

Concurrent Distractions: A Cross-Cultural Study of Media Multitasking Behavior

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ABSTRACT : As media usage continues to increase on a global scale, fueled by the proliferation of mobile devices, this facilitates the effortless behavior of media multitasking. This paradigm shift in the way in which media is consumed presents fundamental challenges for the domains of Human-Computer Interaction (HCI), education, psychology, and commerce. This technological shift introduces a new dimension that is needed when attempting to understand user interaction related to both the devices themselves and the digital platforms accessed. This study begins a process of developing an understanding of cross-cultural media multitasking habits through a survey of a large group of experimental participants. In this study, participants from two different countries were surveyed. The countries used in this study were the USA and Portugal. This research provides valuable insights into the increasingly common phenomenon of media multitasking and the similarities and differences between cultures when users are engaging in this activity. This study contributes to previous research in the realm of media multitasking by expanding on foundational knowledge on a global scale setting the stage for more detailed research on predictors, outcomes, and habits of global media multitasking.

KEYWORDS : Media Multitasking, Human-Computer Interaction, Focus, Media Consumption, Cross-Cultural.

I. INTRODUCTION

Media has evolved over the past century from a print and radio dominant form, to become dominated by television and film, to its current streaming and digitally dominant forms. In the last few years, there has been a proliferation globally of untethered digital devices (such as mobile phones) that can access media content. The average daily duration of media consumption among the general public has increased as has the number of occurrences of media multitasking.

From working on a desktop computer with multiple windows open, to listening to a lecture while checking the news on a phone, to unwinding in front of a television after a long day while browsing Facebook, media exposure and media multitasking is a fact of life for many people. Media multitasking is defined as "simultaneously engaging in two or more types of media or using media while engaging in non-media activities" [1]. Anecdotally, many have observed this phenomenon but measuring and deeply understanding media multitasking is nascent in academic research.

For the purpose of this study, media is defined as including, but is not limited to, print media, streaming video, computer games, social media, mobile phone usage and traditional film and television consumption. Media multitasking, also known as second-screen viewing, is defined as using any two forms of media concurrently.

Understanding media multitasking is important because the activity is pervasive, and the number of occurrences is on the rise; it is also a relatively new phenomenon. This shift in behavior presents challenges and new opportunities for media producers, application developers and software companies, educators, and advertisers. Media and technology are merging as delivery methods and distribution platforms and are increasingly pervasive and ubiquitous in everyday life. Media and commerce are increasingly global and interconnected, which means that understanding the cross-cultural habits of the media is becoming more important than ever.

According to recent studies, users spend 20-50 percent of their media time multitasking [2]. According to the Kaiser Family Foundation, adolescents and young adults spent an average of more than 7.5 hours daily using media [3]. In addition, within these 7.5 hours of daily use, there was up to 10 hours and 45 minutes of media content time, with teens accessing multiple media types simultaneously. In other words, more than a

quarter of the time (29%) was spent in media multitasking [3]. This finding is characteristic of media multitasking behavior, where through accessing multiple media types or platforms at one time, people may be exposed to more combined hours of media use than the number of chronological hours that have passed (say 10.75 hours of media use occurring within 7.5 hours of time).

Additional studies have indicated that people generally engage in media multitasking during 25 to 50% of media consumption time [4]. Cultures may have different behavioral patterns when it comes to media multitasking, and because the practice is becoming more popular, it's important to understand how these differences occur. The time spent media multitasking and device proliferation is currently increasing and is likely to continue to rise. It is highly likely that the increases in this behavior will have an impact on human cognition, educational approaches, media design and digital product design.

1.1 Types of Multitasking

Given the variety and number of media types and media tasks (from watching television, to browsing the web on a laptop, to messaging friends on a cellphone), media multitasking can occur in various ways. Certain media have characteristics which make them more suitable for multitasking. For example, passive media (e.g., television) is easily combined with other more active media, while internally paced media (such as newspapers) requires greater cognitive engagement. In addition, interactive media (e.g., computers) may stimulate multitasking behavior on their own be easily facilitating multiple tasks simultaneously [4].

The amount of media exposure has increased dramatically in the past two decades, primarily through technological advancements which now provides a variety of media types and supports the extensive use of media multitasking, which in turn further increases the amount of media exposure. Given this dramatic shift in how people spend a significant portion amount of their time, the broader implications - both positive and negative - need to be further assessed.

1.2 Multitasking Theory

Media multitasking requires rapidly switching attention between tasks, deciding which information is critical, and filtering out the unimportant information. Three primary theories are applied here to understanding why and how media multitasking may impact cognition [1,5,6] :

- The bottleneck theory of attention frames attention as a limited resource which can only be allocated to one task at a time. In this case, “multitasking” is a misnomer - since the mind simply switches between tasks. Instead, the “bottleneck” limits processing to one item at a time [5].
- The consequences of media multitasking can also be understood through the lens of cognitive control. The scattered attention hypothesis proposes that long-term media multitasking may disrupt cognitive control, and reduce performance, because the individual will gravitate towards the “preferred task” rather than maintain focus [1]. In this way, the increased attentional demands - and the finite nature of attention - hurts performance during multitasking.
- However, these increased attentional demands during frequent media multitasking may also improve cognitive control through the “training” of control processes, as posited by the trained attention hypothesis [6].

However, while frequent media multitasking may improve the ability to filter information, the scattered attention hypothesis is more consistent with other research than the trained attention hypothesis [1].

A variety of studies have been carried out in order to better understand the elements that either cause or predict media multitasking. Researchers have looked into why people multitask, stating that [7]:

“The findings indicated that media ownership, polychronicity, and four motivations (control, entertainment, connection, and addiction) positively predicted media multitasking behaviors”

Polychronicity is described as the belief that certain individuals are more likely to multitask, whereas Monochronicity is defined as the belief that some people are more likely to focus on one activity at a time. Polychronicity and Monochronicity have been linked to diverse cultural preferences [8].

1.3 Causes and Effects of Multitasking

The core purpose of multitasking is to accomplish more in the same amount of time. Research has indicated that task speed and accuracy decrease when multitasking even across modalities with audio and visual tasks. This shows that even though the neural processing for auditory and visual tasks appears to not overlap, they still compete for neural resources [9]. Users may have different reasons and motivations to multitask different media sources.

Multitasking based on the use of digital media, such as the Internet or mobile media, might be explained by motives such as information seeking or social media engagement. Multitasking can help users find information faster, especially when using the Internet, Television viewers or newspaper readers frequently use the Internet (typically on a mobile device), to look for relevant information. Newspaper readers may search for

geographical information about a city named in a news story, or a television viewer may look up information about an actor in the show they are watching.

Willingness to interact socially with friends and family members is also a common motivator for multitasking. For example, viewers may continually communicate with others while watching television via instant messaging and social networking sites such as Twitter, Facebook and Instagram.

Research has shown that media multitasking is not associated with improved dual-task performance but was associated with an increased ability to shift between tasks [10]. Despite this possible boost in task shifting ability, frequent media multitaskers may also be more susceptible to irrelevant environmental stimuli. Heavy media multitaskers were found to perform worse on task-switching tasks compared to light media multitaskers, possibly due to a reduced ability to filter out irrelevant stimuli [11].

Although multitasking typically lowers media impacts, if it incorporates the use of the Internet, it may boost media effects by enabling information searching. Overall, it appears that frequent media multitaskers process information differently from infrequent media multitaskers. This may have negative effects on task accuracy, performance, and filtering of irrelevant stimuli - however it may also promote mental flexibility and improve task switching.

1.4 Learning Cognition and Academic Performance

Several studies have addressed media multitasking and its effects across numerous dimensions related to learning cognition and academic performance. A number of researchers have focused on understanding media multitasking in the context of academic performance in colleges. Media multitasking in this context has been defined as engaging with another media source or media technology while primarily working on academic coursework. Researchers found that is a pervasive phenomenon and that 97% of college students reported some form of media use distracts them while they are in the classroom [12].

While frequently multitasking while consuming entertainment and social media may have long-term negative effects on attentional control, media multitasking in educational settings can have more immediate consequences. Media multitasking is frequently associated with a significant drop in academic performance. Heavy media users (more than 16 hours of media content daily, often through media multitasking) reported getting in trouble often, frequently feeling sad or unhappy, and poor grades (C's or lower) [3]. In addition, college students who frequently multitask in class have lower GPAs [13]. Despite this, students generally do not fully recognize the negative effects of media multitasking on academic performance; college students mistakenly reported that multitasking increased productivity [9]. An ideal media multitasking experience is one that meets affective needs through participation and enables the mixing of individual and shared media experiences.

Other researchers have expanded on this idea and found that a negative relationship between media multitasking and student academic performance, and that in-class media multitasking led to poorer academic performance among university students [14].

Much of the research has associated this behavior with negative emotional outcomes such as procrastination, regret, and guilt [12]. This research is interesting but limited as college students in the US are used as participants. This is done primarily for convenience (given the geographic location of the researchers) but unfortunately means that the results represent a narrow sample selection. Also, college students being generally younger than the average population age, are also more likely to multitask [15].

Memory and cognitive function in relation to media multitasking has been investigated extensively by other researchers. They found that media multitasking comes with various costs, including lowered task performance, prolonged task completion time, and frequent attentional lapses. The researchers posited that [16]:

“It is plausible that heavy media multitaskers may find it difficult to prevent their minds from wandering off because they compromise top-down attentional control by frequently and consistently switching attention between multiple forms of media, diminishing their ability to stay focused on a single task”

Hence, memory and cognitive function seem to be negatively associated with media multitasking due to the cognitive load limitations of human cognition. Expanding on the idea that media multitasking can be correlated with negative cognitive outcomes, other researchers explored media multitasking in the context of cognitive flexibility. In these experiments, researchers extended the examination of cognitive effects and found that heavy media multitaskers were negatively affected by these distractors to a greater degree than lesser media multitaskers [17].

1.5 Evolving Media

The shift from television to streaming and untethered media has been a relatively gradual one. Television programs are still popular, although the delivery of television programs has shifted to predominantly

asynchronous streaming platforms. Whereas previous generations may have gathered around the TV to watch live scheduled programming, younger generations binge watching shows on streaming platforms, and are often sharing their thoughts with their friends as they watch..

A number of researchers have explored the evolving way in which people now watch TV, and the increasingly common behavior of media multitasking while watching television. One study explored how multitasking while watching television might impact stress and engagement with programming. They found that participants were able to multitask and remain engaged with the television program easily, without increasing their levels of stress [18].

Researchers have also investigated the rise of social TV, where television programs are live tweeted and the multitasking behavior (tweeting) becomes part of the larger overall television viewing experience. The researchers found that roughly 44% of general television viewers interact with a second screen while watching live-television shows. Cultural touchstone events, such as the world cup, generated 35.6 million tweets on this topic around the globe [19]. More recently, another research study found that 90% of consumers are typically multitasking while watching TV and that 53% of viewers are multitasking every time or almost every time they watch TV [20].

Current trends in television watching suggest that television is used as a meeting place where family and friends gather to be with one another, both to watch programs together and also to do other tasks while not actively watching [21]. Television has been established as a primary media consumption tool, multitasking is common, and hence television has grown to serve a social mediating function rather than a primary engaging and immersive experience.

Researchers have also discovered that second-screen viewing has become especially popular around large-scale news events such as the U.S. presidential debates, election night, and the State of the Union address [22]. Previous research has also established that the more media and devices a person owns the more they multitask [2].

This further illustrates the increasingly common behavior of media multitasking, where second screens are used as ancillary tools to increase understanding around events and to participate socially, remotely in television viewing. Expanding on this research by understanding media multitasking in a more modern and in-depth way will add to the body of previous research knowledge.

1.6 Demographic Factors: Age and Gender

A range of demographic factors have been explored in relation to media multitasking. Although the exact effects of media multitasking on cognition and task performance are varied, the impact on the way we process information is undeniable. In particular, younger generations are both more likely to multitask than previous generations and are “immersed in new media” and use “multiple technologies easily, interchangeable, and simultaneously” as “digital natives” [9, 15, 23].

Researchers have explored the recent rise in media multitasking use by adolescents. They examined adolescent media use over the past 15 years finding that it had increased significantly [24]. The researchers found media being consumed concurrently meant the reported time difference was made up with media multitasking. This study also found that adolescents who spend more time with media report lower grades and lower levels of personal contentment [24].

Expanding on age related research, other researchers investigated media multitasking across three generations. This work found that members of the ‘Net Generation’ reported more multitasking than members of ‘Generation X’, who, in turn, reported more multitasking than members of the ‘Baby Boomer Generation’. Hence there was an increasing amount of general multitasking of media and resources in successively younger generations. As a result, younger generations have become more adept at multitasking media and resources in general [25]. Compared to other age groups, teenagers and young adults are most confident in their multitasking ability and have the best task performance on dual visual and audio tasks [9, 26].

The effect of gender on multitasking is more unknown, with some finding that females are more likely to multitask than males [27] and generally more efficient multitaskers [28]. In contrast, other research studies have shown that male participants were more likely to own a tablet device, allowing for increased multitasking tendencies in the group [29]. However, others have attributed these effects to differences in executive functioning skills, not gender differences, and they have also asserted that there are minimal gender differences in real-world multitasking [30].

Other demographic factors have been explored such as educational levels and family income however these differences did not accurately predict multitasking behaviors.

Hence, research has shown that generational media multitasking habits are observable and quantifiable. Research into broad demographic differences demonstrates that cultural differences could be an important dimension to understand and likely to expand on the current research’s foundational knowledge.

1.7 Demographic Factors: Location and Culture

Very little work has been undertaken assessing the media multitasking habits of different countries. Many previous cross cultural or cross-national studies have been concentrated on the media multitasking behaviors of the United States. While this is important, the global reality of media and technology make this an incomplete view of the phenomenon.

For example, one recent study found that significant differences between multimedia viewing habits can be observed between the USA media multitask more than participants in the Netherlands. The research proved that participants in the USA media multitask significantly more than their counterparts in the Netherlands [2].

Researchers compared three countries (the United States, Kuwait, and Russia) and found that media multitasking was most common in the United States, which was attributed to differences in technology ownership and press freedom [30].

Similarly, a survey of 5,973 participants from six countries (the United States, the United Kingdom, Germany, the Netherlands, Spain, and France) found that media multitasking was most prevalent in the United States and least in the Netherlands [4]. This study found that age was a universal predictor of media multitasking behavior, indicating that younger demographics were the most likely to multitask, agreeing with much of the previous work in this field. The researchers also found that the media multitasking was again more prevalent in the United States [23].

Research has suggested that the cultural differences between monochronic and polychronic countries may be a predictor of differences in multitasking behavior [4]. A monochronic culture can be described as one where tasks are typically undertaken in a linear and structured manner, polychronic cultures, on the other hand, are less regimented and multiple tasks are often conducted at once.

The United States is often typically characterized as a monochronic culture, whereas Portugal is often classed as a polychronic culture [31], which may play a part in any noticeable country-based differences of media device selection and media multitasking behavior. Note that while North American and Northern European countries are traditionally conceptualized as monochronic cultures, society worldwide is becoming increasingly polychronic due to technological advancements [4, 32]. In addition to cultural concepts of time use, country-based differences in the type of media used for media multitasking may also be based on differences in media or patterns of human interaction.

II. EXPERIMENTAL METHOD

Much of the previous media multitasking research has previously been focused on the advantages and disadvantages of media multitasking, effect of media multitasking on learning performance, advertising, differences between two similar cultures; effect on learner outcomes; and habits of US college students.

This study aims to build on previous research to increase understanding of cross-cultural habits regarding so called media multitasking. The project aims to gather media habit data from participants from USA and Portugal, which each have different demographic, cultural, and economic dimensions.

This study aims to provide a starting point for further cross-cultural research on this increasingly important and increasingly ubiquitous cultural phenomenon.

2.1 Research Question

This study proposes the hypothesis that there are cultural differences in media multitasking behavior, whether it's due to the medium through which the media is received or the applications that users utilize as secondary media sources with which they multitask. The study also posits the hypothesis that some dimensions in media consumption will overlap cross culturally i.e. the American and Portuguese participants engage with media in comparable ways, as well as perceive and use media when multitasking (Table 1).

Category	Questions/Data available
Demographics	Country, age, gender
Self-reported media use	Media consumption Social media consumption
Experiment	Primary media device, secondary media device selected Media, social media selected Time watching media, time media paused Time accessing social media on primary/secondary device Social media alerts received

Table 1: Question Categories

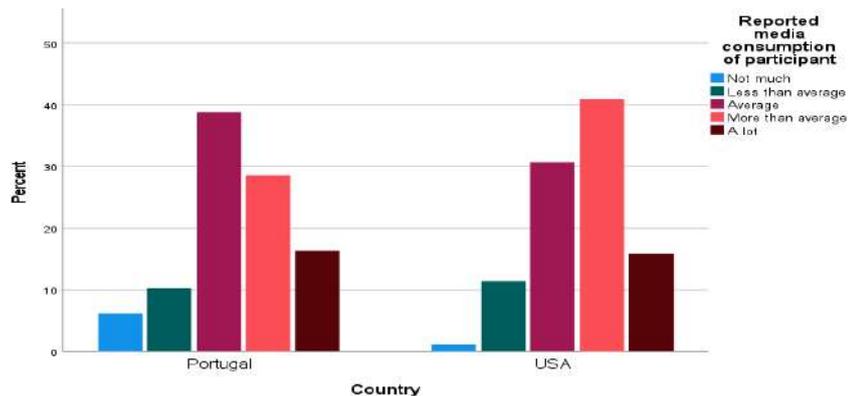
2.2 Participants and Procedures

137 participants were recruited from Portugal (N=49) and the USA (N=88). The average age of Portuguese participants (M=21.98) did not vary significantly from the average age of the American participants (M=23.52). Of the American participants, there were 20 female and 66 male participants; the gender of Portuguese participants was not collected. This analysis uses parametric tests for ordinal, Likert-scale data[33].

III. RESULTS

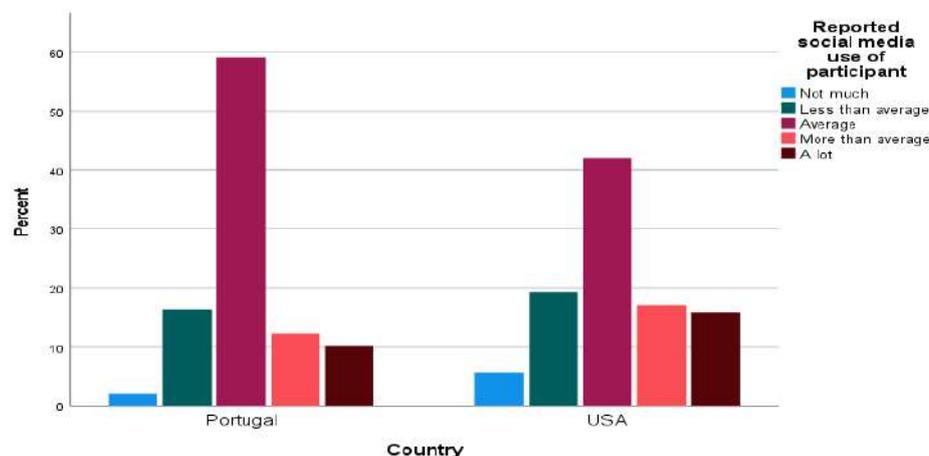
3.1 Part A: Self-Reported Media Use

Question One: participants were asked to describe their media consumption and time spent on social media on a 5-point scale, from “Not much” to “A lot.” Time spent on media consumption did not vary significantly depending on whether the participant was from Portugal (M=3.39) or the United States (M=3.59).



Graph 1: Media Consumption of Participants

Question Two: Time spent on social media also did not vary significantly between Portuguese and American participants (M=3.12 and M=3.18, respectively). Interestingly, the average participant reported that they consumed an “above-average” amount of media.

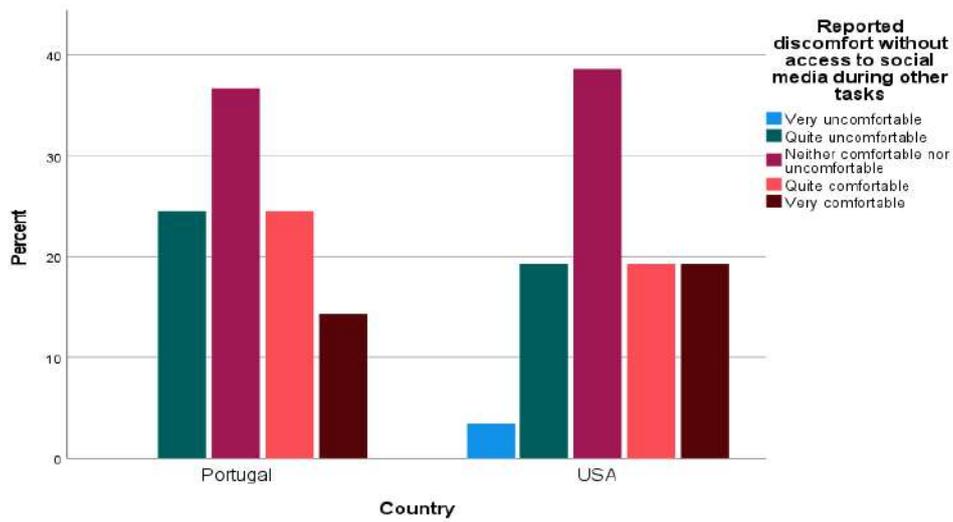


Graph 2: Social Media Use of Participants

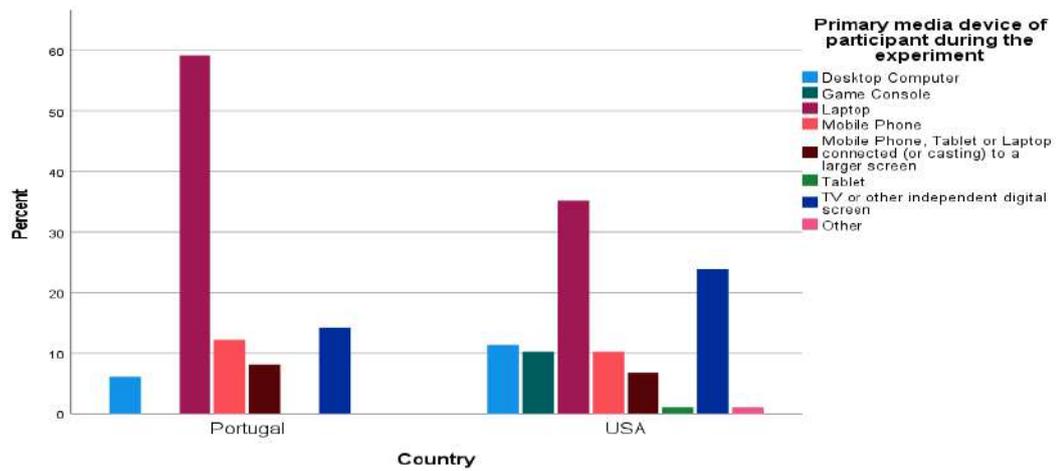
Question Three: Participants were asked to report their discomfort without access to social media during other tasks on a 5-point scale, from “Very uncomfortable” to “Very comfortable.” Reported discomfort did not vary significantly with country of origin, whether Portuguese (M=3.29) or American (M=3.32). Interestingly, 0 Portuguese participants reported feeling “Very uncomfortable.”

3.2 Part B: Media and Social Media Use During the Experiment

Question Four: Device selection; The laptop was the most common primary media device selected by participants in both Portugal (59.2% of respondents within the country) and the USA (35.2%), followed by a TV or other independent digital screen (14.3% and 23.9%, respectively).

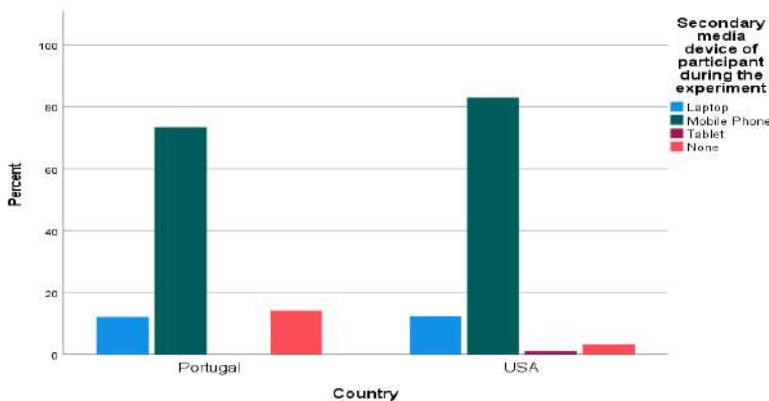


Graph 3: Discomfort Rate Without Access to Social Media During Other Tasks



Graph 4: Primary Media Device of Participants During the Experiment

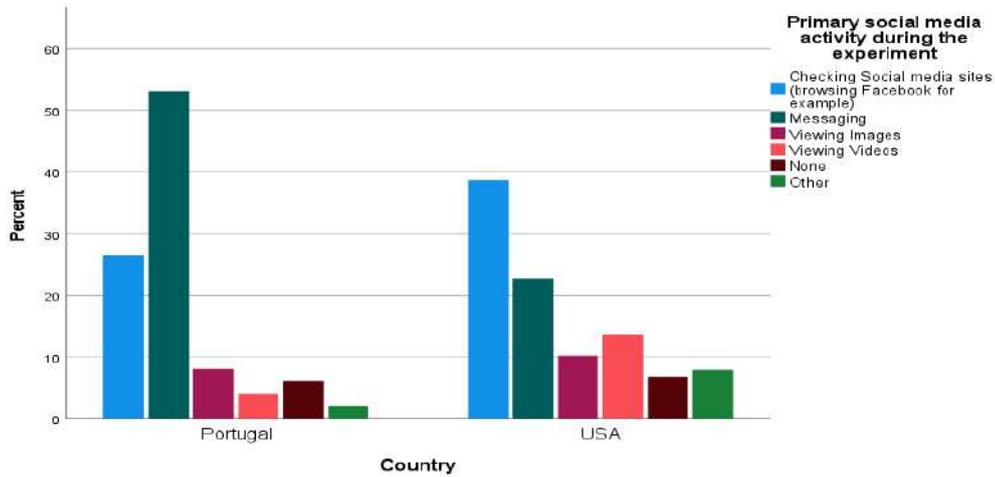
Question Five :The most common secondary device identified for social media use was overwhelmingly the mobile phone in both Portugal (73.5%) and the USA (83%). The distribution of selected primary and secondary devices did not vary significantly by country.



Graph 5: Secondary Media Device of Participant During the Experiment

Question Six: Media selection; TV series/show was the most frequently consumed media type selected by participants in both Portugal (40.8%) and the USA (31.8%), followed closely by Internet/Social Media (40.8% and 31.8%, respectively).A chi-square test of independence showed there was a significant association

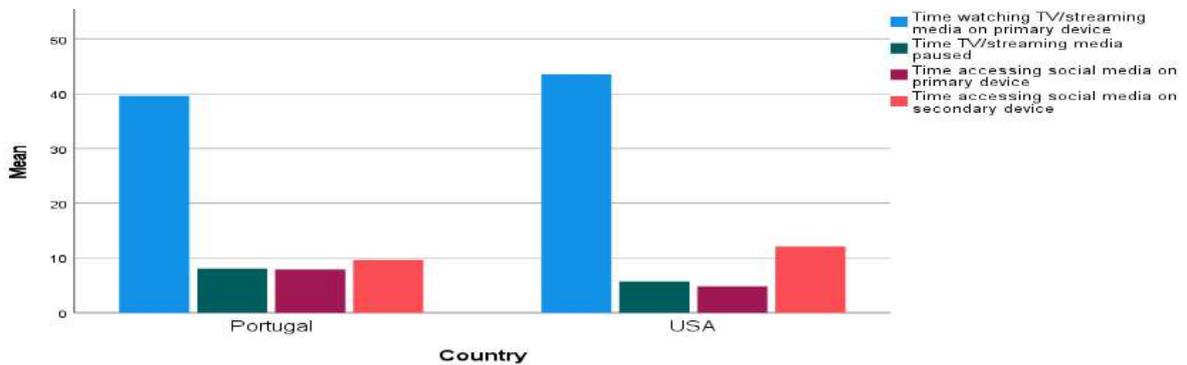
between social media type and country of origin, $\chi^2(5, N=137) = 14.83, p < .05$. 53.1% of Portuguese participants selected “Messaging” as their primary social media activity, followed by “Checking social media sites” (26.5%). In contrast, 38.6% of American participants selected “Checking social media sites” as their primary social media activity, followed by “Messaging” (22.7%).



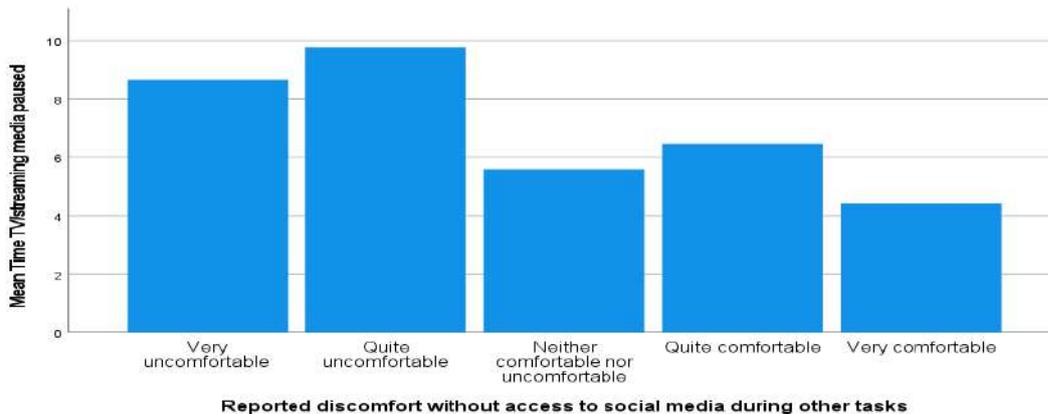
Graph 6: Primary Social Media Activity During the Experiment

3.3 Part C: Time Allocation and Second Device Use

Four independent-sample T-tests showed that there was no significant association between time allocation and country of origin. This includes time watching TV/streaming media on a primary device, time with TV/streaming media paused, time accessing social media on the primary device, and time accessing social media on secondary device. Fourteen participants (4 Portuguese and 10 American) who reported greater than 60 minutes for a single category were excluded from the analysis.



Graph 7: Time Allocation and Second Device Use



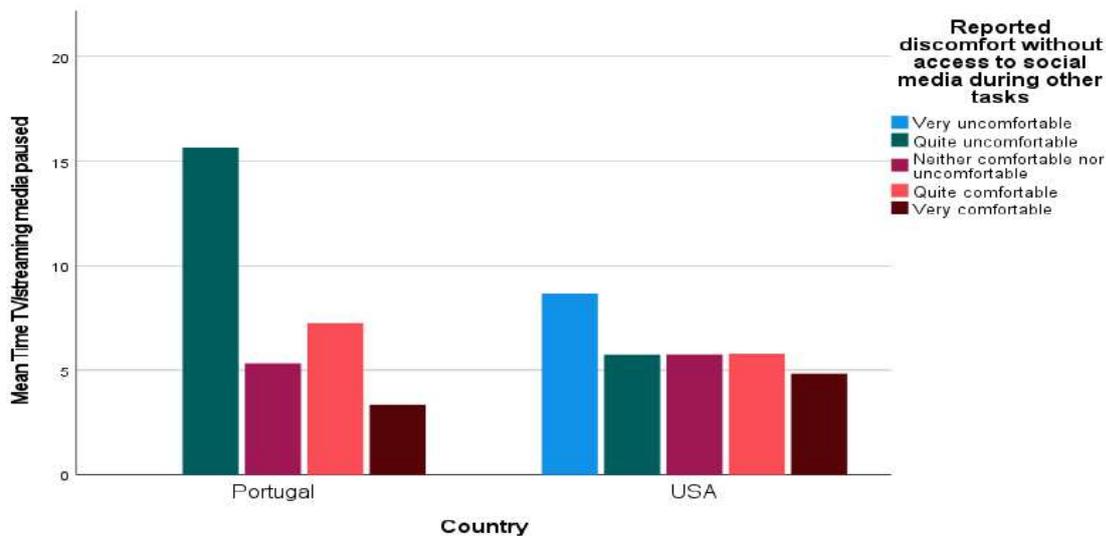
Graph 8: Overall Mean Time Paused (Minutes) by Reported Discomfort Level

3.4 Part D: Comparison of Discomfort Without Access to Social Media while Multitasking

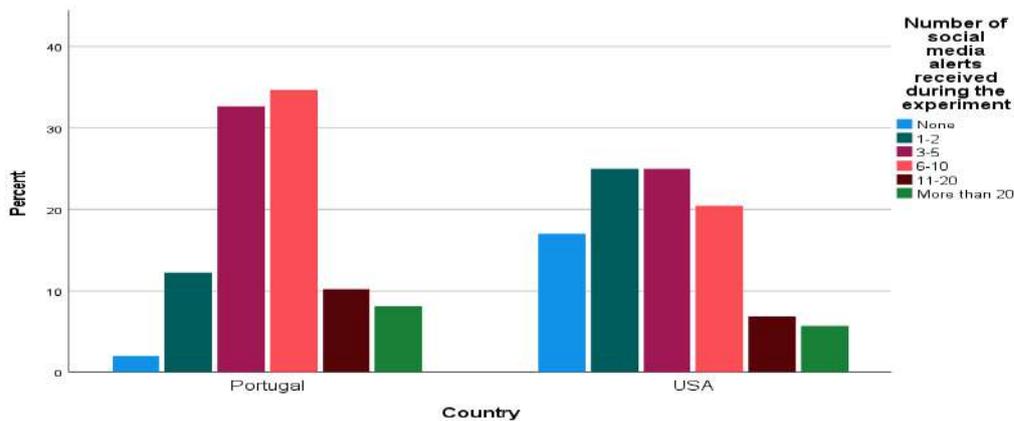
Device use and time allocation during the course of the experiment were also compared between groups who previously reported discomfort without access to social media while performing other tasks (rated 1 = "Very Uncomfortable" or 2 = "Quite Uncomfortable") and those who were neutral or reported being comfortable (rated 3 = "Neither Comfortable nor Uncomfortable," 4 = "Quite Comfortable," or 5 = "Very Comfortable").

Participants who reported feeling uncomfortable without access to social media during other activities trended towards a greater number of minutes accessing social media on a secondary device (M=13.73) than participants who reported no discomfort (M=10.43), $t(121) = -1.78, p=.078$. The difference in time spent accessing social media on a primary device was not significant between groups.

In addition, there was a significant difference in the amount of time with TV/streaming media paused with statistically significantly more pause time for participants who reported discomfort without access to social media (M=9.67) than participants who did not (M=5.56), $t(121)=-2.67, p<.05$.



Graph 9: Overall Mean Time Paused (Minutes) by Reported Discomfort Level by Country



Graph 10: Number of Social Media Alerts Received During the Experiment by Country

3.5 Part E: Social Media Alerts

Participants reported how many social media alerts they received during the one-hour experiment on a 6-point scale, in which 1 = "None," 2 = "1-2," 3 = "3-5," 4 = "6-10," 5 = "11-20," and 6 = "More than 20." An independent samples t-test revealed that participants from Portugal received significantly more social media alerts on average (M=3.63) than participants from the USA (M=2.92), $t(135)=3.05, p<.05$.

3.6 Part F: Device Use and Time Allocation

Device use and time allocation during the course of the experiment were also compared between groups who previously reported discomfort without access to social media while performing other tasks (rated 1 = "Very Uncomfortable" or 2 = "Quite Uncomfortable") and those who were neutral or reported being

comfortable (rated 3 = "Neither Comfortable nor Uncomfortable," 4 = "Quite Comfortable," or 5 = "Very Comfortable").

III- DISCUSSION

In this study the survey responses provided a rich data set which when analyzed qualitatively showed insights into how the USA and Portugal multitask with media. Drawing from gathered sample set allowed the results to reflect the habits of 137 participants from the two mentioned countries.

In this study the survey responses provided a rich data set which when analyzed qualitatively showed insights into how two different countries multitask with media. Drawing from a global sample set allowed the results to reflect the habits of 137 participants from two different countries. The data collected demonstrated that multitasking behaviors are similar cross culturally, although participants from the United States and Portugal prefer different media combinations when multitasking.

The data collected demonstrated that some multitasking habits are similar in many ways in the United States and Portugal. It was showed that TV series/show was the most frequently consumed media type as a primary media and all participants tend to use their mobile devices as a secondary media device. The results also indicate the number of social media notifications participants received during the experiment is considerably high, which shed a light on the reason why mobile phone devices are mostly used as a secondary media device.

The total sample size for this study was 137 participants, which is still a relatively small number. More cultures and larger sample sizes of each country/culture should be explored in order to properly comprehend the complexities of media multitasking behaviors of different cultures.

This study focused on two cultures/countries: The United States and Portugal. In addition, the sample size was weighted toward men and younger participants. It would be useful to investigate a more demographically balanced sample group in the future.

Relying solely on self-reported behavior can be effective but is, by its very nature, inherently limited as a research method. It has been reported that some of the participants can be poor at estimating just how much time they are spending on digital devices and so misrepresent the extent to which they media multitask [34].

Incorporating predictors of media multitasking, such as device ownership and access to media, is also an area that should be explored. Also, metrics such as the amount of media access available and factors such as press freedom and media structures (public vs private broadcasting) could also be of interest. Media systems vary greatly by country and should be explored as a potential factor in media consumption behavior.

In HCI research, surveys are an effective and frequent method. Other research approaches, especially when used in conjunction with surveys, might indirectly improve more insights. In person testing and video recordings, for example, have been used in some past related studies in the domain of media multitasking to better understand the real behavior of media multitasking in action. Future research could benefit from concentrating in a more detailed way on specific media combinations with respect to different countries.

IV. CONCLUSION

The research project demonstrated that media multitasking behavior differs by cultures in perspective of the way media is consumed. Overall, it appears that while Portuguese and American participants engage with media, and perceive and use media while multitasking, in remarkably similar ways. However, statistically significant differences were found between groups in the type and use of social media.

Portuguese participants were both more likely to choose Messaging as their primary social media activity and received significantly more social media alerts during the duration of the experiment than American participants. In addition, participants who reported feeling "Uncomfortable" without access to social media while multitasking, paused their TV or streaming media for a statistically significant greater amount of time than participants who reported feeling neutral or "Comfortable."

The project also demonstrated that some of the modalities of media consumed will overlap cross culturally, the degree to which users media multitask and the applications they use to carry out that behavior will be significantly different.

Similar to the findings of the few other research projects in this area, this project also showed that in most cases, the heaviest media multitaskers will be from the United States due to the media saturated environment and high device concentration in US households.

Future study might benefit from a more extensive examination of certain media combinations in relation to different countries.

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