Multiuser Human-Computer Interaction Settings: Preliminary Evidence of Online Shopping Platform Use by Couples

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Abstract. The phenomenon of multiple users interacting together with a single shared system interface to perform a task (i.e., a multiuser human-computer interaction) is under-investigated in the Human-Computer Interaction (HCI) literature, yet it shows promising avenues for research. For example, little is known about cross-level influences driving collaborative use of a shared system interface, and the literature lacks knowledge about collective adaptation of users to triggers in this setting. The present work contributes to contemporary research on multiuser HCI with system interfaces. As an initial effort, it focusses on the joint use of online shopping platforms by couples. A survey is conducted with 390 respondents in the USA about couples' habits regarding joint online shopping. Results suggest that joint online shopping is overwhelmingly common among couples and that they engage in such activity in a wide variety of ergonomic layouts. Our findings constitute preliminary evidence and intrinsically call for more researchers' interest in investigating emotional, cognitive and behavioral dynamics taking place when multiple users jointly use system interfaces. Such research endeavors may ultimately inform and optimize multiuser system designs and corresponding products and services.

Keywords: Multiuser human-computer interaction · Shared system interface · Collaborative use · Joint online shopping · Couples' online shopping · Joint system use

1 Introduction

The phenomenon of study addressed in this paper is that of multiple users interacting together with a single shared system interface to perform a task. This perspective is important for several reasons. Although most computer systems are designed for use by a single user, they are frequently used in multiuser settings. Examples include individual shopping systems such as e-commerce platforms (e.g., [1–3]). To illustrate further, a recent study revealed that 53% of online purchases by households are operated by two or more users shopping online together [4]. Hence, it is common that individuals use

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information technologies collaboratively with other users by interacting with a single system interface [5].

Despite its importance, this perspective of multiuser interaction with a shared system interface is scant within the human-computer interaction (HCI) literature. Introducing this perspective may contribute to addressing several limitations in extant literature. First, the HCI literature on collaborative system use has been examined mostly through studies focused on group-level use of systems made to be used by groups of users separately, such as with group support systems (e.g., [6]) and collaborative systems (e.g., [7]). Very few studies on group-level system use focus on collaborative task processing jointly performed through a shared system interface. Second, past research has essentially conceptualized system use at a single level of analysis (e.g., individual level or group level), without explicitly addressing cross-level associations, that is, possible influences from or to other lower or higher levels of analysis [8]. Third, the literature on user adaptations during interactions with a system addresses the question of patterns of user coping with triggers (e.g., [9]); however, this literature only considers single-user system use. Hence, little is known about how multiple users, both collectively and individually, adapt to triggers while they jointly interact with a system.

The objective of the present paper is to contribute to contemporary research on multiuser interaction with system interfaces. As an initial study, this research focuses on the collaborative use of online shopping platforms by couples. Two research questions are investigated: (1) to what extent do couples jointly use online shopping platforms; (2) in what settings do couples shop together using online platforms?

To answer these questions, an online survey was conducted on couples' habits of joint online shopping. Based on a sample of 390 responses, detailed results are presented on a variety of perspectives showing the extent to which, as well as settings in which, couples jointly use online shopping platforms. Findings suggest that couples spend a significant amount of time jointly navigating the Internet, with 43.95% of couples spending more than 3 h/week in this activity. Findings also suggest that couples shop together in different ways. During this activity, they use a wide variety of ergonomic layouts and are significantly more physically collocated, though may sometimes be separated. Analyses revealed that during joint online shopping couples most frequently use two separate smartphones, followed by comparable frequencies of using either the same computer or two separate computers. In terms of screen layout, during joint online shopping, couples mostly use the same website window when they use the same screen, whereas they use different windows when they use separate screens. Regarding the location of this joint activity, couples engage in it mostly from home, and specifically either in the living room or the bedroom, and tend to do so physically separated (i.e., remotely) from each other, with men maintaining control of the mouse significantly more than women. Finally, couples engage in joint online shopping mostly on websites related to travel and tourism, computers and electronics, and classified ads.

The remainder of this paper is structured as follows: the study's methodology is presented first, followed by the results, and ending with a discussion of emergent implications.

2 Methodology

To answer the above-mentioned research questions, a survey in the U.S.A. was conducted regarding couples' habits of joint online shopping (note: participants were asked to report on their habits under normal times/conditions). Participants were randomly recruited from a general online population through Amazon Mechanical Turk (MTurk), a crowd sourcing online platform having a United States user base of approximately 85,000 "Turkers" [10]. Participants were required to be in a relationship, without taking into account their marital status or whether they lived with their partner. The survey had to be completed by a single respondent. Finally, the study was approved by the ethics committee of the authors' institution, and each participant provided informed consent.

A total of 490 respondents participated to the study. Excluded from the analysis were responses from participants, who: (i) reported not being in a relationship, (ii) failed one of the attention check questions on MTurk, (iii) completed the survey multiple times, or (iv) completed the survey in an extremely fast pace that would not allow for meaningful processing of the questions and answer options (i.e., 3 s per question, on average). After this meticulous review and cleansing of the questionnaire data collected, the final dataset comprised 390 usable responses.

In addition to demographic information, participants reported on various aspects of their joint online shopping habits, including the extent to which: they buy certain categories of products together; shop together in different types of locations; use different device setups; use different types of screen layouts, in terms of device screen(s) (i.e., same or separate) and website window(s) (i.e., same or different); and each partner controls the mouse during joint shopping. The product categories chosen based on existing product categories that were investigated in the literature in the context of online shopping by couples [1], which were refined and extended following working sessions with two marketing experts. The added product categories are Real Estate, Clothing and Fashion, Leisure Activities, And Cars. The questionnaire was administered through the Qualtrics.com platform. Table 1 presents the participants' demographics.

Several visualizations of various aspects of the collected data and analyses were produced. Significance tests on differences observed were performed using linear regression with random intercept, at $\alpha = 0.05$ significance level and using two-tailed p-value adjusted for multiple testing using the Holm-Bonferroni method. The analyses were performed using the SAS statistical software.

3 Results

Results are presented in Fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16. Differences observed in bar charts are generally statistically significant. The statistics related to the pairwise comparisons are presented in Appendix A.

Regarding which device setup – smartphone, tablet, or computer, and whether single or multiple devices were used – couples used when they jointly shop online, Fig. 1 shows that couples use two separate smartphones significantly more than using the same smartphone; in fact, the former is the most frequently used of all device setups. Regarding the use of computers, couples reported using the same computer more frequently than

separate computers but not to a statistically significant different level. Finally, the least used device setups by couples during joint online shopping were the use of the same smartphone, the same tablet, and two separate tablets. In terms of response data distribution, Fig. 2 shows that the same trend as in Fig. 1 was observed, except for the two most used setups. A total of 93.59% of couples appear to jointly shop together at least occasionally using the same computer, while 92.05% use two smartphone occasionally, 86.67% use two separate computers, 82.56% use the same smartphone, 68.97% use the same tablet, and 61.28% use two separate tablets. Figure 3 shows relative frequencies per device setup, suggesting higher frequencies for the use of two smartphones or the same computer.

Table 1. Participants' demographics

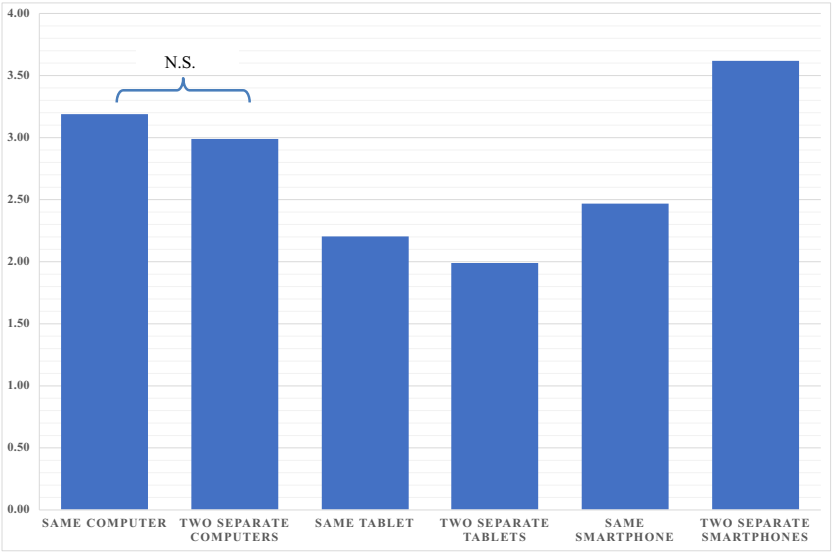
Demographics variables		Frequency (n = 390)	Percentage
Participant's gender	Male	218	55.90%
	Female	170	43.59%
	Other	2	0.51%
Partner's gender	Male	174	44.62%
	Female	215	55.13%
	Other	1	0.26%
Participant's age	18–25 years	41	10.51%
	26–35 years	197	50.51%
	36–45 years	87	22.31%
	46–55 years	43	11.03%
	Greater than 55	22	5.64%
Participant's education level	High school	61	15.64%
	College	69	17.69%
	Undergrad	104	26.67%
	Graduate	115	29.49%
	Post-graduate	41	10.51%
Household income	Less than $30,000	29	7.44%
	$30,000–$49,999	73	18.72%
	$50,000–$69,999	102	26.15%
	$70,000–$89,999	86	22.05%
	$90,000 or more	100	25.64%

Concerning which screen layouts couples use when they jointly shop online, Fig. 4 shows that when they use the same screen, they mostly use the same website window. Also, using the same window within the same screen appears to be the most used of all four screen layout options. On the other hand, when couples use separate screens to

jointly shop online, they tend to use multiple windows as opposed to using the same window. The next most used layout is the use of multiple website windows within separate screens. The least popular setups reported were the use of the same shared window within separate screens and finally the use of different website windows within the same screen. The same trend was observed with the data distribution as shown in Fig. 5. A total of 93.33% of couples appear to at least occasionally use the same website window when they use the same screen for joint online shopping, while 71.03% use different websites windows. Finally, 87.69% use different website windows when they use separate screens, while 78.72% use a same shared website window. Figure 6 shows relative frequencies per screen layout, suggesting higher frequencies for the use of a shared window when using the same screen and the use of different windows when using separate screens.

Regarding the physical location from where couples shop online together, as shown in Fig. 7, results show that couples do so mostly being physically collocated, specifically in their living room, followed by their bedroom. The third most common location to jointly shop online is to be physically remote from each other and in different rooms. This setting was not statistically significantly different from joint shopping in the kitchen, in separate rooms at home, and at the same location out of the home. Lastly, joint shopping in the yard or in the garage were also reported albeit at the lowest frequencies.

Regarding what categories of products are shopped for online by couples (or in other words, the categories of online shopping platforms accessed), as depicted in Fig. 8, Travel and Tourism appears to be most shopped for online. The Cars category follows, with no significant difference with Art and Shows, Groceries, and Real Estate. Leisure Activities



N.S. = Non-Significant

Fig. 1. Extent to which couples use each device setup during joint online shopping

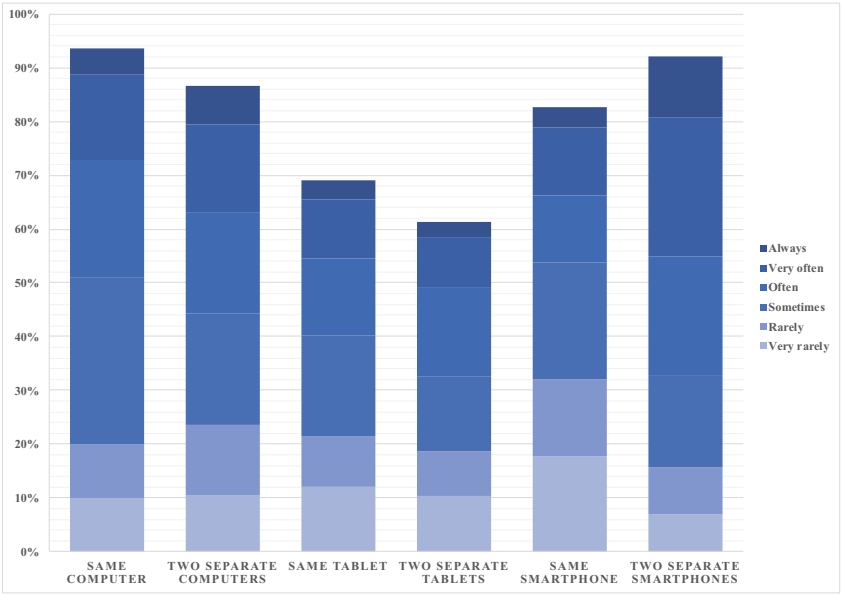


Fig. 2. Frequencies of device setup use during couples' joint online shopping

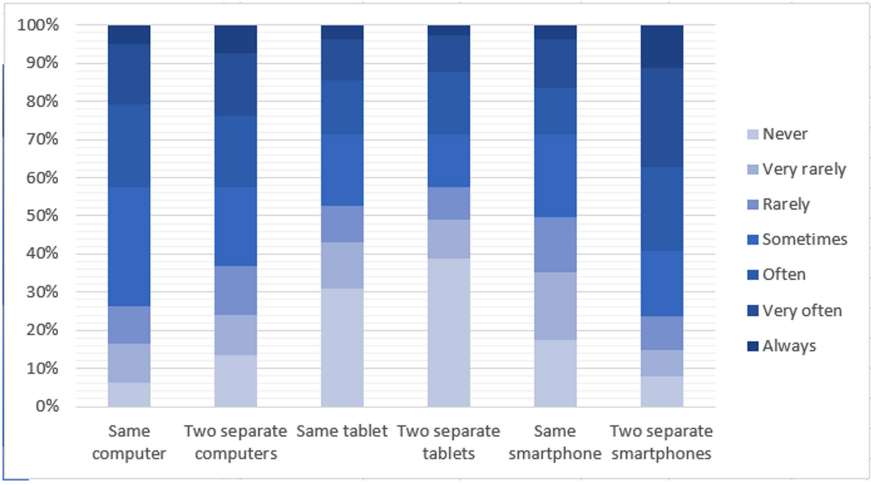


Fig. 3. Relative frequencies of device setup use during couples' joint online shopping

and Clothing and Fashion. The Cars category is followed by the Furnitures and Appliances category, which shows no statistically significant difference with Classified Ads, Leisure Activities, and Clothing and Fashion. The Furnitures and Appliances category is followed by the Computers and Electronics category, with no statistically significant difference with Leisure Activities. The Computers and Electronics category is followed

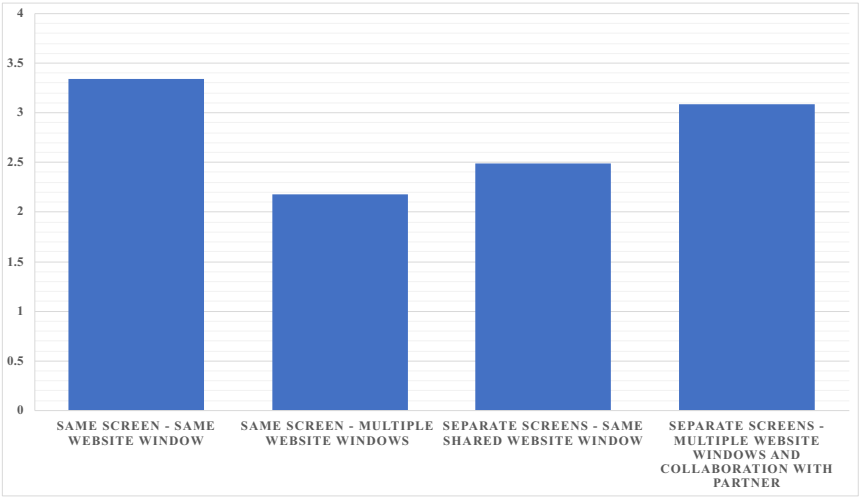


Fig. 4. Extent to which couples use each screen layout during joint online shopping

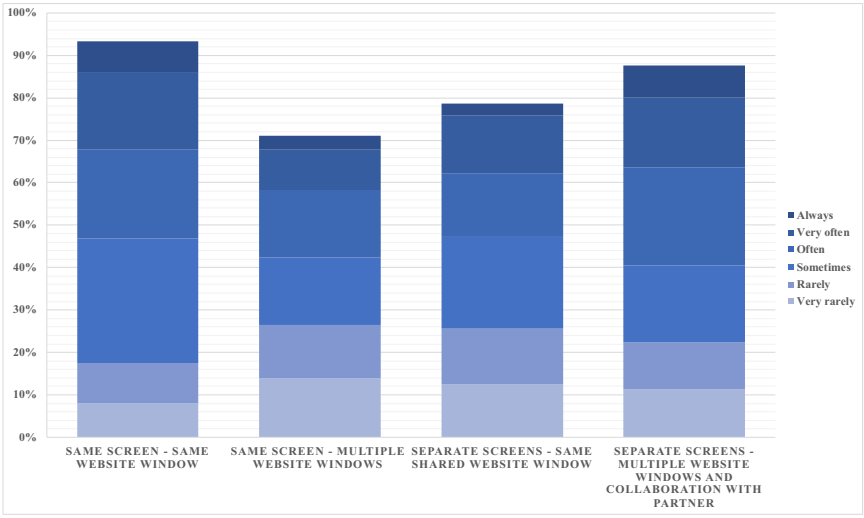


Fig. 5. Frequencies of screen layout use during couples' joint online shopping

by Art and Shows, with no statistically significant difference with the Paper Magazine category.

Also answered was the question as to what extent each partner by gender keeps control of the mouse during the couple's joint online shopping. As shown in Fig. 9, men reported to keep control of the mouse during the activity to a significantly greater extent than women do.

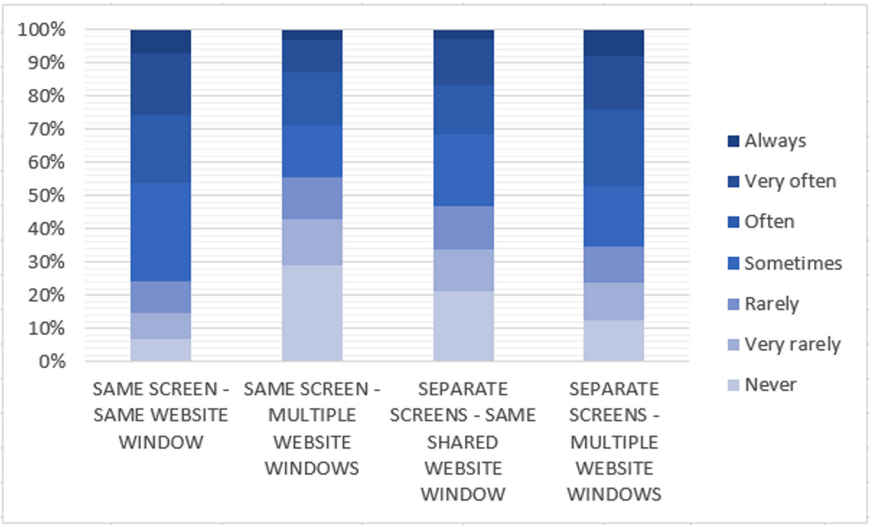
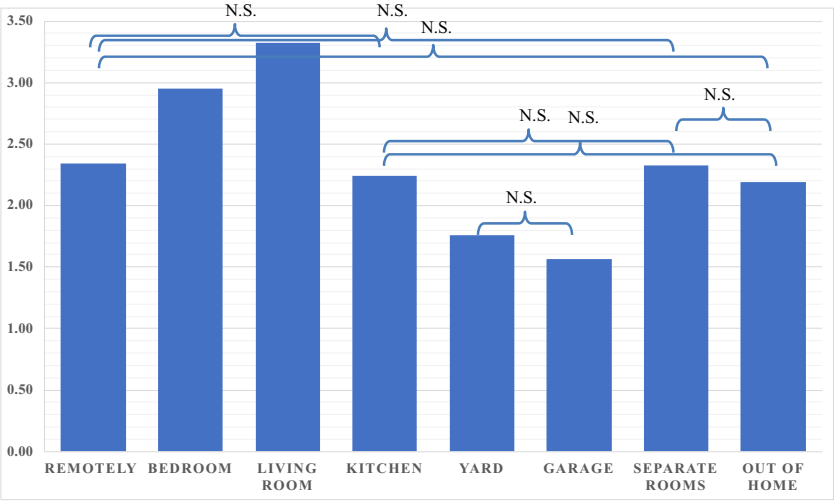
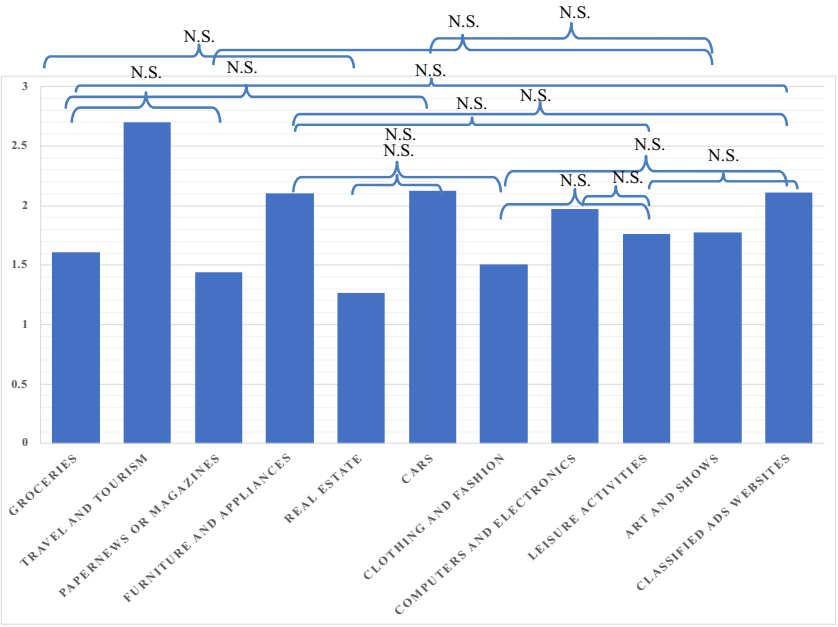


Fig. 6. Relative frequencies of screen layout use during couples' joint online shopping



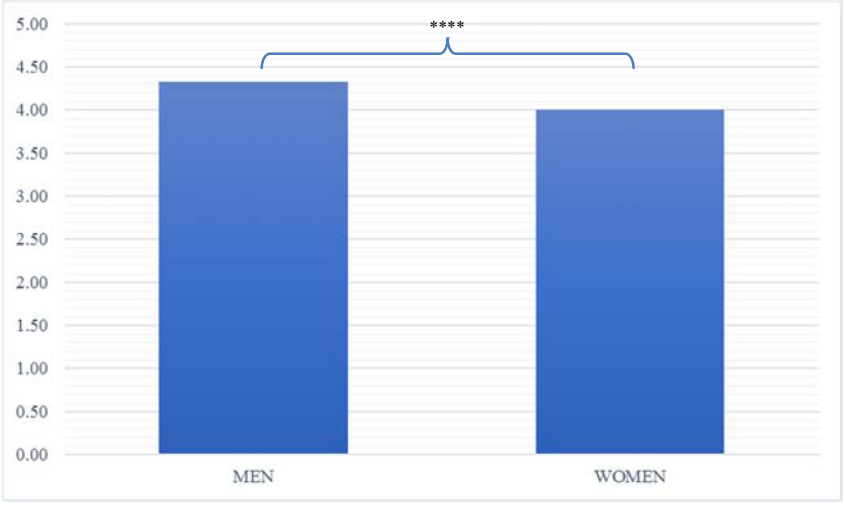
N.S. = Non-Significant

Fig. 7. Extent to which couples jointly shop online by location



N.S. = Non-Significant

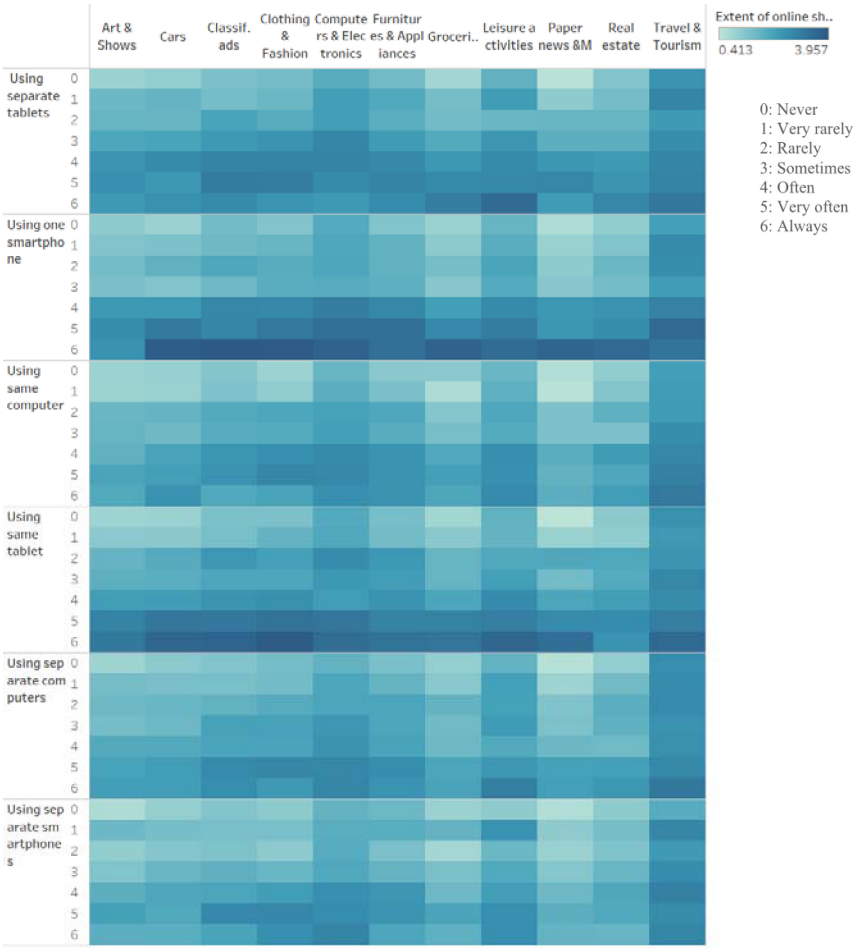
Fig. 8. Extent to which couples jointly shop online by product category



**** = statistically significant at α = .0001

Fig. 9. Extent to which partners keep control of the mouse, by gender

The remaining results are provided against more than one dimension. Figure 10 presents a heatmap representing the extent to which couples were reported to jointly shop online for each product category. This information is reported by the extent to which they use each device to conduct the activity. The heatmap suggests that couples which jointly shop the most for Art and Show are those who always use the same tablet to do so. On the other hand, couples who jointly shop the most for Cars are those which always use the same smartphone to do so, followed by those who always use the same tablet. The result for Cars also applies for the Classified Ads, Clothing and Fashion, Computers and Electronics, Furnitures and Appliances, Groceries, and Paper and News categories. Moreover, it appears that couples which shop the most for Leisure Activities



Vertical axis: Extent to which couples jointly shop online using each device setup.
Horizontal axis: Product categories.

Fig. 10. Extent of joint shopping per product category and by device setup

are those which very often use either separate tablets, the same tablet, or the same smartphone to jointly shop online. Those couples which jointly shop online most often for Real Estate are those which always use the same smartphone to shop online. Finally, those couples which shop most often for Travel and Tourism are those which either most often use the same smartphone or always use the same tablet.

The next view is provided in Fig. 11, which shows the extent to which couples jointly shop online for the different product categories, reported according to the extent to which they jointly shop online in various location settings. It appears that the Art and Shows category is mostly shopped for jointly when the couple tends to do joint shopping very often in separate rooms at or when they are collocated out of home. As for Cars, couples who jointly shop online for this category are those who tend to do joint shopping very often in the yard or out of home at the same location. Moreover, couples jointly shopping very often in the garage are those mostly shopping for Clothing and Fashion. As for Computers and Electronics, couples who jointly shop for this category are those who tend to do joint shopping very often in the yard or in the kitchen or in the garage at home. As for Furnitures and Appliance, couples who jointly shop for this category tend to engage in joint shopping very often in the garage, in the kitchen, or at the same location out of their home. As for Groceries, they are mostly jointly shopped by couples which tend to shop together very often in the yard or in the garage. Leisure Activities are most shopped for by couples which shop together online very often remotely from each other or collocated in the garage or in the kitchen. Paper and News are most shopped for by couples which shop together online very often in the garage or in the same location out of home, or in separate rooms at home. Couples mostly shopping for Real Estate together are those which tend to shop together online very often in the yard. Finally, couples mostly shopping together for Travel and Tourism are those which tend to shop together online very often in the yard.

The following graphs, Fig. 12, 13, 14, 15 and 16 depict the extent to which couples were reported to jointly shop online using either two smartphones or the same computer, i.e. the two device setups that were reported to be the most used. Results are shown against the "Travel and Tourism" product category, which was reported to be the most frequently jointly shopped for online.

As Fig. 12 shows, couples which use separate smartphones for joint online shopping within the Travel and Tourism product category the most are those reported to very rarely do so being physically. As Fig. 13 shows, couples also use two smartphones the most for either collocated or physically separated joint online shopping of the same product category.

As depicted in Fig. 14, couples jointly shopping using the same computer to the greatest extent to shop for Travel and Tourism are those which shop for that product category very often but rarely do so being collocated. Moreover, Fig. 15 shows that couples jointly shopping using the same computer to the greatest extent to shop for Travel and Tourism are those which sometimes shop for that product category but very rarely jointly shop online at the same location from each other.

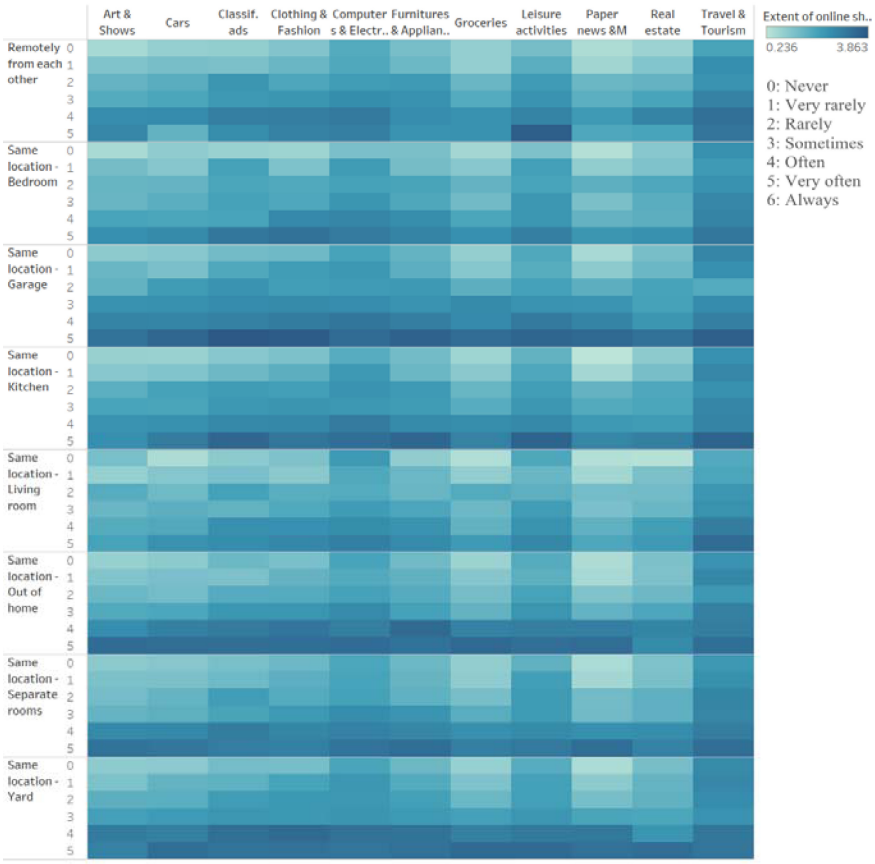
Regarding the use of two separate computers, Fig. 16 shows that the couples jointly shopping using separate computers to the greatest extent to shop for Travel and Tourism

are those which sometimes shop for that product category and very often jointly shop at remote locations from each other.

4 Discussions and Conclusion

4.1 Findings

The present paper presented detailed results on several perspectives showing the extent to which as well as settings in which couples jointly use online shopping platforms. It was observed that couples spend a significant amount of time jointly navigating on the internet, with 44.62% of couples spending 3 h/week, 28.21% spending more than 6 h/week, and 11.79% spending more than 10 h/week in this activity. These observations



Vertical axis: Extent to which couples jointly shop online using each device setup.
Horizontal axis: Product categories.

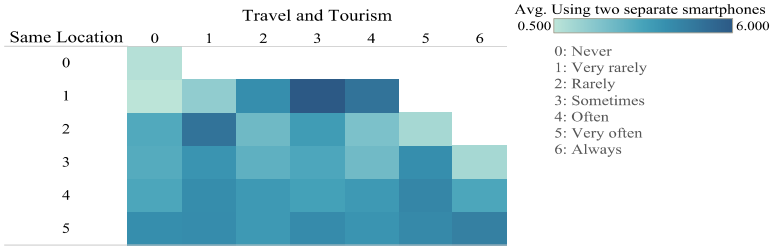
Fig. 11. Extent of joint shopping per product category and by location

suggest that an important proportion of couples consistently jointly use web applications, websites, or other web-based software, including online shopping platforms.

Results also suggest that couples shop together in different ways, using a variety of device setups. More couples were reported to jointly shop online using two smartphones separately (93.59%), using the same computer (92.05%) or using two separate computers (86.67%). However, aggregated data revealed that couples shop together online to the greatest extent using two separate smartphones, the same computer, or two separate computers, respectively.

Just as with device setup, couples use different ergonomic layouts to shop together online. The highest proportion of couples were reported to use same website window when using the same screen (93.33%), multiple website windows when using separate screens (87.69%), and same shared window within separate screens (78.72%), respectively. Besides, this same trend was observed with regard to the extent to which couples use each device layout. Hence, it was observed that couples jointly shop online more usually using the same shared window within the same screen.

Regarding the location relative to each other when shopping together online, results suggest that couples engage in the activity in a variety of location settings. They do so mostly at the same location from each other, and they mostly do so at home in the living room and in the bedroom. However, couples were generally reported to shop online together occasionally remotely from each other.

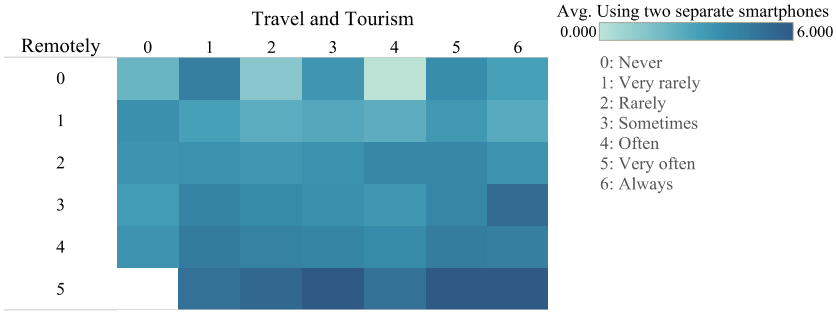


Vertical axis: Extent to which couples jointly shop online at the same location from each other.
Horizontal axis: Extent to which couples jointly shop online for travel and tourism.

Fig. 12. Extent of collocated joint shopping, using two separate smartphones, and by location, for Travel and Tourism

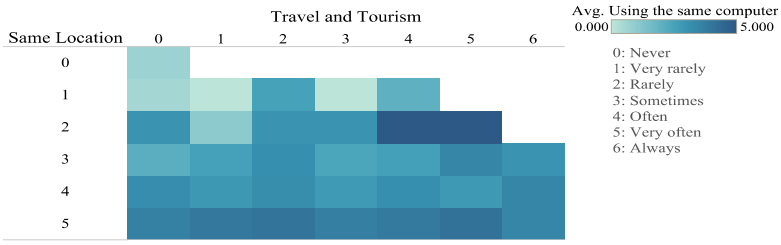
Regarding the types of online platforms (i.e., product categories) jointly used by couples, results revealed that they shop online in a greater proportion for Travel and Tourism, Furniture and Appliances, and Cars.

Finally, results reveal a statistically significant difference in behavior between men and women during couples' joint online shopping: men tend to keep control of the mouse and keyboard more than women.



Vertical axis: Extent to which couples jointly shop online at the same location from each other.
Horizontal axis: Extent to which couples jointly shop online for travel and tourism.

Fig. 13. Extent of physically remote joint shopping, using two separate smartphones, and by location, for Travel and Tourism.

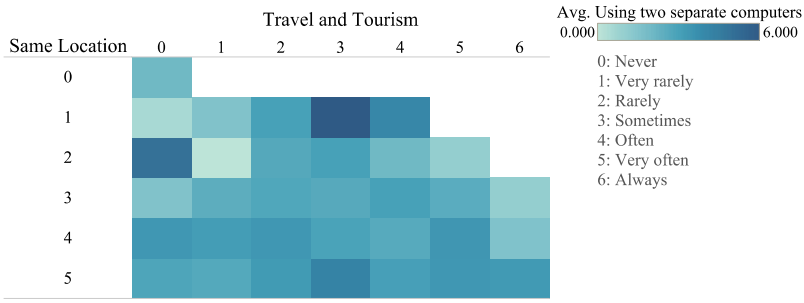


Vertical axis: Extent to which couples jointly shop online at the same location from each other.
Horizontal axis: Extent to which couples jointly shop online for travel and tourism.

Fig. 14. Extent of collocated joint shopping by couples, using the same computer, and by location for Travel and Tourism

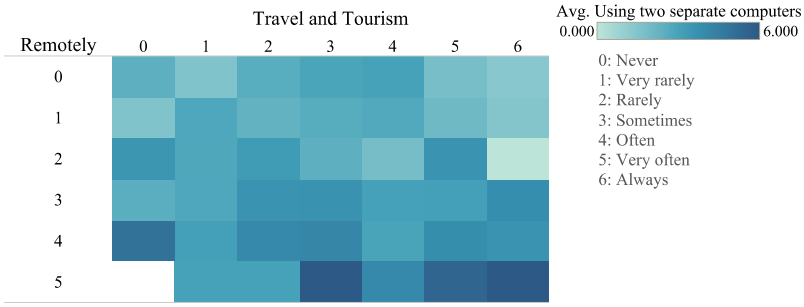
4.2 Implications and Conclusion

This paper aimed at contributing to contemporary research in the area of multiple users interacting together with a single shared system interface to perform a task. Based on a survey of 390 participants, preliminary results in the context of online shopping platforms offer support for this paper's premise in that that the phenomenon warrants deeper exploration. The study results provide straightforward answers to the research questions. Overall, it was observed that most couples jointly use online platforms to accomplish the shopping task together. Moreover, they do so in a wide variety of settings, generally to a significant (frequent) extent. These settings include variety of device setups, ergonomic layouts, physical locations relative to each other, and product categories. The main limitation of this study is that the questionnaire considers the different settings independently from one another. Future research could examine direct links, such as the extent of joint use of systems relative to specific combinations of settings.



Vertical axis: Extent to which couples jointly shop online at the same location from each other.
Horizontal axis: Extent to which couples jointly shop online for travel and tourism.

Fig. 15. Extent of collocated joint shopping, using two separate computers, and by location, for Travel and Tourism



Vertical axis: Extent to which couples jointly shop online remotely from each other.
Horizontal axis: Extent to which couples jointly shop online for travel and tourism.

Fig. 16. Extent of physically remote joint shopping, using two separate computers, and by location, for Travel and Tourism

This study's findings in the context of online shopping platforms pose a call for more research in multiuser human-computer interaction, which is currently lacking within the HCI literature. Hence, several avenues for research can be considered. First, research could propose theoretical frameworks, which may subsequently facilitate the development of research models to be tested. Such frameworks could associate relevant higher-order constructs into logical layers. Second, as with past HCI literature (e.g., [9]), mechanisms of joint use of shared interfaces can be investigated in terms of emotions, cognitions, and behaviors of groups of users. For instance, a working paper proposes a new index for measuring gaze convergence of a user dyad during their joint use of a system interface, and it demonstrates that gaze convergence of a user dyad jointly interacting with a system interface is negatively associated with dyad cognitive load and positively associated with dyad performance [11]. Third, antecedents and consequences

of these mechanisms can be examined. As an illustration, this study revealed that couples using a shared system interface during joint shopping, men tend to control the mouse to a significantly greater extent. Research could examine how the structure of a group of users jointly interacting with an interface shapes the emotional, cognitive, and behavioral dynamics during the task. Figuring out configurations through which groups of users perform optimally during the joint use of system interface may contribute to better system design, ultimately enabling collaborative innovation in organizations. Finally, research could investigate cross-level influences between individual and collective levels during multiuser system use, as per past recommendations about multilevel theorizing (e.g., [5, 8, 12, 13]).

Finally, this study also puts forth a call for practitioners to take into account whenever possible relevant multiuser interactions in various contexts. To illustrate, system designers should develop user scenarios involving multiple users for systems that are often jointly used by multiple users. An example emerging from this study is the design of online shopping platforms for travel and tourism. Likewise, marketers should consider possible influences from other users jointly using such online shopping platforms.

Appendix A: Pairwise Comparisons of Bar Charts' Levels

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Type of products	Clothing and Fashion	Furniture and Appliances	0.07	1
Type of products	Clothing and Fashion	Groceries	5.79	<.0001
Type of products	Clothing and Fashion	Travel and Tourism	−6.80	<.0001
Type of products	Clothing and Fashion	Classified Ads Websites	0.65	1
Type of products	Clothing and Fashion	Art and Shows	5.04	<.0001
Type of products	Clothing and Fashion	Cars	3.88	0.00
Type of products	Clothing and Fashion	Computers and Electronics	−3.15	0.03
Type of products	Clothing and Fashion	Leisure Activities	−1.43	1
Type of products	Clothing and Fashion	Paper News and Magazines	7.75	<.0001
Type of products	Clothing and Fashion	Real Estate	4.01	0.00
Type of products	Furniture and Appliances	Groceries	5.72	<.0001

(*continued*)

(*continued*)

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Type of products	Furniture and Appliances	Travel and Tourism	−6.87	<.0001
Type of products	Furniture and Appliances	Classified Ads Websites	0.58	1
Type of products	Furniture and Appliances	Art and Shows	4.97	<.0001
Type of products	Furniture and Appliances	Cars	3.81	0.00
Type of products	Furniture and Appliances	Computers and Electronics	−3.23	0.02
Type of products	Furniture and Appliances	Leisure Activities	−1.50	1
Type of products	Furniture and Appliances	Paper News and Magazines	7.67	<.0001
Type of products	Furniture and Appliances	Real Estate	3.93	0.00
Type of products	Groceries	Travel and Tourism	−12.59	<.0001
Type of products	Groceries	Classified Ads Websites	−5.14	<.0001
Type of products	Groceries	Art and Shows	−0.75	1
Type of products	Groceries	Cars	−1.91	0.67
Type of products	Groceries	Computers and Electronics	−8.94	<.0001
Type of products	Groceries	Leisure Activities	−7.22	<.0001
Type of products	Groceries	Paper News and Magazines	1.96	0.66
Type of products	Groceries	Real Estate	−1.78	0.82
Type of products	Travel and Tourism	Classified Ads Websites	7.45	<.0001
Type of products	Travel and Tourism	Art and Shows	11.84	<.0001
Type of products	Travel and Tourism	Cars	10.68	<.0001
Type of products	Travel and Tourism	Computers and Electronics	3.65	0.01
Type of products	Travel and Tourism	Leisure Activities	5.37	<.0001
Type of products	Travel and Tourism	Paper News and Magazines	14.55	<.0001
Type of products	Travel and Tourism	Real Estate	10.81	<.0001

(*continued*)

(*continued*)

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Type of products	Classified Ads Websites	Art and Shows	4.39	0.00
Type of products	Classified Ads Websites	Cars	3.23	0.02
Type of products	Classified Ads Websites	Computers and Electronics	−3.80	0.00
Type of products	Classified Ads Websites	Leisure Activities	−2.08	0.52
Type of products	Classified Ads Websites	Paper News and Magazines	7.09	<.0001
Type of products	Classified Ads Websites	Real Estate	3.36	0.02
Type of products	Art and Shows	Cars	−1.16	1
Type of products	Art and Shows	Computers and Electronics	−8.19	<.0001
Type of products	Art and Shows	Leisure Activities	−6.47	<.0001
Type of products	Art and Shows	Paper News and Magazines	2.70	0.10
Type of products	Art and Shows	Real Estate	−1.03	1
Type of products	Cars	Computers and Electronics	−7.03	<.0001
Type of products	Cars	Leisure Activities	−5.31	<.0001
Type of products	Cars	Paper News and Magazines	3.87	0.00
Type of products	Cars	Real Estate	0.13	1
Type of products	Computers and Electronics	Leisure Activities	1.72	0.85
Type of products	Computers and Electronics	Paper News and Magazines	10.90	<.0001
Type of products	Computers and Electronics	Real Estate	7.16	<.0001
Type of products	Leisure Activities	Paper News and Magazines	9.18	<.0001
Type of products	Leisure Activities	Real Estate	5.44	<.0001
Type of products	Paper News and Magazines	Real Estate	−3.74	0.00
Device	Using one computer	Using two separate computers	1.82	0.11
Device	Using one computer	Using one tablet	9.02	<.0001

(*continued*)

(*continued*)

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Device	Using one computer	Using two separate tablets	10.96	<.0001
Device	Using one computer	Using one smartphone	6.59	<.0001
Device	Using one computer	Using two separate smartphones	−3.85	0.00
Device	Using two separate computers	Using one tablet	7.20	<.0001
Device	Using two separate computers	Using two separate tablets	9.13	<.0001
Device	Using two separate computers	Using one smartphone	4.77	<.0001
Device	Using two separate computers	Using two separate smartphones	−5.68	<.0001
Device	Using one tablet	Using two separate tablets	1.94	0.11
Device	Using one tablet	Using one smartphone	−2.43	0.05
Device	Using one tablet	Using two separate smartphones	−12.87	<.0001
Device	Using two separate tablets	Using one smartphone	−4.37	<.0001
Device	Using two separate tablets	Using two separate smartphones	−14.81	<.0001
Device	Using one smartphone	Using two separate smartphones	−10.44	<.0001
Location	Remotely from each other	Same location - Bedroom	−7.30	<.0001
Location	Remotely from each other	Same location - Living room	−11.70	<.0001
Location	Remotely from each other	Same location - Kitchen	1.22	0.89
Location	Remotely from each other	Same location - Yard	6.97	<.0001
Location	Remotely from each other	Same location - Garage	9.29	<.0001
Location	Remotely from each other	Same location - Separate rooms	0.21	1
Location	Remotely from each other	Same location - Out of home	1.83	0.40

(*continued*)

(*continued*)

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Location	Same location - Bedroom	Same location - Living room	−4.40	<.0001
Location	Same location - Bedroom	Same location - Kitchen	8.53	<.0001
Location	Same location - Bedroom	Same location - Yard	14.27	<.0001
Location	Same location - Bedroom	Same location - Garage	16.59	<.0001
Location	Same location - Bedroom	Same location - Separate rooms	7.52	<.0001
Location	Same location - Bedroom	Same location - Out of home	9.14	<.0001
Location	Same location - Living room	Same location - Kitchen	12.93	<.0001
Location	Same location - Living room	Same location - Yard	18.67	<.0001
Location	Same location - Living room	Same location - Garage	20.99	<.0001
Location	Same location - Living room	Same location - Separate rooms	11.92	<.0001
Location	Same location - Living room	Same location - Out of home	13.54	<.0001
Location	Same location - Kitchen	Same location - Yard	5.75	<.0001
Location	Same location - Kitchen	Same location - Garage	8.07	<.0001
Location	Same location - Kitchen	Same location - Separate rooms	−1.01	0.94
Location	Same location - Kitchen	Same location - Out of home	0.61	1
Location	Same location - Yard	Same location - Garage	2.32	0.14
Location	Same location - Yard	Same location - Separate rooms	−6.75	<.0001
Location	Same location - Yard	Same location - Out of home	−5.13	<.0001
Location	Same location - Garage	Same location - Separate rooms	−9.08	<.0001
Location	Same location - Garage	Same location - Out of home	−7.46	<.0001

(*continued*)

(*continued*)

Dependent variable	Level 1	Level 2	t value	Adjusted p-value
Location	Same location - Separate rooms	Same location - Out of home	1.62	0.53
Screen layout	Same screen - Same website window	Same screen - Multiple website windows open	10.85	<.0001
Screen layout	Same screen - Same website window	Separate screens - Same shared website window	7.95	<.0001
Screen layout	Same screen - Same window	Separate screens - Multiple website window	2.37	0.02
Screen layout	Same screen - Multiple website windows open	Separate screens - Same shared website window	−2.90	0.01
Screen layout	Same screen - Multiple website windows open	Separate screens - Multiple website windows	−8.48	<.0001
Screen layout	Separate screens - Same shared website window	Separate screens - Multiple website windows	−5.58	<.0001
Mouse usage	Men	Women	4.86	<.0001

References

1. Berrada, M.A.: Trois essais sur l'influence relative et les stratégies de résolution de conflit lors d'une prise de décision d'achat en ligne en couple. Dissertation/thesis. H.E.C. Montréal (2011). c2011 U6 - ctx_ver = Z39.88-2004&ctx_enc = info%3Aofi%2Fenc%3AUTF-8&rfr_id = info%3Asid%2Fsummon.serialssolutions.com&rft_val_fmt = info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre = dissertation&rft.title = Trois + essais + sur + l%27influence + relative + et + les + strat%C3%A9gies + de + r%C3%A9solution + de + conflit + lors + d%27une + prise + de + d%C3%A9cision + d%27achat + en + ligne + en + couple&rft.DBID = T5A&rft.au = Mekki + Berrada%2C + Abdelouahab&rft.externalDocID = 303785&paramdict = en-US U7 - Dissertation
2. Yue, Y., Ma, X., Jiang, Z.: Share your view: impact of co-navigation support and status composition in collaborative online shopping, pp. 3299–3308
3. Zhu, L., Benbasat, I., Jiang, Z.: Investigating the role of presence in collaborative online shopping. In: AMCIS 2006 Proceedings, vol. 358 (2006)
4. al., B.e.: Ecommerce in Canada 2018. eMarketer, New York (2018)
5. Burton-Jones, A., Gallivan, M.J.: Toward a deeper understanding of system usage in organizations: a multilevel perspective. MIS Q. **31**, 657–679 (2007)
6. Dennis, A.R., Wixom, B.H., Vandenberg, R.J.: Understanding fit and appropriation effects in group support systems via meta-analysis. MIS Q. **25**, 167–193 (2001)

7. Doll, W.J., Deng, X.: The collaborative use of information technology: end-user participation and systems success. Inf. Resour. Manag. J. (IRMJ) **14**, 6–16 (2001)
8. Markus, M.L., Rowe, F.: Is IT changing the world? Conceptions of causality for information systems theorizing. MIS Q. **42**, 1255–1280 (2018)
9. de Guinea, A.O., Webster, J.: An investigation of information systems use patterns: technological events as triggers, the effect of time, and consequences for performance. MIS Q. **37**, 1165–1188 (2013)
10. Robinson, J., Rosenzweig, C., Moss, A.J., Litman, L.: Tapped out or barely tapped? Recommendations for how to harness the vast and largely unused potential of the mechanical turk participant pool. PLoS ONE **14**, e0226394 (2019)
11. Tchanou, A.Q., Léger, P.-M., Boasen, J., Senecal, S., Taher, J.A., Fredette, M.: Collaborative use of a shared system interface: the role of user gaze – gaze convergence index based on synchronous dual-eyetracking. Appl. Sci. **10**(13), 4508 (2020)
12. Zhang, M., Gable, G.G.: A systematic framework for multilevel theorizing in information systems research. Inf. Syst. Res. **28**, 203–224 (2017)
13. Burton-Jones, A., Straub Jr., D.W.: Reconceptualizing system usage: an approach and empirical test. Inf. Syst. Res. **17**, 228–246 (2006)