone-is-not-listening-to-you-884028/>
- Tung, L. (2017, October 11). *Google home mini flaw left smart speaker recording everything*. ZDNet. <https://www.zdnet.com/article/google-home-mini-flaw-left-smart-speaker-recording-everything/>
- Turner, A. (2022, January 3). *How many people have smartphones worldwide (Jan 2022)*. BankMyCell. <https://www.bankmycell.com/blog/how-many-phones-are-in-the-world>
- Verheyden, T., Baert, D., van Hee, L., & van den Heuvel, R. (2019, July 10). *Google employees are eavesdropping, even in your living room, VRT NWS has discovered*. Vrtnws.be. <https://www.vrt.be/vrtnws/en/2019/07/10/google-employees-are-eavesdropping-even-in-flemish-living-rooms/>
- White, T. B., Zahay, D. L., Thorbjørnsen, H., & Shavitt, S. (2007). Getting too personal: Reactance to highly personalized email solicitations. *Marketing Letters*, 19(1), 39–50.
<https://doi.org/10.1007/s11002-007-9027-9>
- Wright, K. B. (2017). Researching Internet-Based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication*, 10(3). JCMC1034. <https://doi.org/10.1111/j.1083-6101.2005.tb00259.x>

Xia, F., Hsu, C. H., Liu, X., Liu, H., Ding, F., & Zhang, W. (2013). The power of smartphones. *Multimedia Systems*, *21*(1), 87–101. <https://doi.org/10.1007/s00530-013-0337-x>

Zeng, E., Mare, S., & Roesner, F. (2017). *Proceedings of the 13th USENIX conference on file and storage technologies* (Vol. 13). USENIX Association. <https://www.usenix.org/conference/soups2017/technical-sessions/presentation/zeng>

Appendix A. Survey

Screen 1

Dear participant,

Thank you very much for participating in this research. This research is conducted for a master's thesis at Erasmus University Rotterdam. It consists of a survey and completing it takes approximately 10-15 minutes.

The survey will ask about perceived surveillance of conversations by smart devices: Do you ever feel like your real-life conversations are being eavesdropped on by technology? Within the definition of smart devices, the use of a smartphone, smart speaker, voice assistant, tablet and any other smart gadget is included.

Please be aware that your participation is completely voluntary, meaning that you can quit at any time during your participation. Furthermore, your personal information will be kept strictly confidential and the findings of this survey will be used solely for thesis purposes. Hence, your anonymity is guaranteed at all times. If you have any questions during or after your participation, please feel free to send an email to survey.thesis.eur@gmail.com

I understand the above and agree on participating in this research.

Screen 2

Before entering the survey, a few demographic questions will be shown.

(Q1) What is your year age?

Dropdown menu with the following options

- 17 or younger
- 18
- 19
- 20

- ...
- 35 or older

At this point, respondents who are 17 years or younger and 35 years and older which are not age categories that will be studied, will be forwarded to an automated message saying “Thank you for your interest in our study. Regrettably, you do not fit the target group of interest.”

Screen 3

(Q2) What gender do you best identify with?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

(Q3) What is the highest educational level that you have followed?

- Primary school
- Secondary school / high school
- Vocational degree after high school
- Bachelor degree
- Master degree
- PhD, MBA, or another equivalent
- Other

(Q4) On average, how many hours per day do you spend on social media?

- Up to 1 hour
- Between 1 and 2 hours
- Between 2 and 3 hours
- Between 3 and 4 hours
- Between 4 and 5 hours
- More than 5 hours
- I do not use social media

At this point, participants who do not use social media will be redirected to the message “Thank you for your interest in our study. Regrettably, you do not fit the target group of interest.”

Screen 4

(Q5) How long have you been using smart devices (i.e., a smartphone, smart speaker, voice assistant and/or any other smart gadgets)?

- 5 years or less
- 5-10 years
- 10-15 years
- 15 years or more
- I am not using any smart device

At this point, participants who do not use any smart device will be redirected to the message “Thank you for your interest in our study. Regrettably, you do not fit the target group of interest.”

Screen 5

(Q6) What smart devices do you own? (multiple answers possible)

Smartphone

Smart speaker

Tablet

Other, namely *[text entry]*

Screen 6

(Q7) To what extent do you agree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(Q7_1) I enjoy using smart devices	1	2	3	4	5
(Q7_2) The return gained from using the smart device outweighs the loss	1	2	3	4	5
(Q7_3) Smart devices are something I look upon favourably	1	2	3	4	5

Screen 7

Please indicate whether you ever felt that your smart device is eavesdropping on you and showing personalised advertisements based on your offline conversations. It is important to note that you have never searched for the term on social media/search engines yourself. This survey asks about advertisements based on solely offline conversations.

(Q8) To what extent do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
(Q8_1) I am concerned that smart devices record conversations to provide personalized advertising on websites and social media	1	2	3	4	5

(Q8_2) I think there are companies that analyze audio files recorded by smart devices to provide personalized advertising online	1	2	3	4	5
(Q8_3) My smart device listens to me and forwards the data to companies to provide personalized advertising on websites and social media	1	2	3	4	5
(Q8_4) I worry that my smart device is recording conversations when I talk to my friends	1	2	3	4	5
(Q8_5) I am concerned that my smart device is capturing information even though I am not actively using it	1	2	3	4	5

Screen 8

(Q9)

Imagine that you find a product advertised on your social media feed after you had a conversation about the product with your acquaintance. How would you react to the product being advertised based on the offline conversation?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(Q9_1) I desire to buy the product that is advertised	1	2	3	4	5
(Q9_2) These advertisements have a positive influence on my purchase decisions	1	2	3	4	5
(Q9_3) I plan to purchase the product that is advertised	1	2	3	4	5

(Q9_4) I do not intend to acquire the product that is advertised	1	2	3	4	5
(Q9_5) These advertisements have a negative influence on my buying decisions	1	2	3	4	5

Screen 9

(Q10) Please indicate your opinion about personalised advertisements on your social media feed that were based on your offline conversation.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(Q10_1) I would like to be able to receive advertisements based on my offline conversations	1	2	3	4	5
(Q10_2) In general, advertisements based on my offline conversations would be irritating	1	2	3	4	5
(Q10_3) In general, advertisements based on my offline conversations would be entertaining	1	2	3	4	5
(Q10_4) I will probably <u>not</u> pay attention to advertisements based on my offline conversations	1	2	3	4	5
(Q10_5) I would be favourable towards advertisement based on my offline conversations	1	2	3	4	5
(Q10_6) I think advertisements based on offline conversations will eventually become part of our daily lives	1	2	3	4	5
(Q10_7) I think advertisements based on offline conversations will become necessary	1	2	3	4	5

Screen 10

(Q11) Have you encountered such personalised advertisements on your social media feed that were based on your offline conversations before?

- Yes, definitely
- Probably yes
- Probably not
- Definitely not

Participants who answered “Yes, definitely” and “Probably yes” continued to Q12. For participants who chose “Probably not” and “Definitely not” Q12 was skipped and they were redirected to Q13.

Screen 11

(Q12) In the previous question you indicated that you encountered personalised advertisements on your social media feed that were based on your offline conversations. If you can recollect a concrete example, please describe it below.

[textbox]

(Q13) Have you heard stories from friends or family about personalised advertisements on their social media feed that were based on offline conversations?

- Yes
- No

(Q14) Have you heard stories from the news about personalised advertisements on social media feed that were based on offline conversations?

- Yes
- No

(Q15) Do you think of eavesdropping of smart devices as a privacy threat?

- Yes
- No

Screen 12

(Q16) To finalize the survey, please evaluate the following statements about your personality. It is important for this research because people with different personalities oftentimes differ in media use and perception of it. To what extent do you agree that the sentences describe you well?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(Q16_1) I see myself as someone who is reserved	1	2	3	4	5
(Q16_2) I see myself as someone who is generally trusting	1	2	3	4	5
(Q16_3) I see myself as someone who is relaxed, handles stress well	1	2	3	4	5
(Q16_4) I see myself as someone who tends to be lazy	1	2	3	4	5
(Q16_5) I see myself as someone who tends to find fault with others	1	2	3	4	5
(Q16_6) I see myself as someone who has an active imagination	1	2	3	4	5
(Q16_7) I see myself as someone who is outgoing, sociable	1	2	3	4	5
(Q16_8) I see myself as someone who has few artistic interests	1	2	3	4	5
(Q16_9) I see myself as someone who does a thorough job	1	2	3	4	5
(Q16_10) I see myself as someone who gets nervous easily	1	2	3	4	5

Screen 13

You have now reached the end of the questionnaire. Thank you for your time and effort. Your help is highly appreciated! If you have questions or comments about this questionnaire, please list them below.

[textbox]

Appendix B. Summary of results

Table B1.

Overview of hypotheses

Hypothesis	Results	Note
H1: The majority of users report perceived surveillance through their smart devices.	Accepted	
H2: Perceived surveillance of conversations by smart devices is negatively associated with attitudes towards those smart devices.	Accepted	<u>Significant control variables:</u> education and the duration of the usage of smart devices
H3: Perceived surveillance of conversations by smart devices is negatively correlated with attitudes towards seemingly personalised ads.	Rejected	<u>Significant control variables:</u> time spent on social media per day
H4: Perceived surveillance of conversations by smart devices is negatively correlated with purchase intentions towards seemingly personalised ads.	Rejected	<u>Significant control variables:</u> time spent on social media per day
H5: Perceived surveillance of conversations by smart devices is positively associated with openness	Rejected	Adjusted scale, only one item used
H6: Perceived surveillance of conversations by smart devices is positively associated with agreeableness	Rejected	Adjusted scale, only one item used
H7: Perceived surveillance of conversations by smart	Rejected	

devices is positively associated with neuroticism		
H8: Perceived surveillance of conversations by smart devices is positively associated with conscientiousness	Rejected	
H9: Perceived surveillance of conversations by smart devices is negatively associated with extraversion	Rejected	

Appendix C. SPSS results

Table C1.

Model summary for PSoC and attitude towards smart devices

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.305 ^a	.093	.062	.60445

Table C2.

ANOVA table for PSoC and attitude towards smart devices

	Sum of Squares	df	Mean Square	F	Sig.
Regression	6.573	6	1.095	2.998	.008 ^b
Residual	64.303	176	.365		
Total	70.876	182			

Table C3.

Coefficients table for PSoC and attitude towards smart devices

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	4.090	.252		16.245	<.001
PSoC	-.093	.048	-.138	-1.920	.056
Smart device use	.248	.099	.194	2.516	.013
Gender	-.038	.097	-.029	-.387	.699
Education	.182	.092	.145	1.980	.049
Age	-.017	.016	-.082	-1.068	.287
Time per day on social media	.044	.038	.087	1.161	.247

Table C4.*Model Summary for PSoC and attitude towards advertisements*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.212 ^a	.045	.012	.55405

Table C5.*ANOVA table for PSoC and attitude towards advertisements*

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.532	6	.422	1.375	.227 ^b
Residual	54.028	176	.307		
Total	56.560	182			

Table C6.*Coefficients table for PSoC and attitude towards advertisements*

	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
(Constant)	2.393	.231			10.369	<.001
PSoC	.006	.044	.011		.146	.884
Gender	-.100	.089	-.086		-1.129	.260
Education	.083	.084	.074		.991	.323
Age	-.002	.014	-.013		-.162	.871
Time per day on social media	.092	.035	.204		2.649	.009
Smart device use	-.056	.090	-.049		-.617	.538

Table C7.*Model Summary for PSoC and purchase intention*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.239 ^a	.057	.025	.47590

Table C8.*ANOVA table for PSoC and purchase intention*

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.417	6	.403	1.778	.106 ^b
Residual	39.860	176	.226		
Total	42.277	182			

Table C9.*Coefficients table for PSoC and purchase intention*

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	2.607	.198		13.152	<.001
PSoC	-.029	.038	-.056	-.766	.445
Gender	.116	.076	.115	1.515	.132
Education	.012	.072	.013	.169	.866
Age	.004	.012	.026	.328	.744
Time per day on social media	.072	.030	.184	2.409	.017
Smart device use	-.021	.078	-.021	-.266	.791

Table C10.*Model Summary for PSoC and personality traits*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.216 ^a	.047	-.034	.91030

Table C11.*ANOVA table for PSoC and personality traits*

	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.783	10	.478	.577	.830 ^b
Residual	97.780	118	.829		
Total	102.562	128			

Table C12.*Coefficients table for PSoC and personality traits*

	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	3.767	.797		4.726	<.001
Extraversion	-.087	.120	-.073	-.728	.468
Neuroticism	-.065	.104	-.064	-.623	.534
Conscientiousness	-.097	.116	-.079	-.839	.403
Agreeableness	.059	.099	.056	.601	.549
Openness	.142	.091	.143	1.552	.123
Gender	.094	.183	.051	.512	.610
Education	.015	.170	.008	.087	.931
Smart_device_use	-.145	.176	-.079	-.821	.413
Age	.011	.028	.039	.400	.690
Time per day on social media	-.050	.069	-.069	-.713	.477