

WHERE'S THE PHONE? A STUDY OF MOBILE PHONE LOCATION IN PUBLIC SPACES

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ABSTRACT

This paper presents the approach and the outcome of a study, called Where's-the-phone to identify characteristics of how mobile phones are carried whilst users are out and about in public spaces. A series of contextual interviews were conducted in public spaces of Helsinki, Milan and New York collecting 419 responses in total. The results show a strong tendency by gender, with females using bags and males using trouser pockets to place their mobile phones. Comments from participants suggested users did not place the phone wherever available, but rather considered many aspects, such as the convenience, tolerance to multiple postures, risk of theft, comfort, or impact to their appearance. We learnt that bag users miss incoming alerts more often than with other carrying methods. Based on the outcome of the study, we discuss the challenges in designing mobile devices, in particular mobile phones.

Keywords

Mobile context, handheld computing, mobile phone, contextual interview, device location

INTRODUCTION

Handhelds and wearable computers are, as Gorlenko and Merrick described, “fully mobile wirelessly connected (FMWC)” computing devices [6]. The name suggests how much such devices allow users to stay connected as much as form factor and input/output mechanisms being optimized for mobile contexts. Currently most mobile phone products can be classified as handhelds; wearable phones have been released in several markets, yet as of today, they remain experimental or conceptual.

Whilst these wearable and handheld devices share similar capabilities, there is a significant difference between the two. When user is on the move, wearables can be attached to the user's clothes and body whereas handhelds have a greater tendency to roam – they are placed on table surfaces, are passed from hand to hand amongst peer groups, or even docked to car kits. As a consequence, there is a greater need for users to explicitly remember to carry them from place to place.

The difference brings more uncertainty in designing handhelds than to wearables. First of all, unlike wearable that are “worn close to the user's sensors (eyes and ears) and actuators (hands and mouth)” [6], the form factor does not dictate to the user where the device should be kept while it is not in use for voice calling and messaging. This leads to the second issue, that user might simply keep the device wherever is available defined by other carrying items such as keys and wallets, which might limit frequent usage expected in emerging applications such as instant messaging chat, push to talk, or music players. And thirdly, depending on where user places the device, effective design of the product and applications can change. For example, what is the optimal orientation of the display? Are the phone output requirements such as strength of vibration, tone, pitch and volume of ring tone, be the same if the phone is carried in the pocket or in bags? The paper reports our approach to these questions and findings by conducting the study.

Previous Research

Despite its complexity and range of factors that can affect the results, many researchers have attempted to capture context and context-aware computing [3-4, 7]. It is particularly noteworthy that Dey, Abowd, and Salber defined elements in context as “any information that can be used to characterize the situation of entities (i.e., whether a person, place, or object) that are considered relevant to the interaction between a user and an application, including the user and the application themselves” [3]. Empirical research has captured context, by studying users carrying out certain tasks indoors, or if outdoors, many in mobile work context [1]. We found this approach too specific for our purpose, since mobile phones can be carried by almost anyone in a great range of contexts – from when people get up in the morning (woken by the phone alarm clock application) to the last thing at night and pretty much all contexts in between [2].

Market analysts forecast that by the end of 2005, there would be around 1.6 to 2 billion mobile subscribers [9, 13], approximately a quarter of the world population. Whilst mobile phones were initially sold as an expensive business-oriented tool, it is now used by all stratum of society. As the adoption of mobile phone technology and the range of usage expand, it becomes increasingly difficult to create task-driven studies, since the range of tasks is also increasing. For instance, short messages are used by teenagers for gossips and homework help [8]; farmers and fishermen are reported to use mobile phones to call “several markets and work out where they can get the best price for their

produce” [5], some even fake their phone talk to create their private space in public [11]. Instead of focusing on tasks that we already know as a fragment of all activities, we set our focus to general context situated in their everyday lives. One referable approach is Tamminen et al, observing 25 urbanites in public or semi-public space [16]. The approach not only identified social and psychological constraints, but also pictured constant manipulation challenges subjects faced. Our study also falls under this approach, however, with more emphasis on repeatable methods and greater quantity. The next section describes our approach in more detail.

Purpose of This Study

We named the study as Where’s-The-Phone, and set following as primary objectives:

- Identify where people keep their phones when they are in mobile context.
- Find out if there are specific profiles of the user, such as gender, city of residence, or age that are tied to the phone location.
- Verify if there is any influence of the phone location to the user or their perception on phone interaction.

We identified following as core research questions of this study:

1. How does user carry the phone while they are out and about?
2. Why did user choose to place the phone in the current location? Is this the usual location?
3. What alert type (i.e. vibration, ring tones, display backlight) do they use?
4. Does the user feel that the selected location of the phone draws appropriate attention to incoming calls and messages?
5. What factors influence the user to define the phone location?

The following section describes how we tried to answer these questions in this study.

METHOD

Our Approach

The biggest challenge was whether we could identify tendency of any kind. Individual factors such as clothing and what else is carried can easily affect the location of the phone. This in turn can be influenced by factors such as user context, weather and temperature conditions, time of day and tasks carried out by the user

prior to, during and after they are in contact with the research team. A certain quantity of users needed to be observed and interviewed to reduce these effects; to make sure that we will not be biased by setup of a small group of users; we decided to adopt a quantitative approach. Typically a Nokia User Experience Research Team ran in-depth qualitative research ran the Where’s-the-Phone studies in parallel. This approach enabled us to effectively manage and assure the ongoing quality of the data collected and gave researchers an opportunity to cross-reference data and probe additional material.

Self-administered survey was also considered but we felt the method is inappropriate, as the outcome would strongly depend on user’s subjective views [12]. In the end, we decided to run a contextual interview but with a fixed set of questions. Researchers went out to public spaces such as streets and parks to address these questions. We hoped to obtain a good number of responses in a relatively short time period, of real users in real contexts. In the event a pair of data collectors could collect approximately ten responses during one-hour working period.

Another concern was how much the result could be applied to other geographical/cultural areas. As with any field research, there is a risk that findings are bound to certain time and location. In order to increase the possibility of this study to be iterated under different conditions with or without same research team involved, we developed a one-page recording sheet a researcher filled in for each participant. For “Where’s The Phone?” question, the question text was followed by a classification of possible phone locations so interviewer can quickly fill in the answers. Locations were:

- Lower-body pockets: Skirt pockets (front, back), trousers pockets (front, back, thigh).
- Upper-body pockets: shirt pockets (chest, side), jacket pockets (chest in/out, side).
- Bags: Shoulder bags, cross-body bags, brief case, backpacks
- Belt enhancements: Belt bags, belt clips, fanny packs.
- Strap usage.
- Not with person.

For pockets, we also recorded the laterality (was the used pocket on right or left-hand side). In case there was no match in these categories, data collectors marked as other, followed by description of the location.

By clarifying the characteristics of the location type, such as size, possible carrying style, and the physical distance between the location and user’s senses (audio, visual, and tactile), we aimed to capture its effect on user’s perception on incoming alert like phone calls. For instance, we assumed that a ringing tone of a mobile phone is more likely to be missed if kept in a briefcase than attached to the belt

case as it hinders any phone information to reach user’s senses (TABLE 1).

TABLE 1 - Example of possible phone locations and its effect to user interaction

				
	Shoulder bags	Briefcase	Trousers Front Pocket	Belt bag
Phone				
Physical contact	Some	None	Good	Good
Visibility	No*	None	Some	Some
Audibility	Possibly Poor	Poor	Good	Good
Tactility	Possibly Poor	Poor	Good	Good

*Bags sometimes left open, but increases risk of theft.

The initial sheet only contained text. Later images were added for bags and phone enhancements so our classification can be consistent between researchers. The improvement was found useful as we expanded the study to multicultural settings, as thanks to images, we were able to avoid the confusion caused by the localization of these sheets. So far there were three languages used in the study (Finnish, English, and Italian), and in some languages, there was some ambiguity between items we listed, i.e., purse and a general bag. The use of images and text helped the disparate research teams to reach a common understanding of each classification, and to discuss items that did not fall within this classification. This has proved useful since different research team members have collected data in four locations over a two-year period.

To compliment the questionnaire, photographic data was also collected. The photographer was instructed to take photos of the user, the user’s phone and the phone location(s) (Figure 1). Permission was sought prior to taking the photos. The objective of this recording was that we always had a data that we can go back to see if there were any factors we have missed. Addition to the defined areas, the indexed recording sheet also became the target of photography so the photographs taken from the particular user can be easily spotted while browsing through the photos (Figure 2).



Figure 1 - Example of captured images during the survey: user, phone location, and phone.

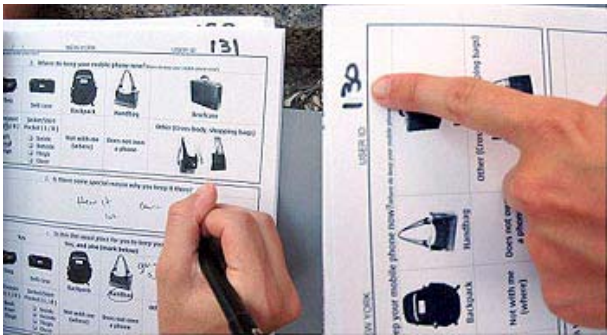


Figure 2 - Using the recording sheet.

TABLE 2 - Participants Gender & Location

	Male	Female	Total
Helsinki	20% (84)	18% (75)	38% (159)
Milan	13% (56)	13% (54)	26% (110)
New York	20% (85)	16% (65)	36% (150)
Total	54% (225)	46% (194)	100% (419)

Team Preparation. Research teams went out with some means of identification (T-shirts, badges). As the study consisted of an interview and photography, two researchers formed a team to approach each participant. The language used for the interview was Finnish, Italian and EnglishThere was a small gift of 1-2 euro worth compensation in Helsinki and no reward at all in Milan and New York. Each interview took approximately five to ten minutes. The outcome of the interview was transcribed onto the paper and later placed into a common spreadsheet.

Participants. Participants were collected in Helsinki, Milan, New York. Participants were recruited in parks, streets, and railway stations – places where we felt people would be open to being approached by researchers. For this reason busy areas were excluded from this study. All studies were conducted during the summer months, whilst the temperature was between 20 and 30 degrees.

Due to the season and locations, most of our respondents did not appear to adhere to a strict dress codes; the majority

wore casual clothes such as jeans and T-shirts, and some exception of business suits and high school uniforms.

FINDINGS

Phone Location Overview

Data was collected from a total of 419 participants from three cities. This covered 225 males and 194 females, and in the main respondents were in their 20s (192 respondents), followed by 30-50s (110), below 20s (67), and over 50s (48). Overall, the most popular phone location was trousers pockets (34%), followed closely by shoulder bags (33%). These two locations were dominant, as they occupied 67% of all responses. Following shoulder bags were bag enhancements (8%) and backpacks (8%).

Phone Location by City. Figure 3 shows where users kept their phones in observed cities. Trousers pockets and shoulder bags were primary locations used in every city. Among them, Helsinki had relatively diverse location used, with lower ratio of trousers pocket and certain amount of users found in other locations such as belts and backpacks.

One aspect we can think of is the different population and accessibility in observed cities. Helsinki metropolitan area has population of 1.2 million, while New York City with 9 million, and Milan 4.5 million. Only in Helsinki did we observe a few mothers with large baby carts, using the pocket or the rack of the cart to carry their belongings, essentially detaching these normally carried items from their body.

Another aspect may be different trends and acceptance in the way people dress in these cities. In this study we did not ask participants in this area and we cannot conclude if it affected their phone location.

Is this the usual location of the phone? We also asked if participants usually carry the phone in the same location. 93% (388) participants answered they typically use the current location. The fact that majority using the consistent location suggests that they may not have many options to do store particularly in summer when the study took place. The rest, 7% (N=31) of all participants mentioned reasons why the location being changed at the specific time we observed:

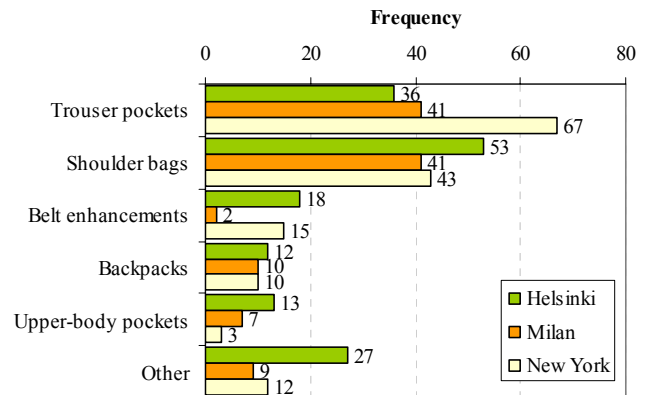


Figure 3 – Phone location by each city.

- Different clothing. Some participants had different clothing on that day, thus usual location was not available.
- Expecting a phone call. Participants placed the phone in trousers' front pocket instead of their bags so they could hear the alerts and access the phone quickly.
- Wanting to spend quality without the possible intrusion of incoming communication, and in addition not expecting important incoming communication. In Helsinki and in Milan, we encountered participants who did not carry the phone. As they described:

"I left the phone since I don't want to be disturbed while at my break from office hours" – Male in 30s, Milan

"Because I went to the Church" – Female in 50s, Milan

The behaviour of consciously not carrying the mobile phone for a pre-defined task is consistent with other internal Nokia studies [2]. However because this topic was not the focus of this research further discussion will be kept for a following study.

First comments imply that by changing the clothing, which is due to climate and occasion, participants had to change the location of the phone. This shows the significance of our study to take place in different season, such as in winter, where people would have more clothes and most likely pockets to choose from. Other comments are also important, as participants told us that they change the location of the phone, depending on the expectation, will or appropriateness of phone interaction in context. This shows that phone still needs an improvement in its form factors and its interaction design; accurate alert to notify users of incoming and easy access to allow users to respond promptly seemed not yet achieved in current phones.

Phone Location and Gender. When we looked at phone location by gender (TABLE 3), we found trousers pockets occupied 57% of male participants while shoulder bags 66%

of female. Belt enhancements (such as belt clips and holders), bag packs, and upper-body pockets followed these two locations, but with much fewer proportions. Apart from backpack users, top four locations were gender-dependent. A binominal test (one-tailed) for the difference between two population proportions show that there were significantly more male participants than female for trousers pockets ($z=-10.453$, $p<.01$), belt enhancements ($z=-5.030$, $p<.01$), and upper-body pockets ($z=-3.290$, $p<.01$), while more female participants used shoulder bags ($z=13.485$, $p<.01$).

Difference became more salient when we looked at reasons why users decided to keep the phone in the current location (Figure 4). For people who had phones in trousers pockets, benefit of keeping the phone was related to allocating the phone and interacting with it quickly (35%) – Participants mentioned ease of access (17%), sense of presence (9%), or whether location makes incoming audible (5%) and tangible feedback (3%). On the other hand, almost 50% of shoulder bag users mentioned the availability – they either mentioned that there's no other place (14%), bag always carried with them (13%), their clothing not having pockets (11%), or phone does not fit elsewhere (7%).

TABLE 3 -Phone Location & Gender

Location Type	Female		Male		Grand Total
Trouser pockets	8%	(16)	57%	(128)	34% (144)
Shoulder bags	66%	(128)	4%	(9)	33% (137)
Belt enhancements	1%	(2)	15%	(33)	8% (35)
Backpacks	10%	(19)	6%	(13)	8% (32)
Upper-body pockets	2%	(3)	9%	(20)	5% (23)
Not with the person	4%	(7)	6%	(13)	5% (20)
Cross-body	4%	(8)	2%	(5)	3% (13)
Other	4%	(7)	1%	(3)	2% (10)
Do not own phone	2%	(4)	0%	(1)	1% (5)
Grand Total	100%	(194)	100%	(225)	100% (419)

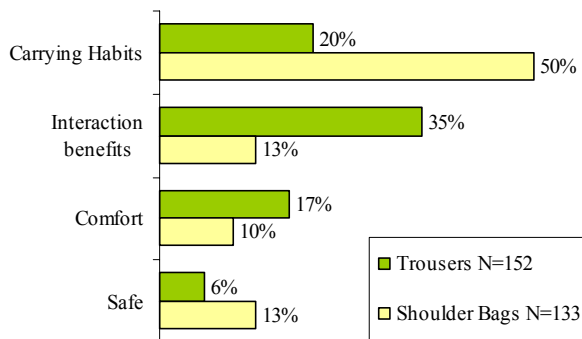


Figure 4 Primary reasons for location by trousers pocket users and shoulder bag users

The fact that each phone location has significant bias to gender is interesting. The reason behind the selection of phone location can be physical and/or psychological. Physical constraints can be the clothing and styles to carry their belongings, which greatly differ by gender. Psychological constraints may be caused by habits or what society perceives as appropriate for man/woman to dress. As some participants described:

“Women don't want to keep phones in pocket. Phone is too heavy.” – female respondent in 30s, Helsinki

“Because we men do not go around with a handbag.” – male respondent in 30s, Milan

Comments show the psychological factor affecting the phone location. Not only participants of different gender had different space available, but also they had certain ideas how they should dress and carry phones. This shows that there are potentially very different needs in mobile device product design by gender. Additionally, it is very important that these studies be iterated in multiple cultural settings. The perception of how each gender should dress may be determined by different cultural background, and this would certainly have impact on where the phone would be finally placed in mobile context. This will be the focus of follow up studies.

Phone location by age group. Another aspect of participants we assumed to have impact on phone location was their age. TABLE 4 shows the phone locations separated by age group. Majority of participants below 30s used two primary locations, while over 30s had more diversity using belt enhancements and upper-body pockets. This has been affirmed by chi-square test, as we saw these two groups significantly differ in terms of used phone locations ($\chi^2(5, N = 418) = 52.503, p < .01$).

TABLE 4 – Phone location by age group

Location	Below 30		30 and over		Grand Total
Trousers pockets	40%	(105)	25%	(39)	34% (144)
Shoulder bags	35%	(92)	28%	(45)	33% (137)
Other Bags	13%	(34)	8%	(13)	11% (47)
Belt enhancements	5%	(13)	14%	(22)	8% (35)
Other	5%	(14)	11%	(18)	8% (32)
Upper-body pockets	1%	(2)	13%	(21)	6% (23)
Grand Total	100%	(260)	100%	(158)	100% (418)

Pocket Usage. Pocket usage was recorded together with further details, such as clothes type (trousers, skirts, shirts, or jackets), and pocket location (front or back, left-hand or right-hand side). TABLE 5 shows the pocket details in particular.

TABLE 5 - Pocket Locations And Laterality

Pocket Location		Right		Left		Total	
Trousers	Front	42%	(61)	32%	(47)	74%	(108)
	Thigh	5%	(7)	4%	(6)	9%	(13)
	Back	3%	(4)	3%	(5)	6%	(9)
Jacket	Chest out	3%	(5)	1%	(2)	5%	(7)
	Chest in	1%	(1)	1%	(2)	2%	(3)
	Side	1%	(1)	1%	(1)	1%	(2)
Shirt	Chest	1%	(1)	1%	(2)	2%	(3)
Skirt	Front	0%		1%	(1)	1%	(1)
Total		55%	(80)	45%	(66)	100%	(146)

74% of total pockets users utilized trousers front pockets, followed by other trousers pockets. Due to observed locations and warm climate, many participants wore casual and light clothing, which presumably limited the number of pockets to begin with. Yet in many cases, trousers had pockets in multiple locations, mostly on both front and back. It is interesting to think that why majority have still chosen front pockets in particular, as front pockets can be more distorted than ones on the back. Participants' comments indicate several reasons:

“(Phone) falls out if in shirt pockets” – Male in 50s, NY

“Better than placing it in the back pocket where it will be crushed when sitting” – Male in 20s, NY

“I broke the screen keeping it in my back pocket” – Male in 20s, Milan

The comments imply that mere capacity of the location is not enough to keep the phone. Based on their experience with shirt pockets and back pockets, participants felt pocket needs to have certain tightness so it will not drop by accident. Front trousers pockets may not be the most comforting but an only place that allows users to keep phones without being concerned of losing or breaking them.

For laterality of pockets, 55% carried their phone on their right-hand side, and 45% carried on left-hand side. This contrasts with hand laterality of entire population, reported to be 72% right-handed, 5% left-handed, and 22% using both [15]. This raises an interesting question that we currently do not have an answer for. We need to consider that perhaps the mobile phone population might be less right-hand dominant. This is possible, as tasks like handling phone calls are not as precise as tasks like writing with pen and paper, and therefore do not require the user to use their dominant hand. Also, users who need to carry out tasks such as taking notes while calling might even prefer to operate their phone with their less dominant hand.

Another aspect can be the effect of carrying items, which can also be seen from participants' comments:

“Key ring is on the right pocket and I don't want to scratch the phone by placing it in a same pocket.” - Male, 20s, Helsinki

“I have my wallet on the (trousers) left pocket and have phone in right pocket to answer with right hand.” - Male, 20s, Helsinki

“I have cigarettes in trousers' back pocket and have my phone in my right front pocket. Left pocket is for sticking in my left hand.” - Male, 20s, Helsinki

The location of the phone seems to be set by both planned and unplanned placement of objects. Objects can be daily carried items such as keys, wallets, cigarettes, or in some cases even a hand tucked in pocket for comfort. Mobile phones and these items seem to affect each other particularly for men who seem to utilize their trousers pockets. If phone interaction is prioritized, users may place the phone on the same side as the dominant hand used for its interaction. If other items occupy the dominant side, users would compromise the interaction and place it on the other side. In such cases, we can say that users chose the phone location rather passively instead of creating a smooth flow in device interaction.

Belt Enhancements. Many phones sold today can be used with accessories that allow users alternative methods of carrying. For instance, a strap can be attached via a small hole position on the corners or edges of the device. The design allows user to personalize or to carry the device. Other enhancements are belt clips and holders, which can be attached to their belts to create a dedicate space for the phone.

The study showed that these enhancements ranked a distant third after shoulder bags and pockets. Belt clips and holders were found to be primarily for male participants over 30s. For strap usage, we found out that there were even fewer (8) strap users.

Despite its moderate popularity, participants of belt enhancements appeared more content than of shoulder bags or trousers pockets.

“It is comfortable to carry it there.” – Male, 30s, Helsinki

“It has to be there because I don't feel the vibration from my bag.” – Male, 20s, New York

“This way it doesn't fall when I bend over.” – Male, 30s, Milan

“When I'm on move it's easily available both indoors and outdoors. It doesn't matter whether I have my jacket or not.” – Male, 30s, Helsinki

It seems belt enhancement overcame a number of problems associated with other methods. Users expressed the location being comfortable, secure, and tolerant to postures and changes of clothing occurring in their daily lives. To bring advantages of belt enhancements to wider audience, perhaps enhancement should be replaced by something that is more

integrated to the device. For instance, an integrated clip or a chain that can be attached to the pocket might be a good enhancement to reduce concerns mentioned by pocket users.

Used and Noticed Alerts

Most mobile phones are capable of audio, tactile, and visual output. In case of incoming calls and messages, users can be alerted by ring tones (audio), vibration (tactile), and information on the display (visual).

In reality, particularly in mobile context where users have other tasks, it is unlikely that phones are in such an optimum state where all these output are able to reach the user. Users are likely to be engaged in other tasks and attention would not necessarily be directed to the phone. Additionally, the context may include external noise and vibration e.g. travelling on a bus, which can prevent the alert from effectively working. Taking this into account, we asked the participant for their perception if their phone managed to alert them effectively. Note that this was a subjective evaluation, and may be somewhat different from reality.

Among 419 participants, 94% - 392 participants – had vibration capability in their phones. Among them, 70% told us they have the vibration on. However, when we look at the proportion of users who felt that their perception of alert effectiveness, we could not see any difference (TABLE 6). Indeed, a binominal test for the difference between vibra users and non-vibra users show there was no significant difference in participants' perception on noticing incoming alert ($z=0.1896$, $p<.01$). This is interesting, as we initially expected that in case vibration feedback could reinforce the detection of incoming alerts. The result shows that in fact that is not the case.

TABLE 6 – “Do you always notice incoming alerts?”

	Yes	No/Not always	Total
Alert with Vibra*	68%	33%	100%
Alert without Vibra**	64%	36%	100%

* = alerts user with audio, visual, and tactile output of the phone; ** = alerts user with audio and visual.

We also investigated how is the perception of alert by phone location (Figure 5). As the figure shows, for participants using pockets and belt enhancements, roughly 70% mentioned that the incoming alert works fine; on the other hand, for bag users, only 46% felt incoming alert is successful.

This outcome is very much aligned to participants' comments about the location. Pockets and belt enhancements allow the phone's speaker to be somewhat exposed to the air, making it more likely that

the user will notice the audio alert. Additionally, despite layers of clothes, and possibly a belt between the user and the phone, the proximity to the user may be sufficient for vibration to reinforce the alert. Bags are ineffective to transmit incoming communication, particularly if they are carried away from user's body and phones are placed deep inside. Given that bags one of the primary phone locations, user interfaces optimized for bag location is worth consideration.

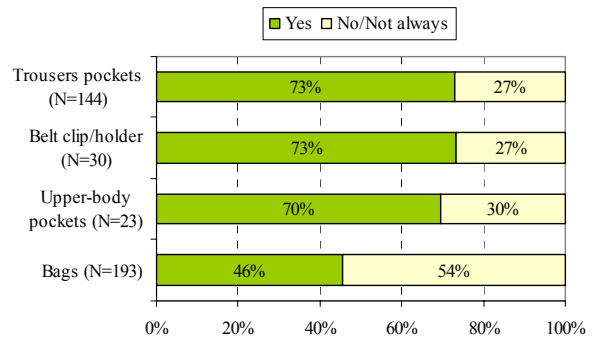


Figure 5 – Perception of alert effectiveness by phone location.

DISCUSSION

This study set out to answer a very simple question – where do people carry their mobile phone? With intensive competition, and product segmentation in the industry, mobile phones now come in a variety of shapes, colours, and sizes. The discussion of the appearance of the mobile phone has often been centred on the aesthetics and ergonomics of active use. However, as life goes digital, the mobile phone is more capable of being a tool for delivering notification information – not just notification of incoming communication, but in principle also when a file download has completed, how long until your laundry is ready, or how many steps you have walked that day. In this situation the mobile phone constantly supplies status information so it makes sense to understand where the device is when it is not in use.

Through observation of 419 urban residents, we found out that most male participants carried their phones in trousers front pocket and female participants in their shoulder bags. High penetration of front pocket, which can be tight and uncomfortable, shows that a mere capacity of the location is not enough to influence where users should keep their phone. A high concentration of males over 30 used belt clips, which we interpret to be because of the relative importance of convenience and security (risk of theft of the device) over appearance.

Findings from this study pose and number of product design challenges: For instance, if the phone remains its form factor

and provides a music player feature with headset, will the user be able to embrace the feature smoothly? Will current walkie-talkie users replace the device with the phone if such a feature exists i.e. push-to-talk? Or simply how can phone notify the user for incoming calls or messages effectively even the phone is in the bag?

Additionally, the study also gave us some directions we could exploit for coming technologies such as flexible displays. In many aspects, current design of mobile phones is limited by the hard components. Once flexible displays being available, we know how should it be designed and placed so that the user will feel more comfortable when carrying the device.

In terms of the methodology, we found the in-context, survey approach practical. The study was conducted in parallel with other user research that took place in reported cities. Where's-the-phone study questionnaire and photographic data helped shape the questions we asked during this parallel research. Photographs were particularly useful for two reasons: Firstly, images allowed us to revisit participants when new assumptions about our data emerged. For instance, photos revealed additional data such as the number of phones with and without straps and what percentage of users has protective covers on their mobile phone. Secondly, designers like to see photos of real people and their phones - and this data is packaged up and distributed internally as a digital picture book.

In the end, we felt the method worked surprising well. Two data collection assistants with three hours of training could comfortably collect data from ten participants per hour. Our rejection rate - where people were asked but declined to take part in the study varied from 10 to 30%. Also to our surprise we encountered very few instances where users were happy to answer the questionnaires but did not want to appear in photographs. As a result, we were able to collect sufficient quantitative data in a short time.

Due to climate and the lack of dress code requirements, we saw very few people wearing jackets. It is likely that this approach will need to be adapted to work in a busy business district, or during a cold winter. Future studies are already schedule in other locations and weather conditions, where we could observe users of different cultural backgrounds and clothing.

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