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## ANALYSIS OF THE LINK BETWEEN DEMOGRAPHICS AND MOBILE PHONE CONSUMPTION BEHAVIOR IN GHANA

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### ABSTRACT

*The purpose of the study is to contribute to the body of knowledge in the area of sustainable development by examining respondent's mobile phone consumption behaviour in relation to demographic variables. The research is based on quantitative, descriptive and cross sectional survey of a sample of 182 students of Sunyani Polytechnic. The sample was selected through convenience sample method. Primary data was collected using self-designed questionnaire, administered during lecture periods and analysed using the SPSS version 16.0. The main descriptive and inferential statistics are frequencies, percentages and Chi-square. Results are presented in Tables. Demographic variables are associated with emotional attachment with a particular phone; reasons for phone discard; disposal method and attitude towards environment. Manufacturers of mobile phones should incorporate the findings into their production strategies to ensure sustainable consumption. Causal studies should be examined in future studies since the current study is descriptive in nature.*

**Key words:** Gender; mobile phone product lifetimes; Emotional attachment; motive of phone discard; method of phone disposal.

**Jel Classification:** Q56; D11; D12; L67; L68.

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## 1. INTRODUCTION

The issue of sustainable developments has raised attention and research in the consumption of mobile phones since the rate of mobile phone replacement has been on the increase in developed and developing economies (Wilhem, 2012 and Wilhelm et al., 2011) including Ghana. According to researchers (Wilhelm, 2012; Wilhelm et al., 2011) the frequent discarding of mobile phone does not lead to sustainable consumption and call for policies and strategies they will ensure sustainable consumption.

Various demographic variables are believed to be associated with the consumption pattern of consumers including mobile phone by researchers and marketer are urged to understand demographic influence through research so that they are sustained the current keen competition (Pol & Thoma 1995; Pampel et al., 1994; Hansman & Schutjens, 1993; Pol, 1991; Mendes 1989). Better understanding of demographics will help marketers to efficiently segment the market.

Demographic variables have been used by marketer in targeting their customers in selling of various goods and services in developed and developing economies. The factors are age, income, gender, social class, religion, personality type and educational level. These factors according to researchers are explanatory variables in relation to consumers purchase behaviour (Hansman & Schutjens, 1993 and Pol, 1991).

Various researchers (Wilhelm et al. 2011; Cant et al., 2006; Wood, 2004; Kalyanam & Putler, 1997; Gupta & Chintagunta, 1994; Ghosh & McLafferty 1987; Tybout and Hauser 1981; Murphy & Staples, 1979) have empirically examined the predictability of demographics of consumer purchase behaviours. Among the areas examined are brand choice, retail location and transportation.

In an empirical study by Wilhelm et al. (2011), they reported that the frequency of discarding phones is influenced by demographic and socio-economic variables such as income, gender and age. Gender significantly affected the reasons for which consumers replaced their phones. Men and women are affected differently. Upgrades and new technologies affect men to change their phones than women. Women replace their phones when the phone is lost or damaged (Wilhelm et al., 2011).

Technological advances, new styles or lower prices motivate fewer survey respondents to trade-in their old phone for a new one, although men, those who enjoy higher family incomes (chi square=37.4,  $p<0.05$ ) and those who never recycle (Chi-square=26.43,  $p<0.05$ ) are significantly more likely to be motivated by the introduction of new phone styles or technologies.

The gender differences are quite pronounced: 30% of men are motivated by new technologies/styles (vs. 11% of women), while 44% of women (vs. 30% of men) replace their phone because it is damaged or lost (chi-square = 19.3,  $p<0.05$ ). However, the upgrade discount with contract renewal is the number one motivator for men (37%) and just as important as replacing a broken/lost phone for women (44%). These data do suggest that men are more enamored of new technologies and upgrades. Clearly there are social rewards associated with owning the latest model of mobile phone (Cripps & Meyer, 1994).

Maharaj and Parumasur (2011) reported that users between 18 to 40 years of age attached a higher level of importance to these services (SMS/MMS, internet/e-mail, entertainment/recreational, camera) than older users at 1% level of significance. This indicates that age influence the importance attached to cell phone services. They also reported that users who are single attached a higher level of importance to these services (SMS/MMS, internet/e-mail, entertainment/recreational, camera) than married, widowed and divorced respondents at 1% level of significance. This also shows that importance attached to cell phone services is influenced by marital status.

Maharaj and Parumasur (2011) in addition reported that in relation to the size of the screen and weight features of mobile phones, users in the technical and self-employed occupational categories attached more importance to these features than users in all other occupational groups. Also students and self-employed users attached a higher level of importance to the colour/appearance and accessories features than users in all other occupational groups. In the case of the ease of use, it was reported that home executives and self-employed users attached a higher level of importance than users in other occupations at 5% level of significance.

Language of respondents significantly influence importance attached to attribute in Maharaj and Parumasur (2011) study at 1% and 5% levels of significance. They reported that English speaking subjects attached a higher level of importance to these features (ease of use, post purchase services, reliability, usage/experience and value features,) than Afrikaans and Zulu

speaking subjects. Also Zulu speaking subjects attached a higher level of importance to the accessories feature than English and Afrikaans speaking users.

Ng et al. (2010) reported no significant difference between males and females for all applications of mobile phone except transaction base mobile activities such as online booking and purchasing ( $p=0.039$ ). They indicated that Female respondents appear to be more cautious of monetary transactions in mobile services. Ng et al. (2010) revealed that respondents with higher spending emphasised transaction based applications ( $p=0.010$ ), location based ( $p=0.001$ ) applications and content delivery ( $p=0.010$ ).

Kumar and Lim (2008) revealed that age influence mobile service perceptions and loyalty decisions of respondents. Kumar and Lim (2008) reported that Generation Y respondents placed more emphasis on emotional value from mobile services. They indicated that satisfaction and loyalty of consumers of mobile service is a function of enjoyment and fun.

### **1.2. Statement of problem/Justification/Significance**

A lot of mobile phone users change their mobile phones frequently for many reasons and some also owned multiple mobile phones (Wilhelm, 2012 and Wilhelm et al., 2011). This has attracted attention from researchers, policy makers and environmental scientist on the sustainability of consumption in relation to sustainable development.

Examination of the link between demographics and mobile phone consumption will help manufacturers and marketers interested in sustainable consumption to efficiently target their consumers to ensure sustainable consumption and also survive in the current competition. The paper is to evaluate association between demography and mobile phone consumption behaviour.

In spite of the extensive use of demographic data in marketing research in the literature, there has been a very limited set of research that has examined the association of demographic variables on customer mobile phone consumption behavior and no empirical work exist in the study area in the knowledge of the researchers.

The paper fills in the literature gap. The findings provide further understanding of the theory of demography in relation to purchase behaviour of consumers by providing answers to research questions. The findings also serve as reference material for researchers doing similar work and provide policy guide to marketers and manufacturers on how to segment their markets using demography.

### **1.3. Global Objectives/Specific Objectives**

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The global objective of the paper is to contribute to the body of knowledge that exists in the area of sustainable consumption by investigating the link between demographic variables and mobile phone consumption. Specifically, the paper investigates the association between demographic variables and motives for mobile phone discarding; methods of disposal of old phones; attitude towards global climate change and formation of emotional attachment with mobile phone.

#### **1.4. Research Questions and Assumptions**

The paper is based on the research questions which are:

- What demographic factors influence replacement of phones?
- What demographic factors influence disposal methods of phones?
- What demographic variables influence attitudes of respondents towards sustainable consumption in relation to mobile phone consumption?

Answers are provided for these research questions in the survey. The paper is based on the assumption that consumer's demographic variables are associated with mobile phone consumption and attitude towards environment.

#### **1.5. Limitations and scope**

The findings are based on self-reported responses of respondents and as such bias respondents might possible. The sample selection is non-probability and as such the findings might lack external validity. The design is cross-sectional design and descriptive analysis. Hence causal interpretations should not be made. Strategies for sustainable consumptions are not discussed in the paper.

### **3. RESULTS**

The results on sample features and the effect of demographic variables are presented in this section of the paper. The analysis is base on Pearson's chi-square test.

#### **3.1. Sample Characteristics**

Majorities of the respondents in the survey are males 106(58.2%) and the age distribution indicates that majority 97(53.3%) respondent's falls in the age group of 18-22. Most 71(39%) of the respondents are from Ashanti regions where as majority 92(50.5%) are in second year. Most of the respondents considered their family income group to be medium 106(58.2%) and individual personality type 84(46.2%). The rest of the results are shown in Table 1.

**Table 1: Distribution of responses on Demographic features**

<b>Variables</b>	<b>Frequency</b>	<b>Percentages (%)</b>
<b>Gender</b>		
Male	106	58.2
Female	73	40.1
Missing responses	3	1.6
Total	182	100.0
<b>Age</b>		
Less than 18	3	1.6
18-22	97	53.3
23-27	74	40.7
28-32	3	1.6
33-37	1	0.5
Above 42	2	1.1
Missing responses	2	1.1
Total	182	100.0
<b>Region</b>		
Brong Ahafo	50	27.5
Ashanti	71	39.0
Western	10	5.5
Eastern	13	7.1
Volta	5	2.7
Greater Accra	6	3.3
Central	8	4.4
Northern	6	3.3
Upper east	3	1.6
Upper west	7	3.8
Missing response	3	1.6
Total	182	100

<b>Year in school</b>		
First year	89	48.9
Second year	92	50.5
Missing response	1	0.5
Total	182	100.0
<b>Religion</b>		
No religion	6	3.3
Christian	155	85.2
Muslim	18	9.9
Other religion	1	0.5
Missing responses	2	1.1
Total	182	100.0
<b>Family income status</b>		
Low	19	10.4
High	37	20.3
Medium	106	58.2
I don't know	19	10.4
Missing response	1	0.5
Total	182	100.0
<b>Personality type</b>		
Individual	84	46.2
Collectivistic	77	42.3
I don't know	20	11.0
Missing responses	1	0.5
Total	182	100.0

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### **3.2. Results on the link between demographic variables and mobile phone consumption behaviour**

The results on the association between demographic variables and product lifetimes and consumption, emotional attachment, motive for phone discard, forms of disposal and attitude towards environmental sustainability are provided in this section of the paper.

#### **3. 2.1. Demographics and mobile phone product lifetimes and consumptions**

Gender has significant relation on the purchase of mobile phone. Males (89.6%) are more than females (74%) to have purchase mobile phone before (chi-square=10.398; p=0.006). More males (41.9%) expected their phones to last for 2years where as more females preferred 3-5years (38%) (Chi-square=6.489; p=0.090).

Age has significant relation with mobile phone purchase. Respondents in age group of 28-32year and 33-37years have purchase mobile phone more than the other group (chi-square =40.572; p=0.000). Age group also influences the number of years respondents have used mobile phone (chi-square=32.725; p=0.036). More respondents in age group 33-37years have used mobile phone between 2-4years than other age group. Age is link statistically to ownership of mobile phone (chi-square=29.630; p=0.001).

Respondents (100%) in age groups of 28-32years; 33-37years and less than 18years consider the ownership of mobile phones as more important than the other age groups. Respondents (100%) in age group of 33-37years consider lifetime information on package of phone as more important than other age group. This indicate a link between age groups and the importance of lifetime information on the package of mobile phone (Chi-square=18.875; p=0.042).

Region has significant relation with the number of phones owned (Chi-square=56.840; p=0.015). More respondents in upper eastern region more owned 3-5 phones than the other age groups. Respondents (83.3%) in northern region more than the other regions owned 1 phone. Respondents (60.0%) in Volta region more own 2 numbers of phones than the respondents in other regions and also more owned above 5 numbers of phones.

Year in school has a link with the number of phones owned (Chi-square=12.199; p=0.016). Respondents in first year more owned 1 mobile phones than respondents in seconds (22.7%).

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Respondents (25.0%) in first year more owned above 5 numbers of mobile phones than the respondents in second year. Respondents (11.4%) in first year more than respondents in second year are undecided with the number of mobile phones owned. Respondents (25.0%) in second year more owned 2 number of mobile phones than respondents in first year. Respondents (37.0%) in second year more owned 3-5 numbers of phones than respondents in first year.

Year in school is linked significantly with frequency of discarding of mobile phone (Chi-square=8.546;  $p=0.014$ ). Respondents (26.2%) in second year more than respondents in first year frequently discard their mobile phones. Respondents (46.1%) in first year more than respondents in second year do not frequently discard their old phones. Respondents (Chi-square=8.546;  $p=0.014$ ) in second year are more than respondents in first year undecided on the frequency of discarding of old phone.

There is significant relation between year in class and discarding of functioning mobile phone (Chi-square=4.975;  $p=0.083$ ). Respondents (25.0%) in first year more discard their functioning phone than respondents in second year (12.1%). Respondents (78.0%) in second year more than respondents (67.0%) in first year do not discard their functioning phone.

Religion has significant link with purchase of mobile phones (Chi-square=46.113;  $p=0.000$ ). Respondents (100.0%) with no religion more than other respondents in other religions purchase mobile phones. Respondents (16.1%) who are Christians more than other religious groups have not purchase any mobile phone before. Religion has association with number of mobile phones owned (Chi-square=19.843;  $p=0.070$ ).

Respondents (33.3%) with no religion more owned 2 number of phone and above 5 numbers of phones than the other religious groups. Respondents (52.9%) who are Muslims more than the other religious groups owned 1 phone. Respondents (100.0%) in other religious groups more owned 3-5 mobile phones than the respondents in Muslim, Christians and no religion.

Religion is significantly related to the importance of ownership of mobile phones (Chi-square=13.960;  $p=0.03$ ). Muslims respondents and respondents in other religious fate more considered ownership of mobile phones as important as compared to Christian respondents (97.4%) and respondents with no religion (83.3%). Religion has significant link with the importance of lifetime information on package of mobile phone (Chi-square=25.011;  $p=0.000$ ). Muslim respondents (94.1%) more consider lifetime information on package of phone than the

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Christian group (Chi-square=82.9%) and those in no religious group (66.7%) as were as other religious groups (0%).

Family income status of respondents is significantly associated with number of mobile phone owned (Chi-square=21.440;  $p=0.044$ ). Low income family respondents (57.9%) more owned 1 phone than high income group (10.8%) and medium income group (21.0%) as well as those who do not know their income group (10.5%). Respondents in high income group more owned 2 mobile phones than other income group such as low (15.8%), medium (22.9%) and those who do not know their income group (21.1%).

Respondents (36.8%) who do not know their family income group more owned 3-5 numbers of mobile phones than medium income group (29.5%), high income group (35.1%) and low income group (10.5%). Also respondents (26.3%) who do not know their family income group more owned above 5 numbers of mobile phones than medium income group (21.0%), high income group (21.6%) and low income group (5.3%).

Family income status has a significant link with discard of mobile phones (Chi-square=11.863;  $p=0.065$ ). Respondents (44.4%) who do not know their family income group more discard mobile phones than medium income group (22.9%), high income group (33.3%) and low income group (10.5%).

Respondents (68.6%) in medium income group more do not discard their mobile phones than low income group (63.2%), high income group (58.3%) and those who do not know their family income status (44.4%). Low income respondents (26.3%) more do not know whether they discard their phone than high income group (8.3%), medium income group (8.6%) and those who do not know their family income status (11.1%).

Family income status has significant association with discarding of functioning mobile phone (Chi-square=11.601;  $p=0.071$ ). High income status respondents more discard their functioning mobile phones than medium income group (20.0%), low income group (15.8%) and those who do not know their family income group (5.6%).

Respondents who do not know their family income status more do not discard their functioning phone than medium income group (71.4%), high income group (75.7%) and low income group (57.9%). Low income respondents (26.3%) more do not know whether they discard their functioning phone than high income group (2.7%), medium income group (8.6%) and those who do not know their family income status (5.5%).

Personality type is related to discarding of mobile phone by respondents (Chi-square=10.936;  $p=0.090$ ). Respondents (40.0%) who do not know their personality type more discard their old phone than collectivistic type (20.0%) and individual personality type (28.9%). Collectivistic personality type respondents more do not discard their old phone than individualistic type (62.7%) and those who do not know their personality type (35.0%). Respondents who do not know their personality type more do not know whether they discard their old phones than collectivistic type (9.3%) and individualistic personality type (8.4%).

### 3.2.1. Demographics and emotional attachment

On whether respondents feel reluctant to discard old phones more males (56.9%) than females (36.6%) feel reluctant to discard old phones (chi-square=9.534; 0.009). More females (47.9%) do not feel reluctant than males (38.2%) to discard their mobile phones. Age has significant link with emotional attachment with a particular phone (Chi-square=16.895;  $p=0.077$ ). Respondents (0.077) in age groups 33-37years; 28-32years and less than 18years forms more emotional attachment to particular mobile phones.

Those in age group above 42years do not more form attachment with their phone. Respondents (Chi-square=17.052;  $p=0.073$ ) in age group 28-32years and 33-37years more than the other age group do not forget about the old phone when they purchase new phone. Respondents (66.7%) in age group less than 18years more forget quickly about their old phone when they get new phones than the other age group.

Formation of emotional attachment with a particular phone is significantly associated with family income status of respondents (Chi-square=20.628;  $p=0.002$ ). Respondent in medium income group (72.1%) more form emotional attachment than high income group (58.3%), low income group (70.6%) and those who do not know their family income status (57.9%).

Respondents (41.7%) in high income group more do not form emotional attachment with a particular phone than low income group (23.5%), medium income group (26.0%) and those who do not know their family income group. Respondents (21.1%) who do not know their family income group more do not know whether they form emotional attachment with a particular phone than medium income group (1.9%), high income group (0.0%) low income group (5.9%).

Family income status is significantly associated with feeling of guilty of discarding old phone (Chi-square=24.840;  $p=0.016$ ). Respondents (42.9%) in high income group more feel guilty for

discarding old phone than low income group (37.5%), medium income group (37.1%) and those who do not know their family income group (26.3%).

Respondents in medium income group (57.1%) more do not feel guilty for discarding old phone than high income group (48.6%), low income group (43.8%) and those who do not know their income group (36.8%). Respondents (31.6%) who do not know their family income group more do not know whether they feel guilty than medium income group (4.8%), high income group (8.6%) and low income group (18.8%).

### **3.2.3. Demographics and motive for phone replacement**

Reasons for discarding mobile phones as a results of phone damage have a significant link with year in school (Chi-square=18.214;  $p=0.001$ ). Respondents (75%) in second year more than respondents (44.4%) in first year replaced their mobile phone as results of phone damage.

Family income status has significant association with discarding mobile phone as a results of phone lost (Chi-square=24.576;  $p=0.017$ ). Respondents in high income group more discard their phone (72.2%) due to phone lost than low income status (29.4%), medium income group (59.1%) and those who do not know their income group (52.6%). Low income group respondents (41.2%) more do not discard their phone due to phone lost than high income group (19.5%), medium income group (23.8%) and those who do not know their income group (10.5%).

Personality type is related to discarding mobile phone as a results of low price on new phone (Chi-square=10.936;  $p=0.090$ ). Respondents (64.6%) with individual personality more discard their phones as a result of low prices on new phones than collectivistic type (51.3%) and those who do not know their personality type (21%). Respondents (47.4%) who do not know their personality type more do not discard their phone due to low price on new phone than collectivistic type (22.4%) and individualistic (19.5%).

Personality type is related to discarding mobile phone as a results of lost mobile phone (Chi-square=18.817;  $p=0.093$ ). Respondents (68.4%) who do not know their personality type more do discard their phone due to lost phone than collectivistic type (50%) and individualistic (64.6%). Respondents (24.4%) with individual personality type more do not discard their phones as a result of lost phones than collectivistic type (22.4%) and those who do not know their personality type (21.1%).

### **3.2.4. Demographics and forms of disposal**

More males (28.3%) dispose off their mobile phone by keeping it as backup than females where as more females (50.7%) than males dispose off their phone by giving it away (Chi-square=14; p=0.006). Age has significant relation with disposal method of mobile phone (Chi-square=34.808; p=0.021). Respondents in age group 33-37years more recycled their old phones than the other age group. Respondents in age groups of 28-32years and less than 18years more keep their old phones as backup than the other age groups. Those in age group 23-27years more give their old phones away and also trade in their old phones for new phones.

Region is related significantly to frequency of recycling of mobile phone at home (Chi-square=39.076; p=0.062). Respondents (80.0%) from Volta region more sometimes recycled their phone at home than the respondents from other regions. Respondents (28.6%) from Central region more frequently recycled their phone at phone than the respondents in other region. Respondents (100.0%) from Upper eastern region are more undecided than the respondents from other regions.

Religion of respondents has significant association with frequency of phone recycling at home (Chi-square=21.929; p=0.009). Respondents in other religion more frequently recycled phone at home than those in no religion (50.0%), Christians (9.3%) and Muslims (0.0%). Muslim respondents (55.6%) more recycle sometimes than Christians (51.3%) and no religion (16.7%). Muslim respondents (44.4%) are more undecided as to the frequency of recycle than Christian (38%) and respondent with no religion (33.3%).

### **3.2.5. Attitude towards environmental sustainability**

On attitude towards environmental sustainability, more males (90.4%) than females (83.3%) are concerned with global change (chi-square=6.848; p=0.033). Respondents in age group of 28-32years and 33-37years are not willing to purchase mobile phones made from recycled materials more than the other age groups (Chi-square=37.364; p=0.001).

Religion is significantly related to willingness to buy phone made from recycle material (Chi-square=88; p=0.000). Muslim respondents more are willing to buy phones made from recycle material than Christians (27.6%) respondents with no religion (16.7%). Respondents (66.7%) with no religion are more not willing to buy phones made from recycles material than the Christians group (55.3%) and Muslims group (55.6%).

### **3.2.6. DISCUSSIONS**

The results from the analysis revealed significant relationship between demographic variables and emotional attachment; motive for phone discard; method of disposal; attitude towards environmental sustainability and mobile phone product lifetime. The findings are consistent with the findings of previous researchers such as Wilhelm et al. (2011); Maharaj and Parumasur (2011); Ng et al. (2010) and Cripps and Meyer (1994). Demographic information has been used by marketer's long time ago to segment their market in order to survive in the current competitive global market.

Wilhelm et al. (2011) indicated that the frequency of phone discard is significantly influenced by demography. Upgrades and new technologies affect men to change their phones than women. Women replace their phones when the phone is lost or damaged. Men who enjoy higher family incomes (chi square=37.4,  $p<0.05$ ) and those who never recycle (Chi-square=26.43,  $p<0.05$ ) are significantly more likely to be motivated by the introduction of new phone styles or technologies.

Men are motivated by new technologies/styles (vs. 11% of women), while 44% of women (vs. 30% of men) replace their phone because it is damaged or lost (chi-square = 19.3,  $p<0.05$ ). The upgrade discount with contract renewal is the number one motivator for men (37%) and just as important as replacing a broken/lost phone for women (44%).

According to Maharaj and Parumasur (2011) users of mobile phones between 18 to 40 years of age attached a higher level of importance to these services (SMS/MMS, internet/e-mail, entertainment/ recreational, camera) than older users at 1% level of significance. This indicates that age influence the importance attached to cell phone services.

Ng et al. (2010) indicated that males and females attitude towards all applications of mobile phone except transaction base mobile activities such as online booking and purchasing ( $p=0.039$ ) are different. They indicated that Female respondents are more cautious of monetary transactions in mobile services than males. Ng et al. (2010) reported that respondents with higher spending emphasised transaction based applications ( $p=0.010$ ), location based ( $p=0.001$ ) applications and content delivery ( $p=p=0.010$ ) than those with lower spending.

#### **4. CONCLUSIONS AND POLICY IMPLICATIONS**

The objectives of the paper have been achieved. Demographic variables (age, gender, region, religion, family income status and personality type) are related significantly to mobile phone

consumptions, formation of emotional attachment, motive for phone discard, method of phone discard and attitude towards environmental sustainability. Manufacturers, designers and marketers of mobile phones interested in sustainable consumptions should incorporate the findings of the paper into their production strategies.

Policy makers should encourage phone makers to embark on sustainable productions and also educate consumers to adopt sustainable consumptions. These will help sustainable development. Future studies should look at causal analysis, increase sample size and also replicate the study in other departments of the school to determine if the findings will be replicated.

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