New opportunities in the digital age: mobile phone ownership, usage and truancy

by high school students

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Chapter for the Liber Amicorum of prof dr Jan van Dijk.

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Dear Jan, in 1973 we met when I (the first author of this chapter) started as an assistant researcher at the Research Centre of the Ministry of Justice (WODC). This period at the WODC was characterized by a lot of inventive and original research, more characteristic perhaps of a true university department than a Ministry. Among the many things that happened I will briefly describe - with my two co-authors - two experiments you were involved in.

First, together with Guus Roëll and Carl Steinmetz, you investigated the role of guardianship in an interesting experiment that included a crime victim and a 'thief' being watched by a discrete observer. As far as we can remember, you acted as the victim, Carl Steinmetz was the offender and Guus Röell, being trained as a biologist, was the discrete observer. The experiment went as follows: you placed a bicycle near a terrace full of people and locked it with a heavy lock. A few minutes later, Carl would come with a heavy bolt cutter, cut the lock and steal the bicycle. Guus Röell would score the behavior of people on the terrace (Röell, Dijk, & Steinmetz, 1982). Different conditions were created: the theft occurred in a larger city (The Hague) or a village (Leiderdorp) and with or without police officers present. The findings show (table 1) that few potential guardians interfered with the 'thief'. When police officers were present, only nine persons among hundreds of members of the public notified the police, in the condition were police officers were available at about 50 m from the scene.

Table 1 about here

A second experiment, together with Nicolette Nijenhuis (Dijk & Nijenhuis, 2011) the two of you integrated survey data on the fear of crime with experimental evidence. You investigated the congruence between what people say – in the survey - and what they actually do when someone knocks on their door. Let us explain: in a first phase of the study, during a survey, respondents were asked the following question: 'Imagine that

you are alone at home around ten o'clock at night, and someone unexpectedly rings the doorbell. What would you do?' The respondents could choose from four answers: 1) I'll just open, 2) I do not open until I've seen that it's someone I know, 3) I open the door if I know him or if I could see or hear that the person who is calling makes a reliable impression, 4) I'll let them ring and do not open the door.[1] You and Nicolette Nijenhuis took the liberty of going to the houses of those respondents at around ten o'clock in the evening, ring the bell and investigate whether people would open the door, and that matched with their answer given during the interview. The most important finding was that actually what people say and people do matched very well (see table 2). Lovely research indeed, and original.

Table 2 about here

Finally, perhaps less fun, but certainly as important, you developed – with Carl Steinmetz - what was to become the Dutch Victim Survey. This survey, after many reshufflings and renaming, still exists today as the 'Integrale Veiligheidsmonitor'. Based on the information from victim surveys you showed how opportunities and routine activities were about the most important determinants of crime.

We take some space to describe these studies because they represent what is still very important today. Your studies focused on crimes that were important to large numbers of victims, they were experimental and they were linked to the practical issues of understanding crime and crime prevention. As argued, these principles are just as

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[1] Stelt u zich eens voor dat u 's avonds om een uur of tien alleen thuis ent en er wordt onverwacht aangebeld. Wat zou u doen? De respondent kon kiezen uit vier antwoorden: 1) Ik doe gewoon open, 2) Ik doe pas open als ik gezien heb dat het iemand is die ik ken, 3) Ik doe open als ik hem ken of als ik heb kunnen zien of horen dat diegene die belt een vertrouwde indruk maakt, 4) Ik laat bellen en doe niet open

important today as they were 30 year ago. However, the world has changed a lot since then. Besides the physical world we are living in, digital space has appeared. Digitalization has made our life easier and interesting in many ways. In line with the routine activities approach (Cohen & Felson, 1979; Felson & Clarke, 1998) it has also created huge opportunities for crime. We are only starting to grasp the breadth and depth of the implications for crime of this gradual but all-inclusive digitalization of our world.

The present study takes a subject that was fundamental in the first victim surveys, namely opportunities for crime, but it focusses on the opportunities of the present digital age, namely mobile phones. First, it describes the extent to which mobile phone use has penetrated high school-life. We wish to describe how 'digital' and 'online' our Dutch high school students are. The trend to own expensive electronic equipment, to be able to communicate with the outside world permanently, and other IT-related changes represent a major development in new opportunities for crime.

Second, we study to what extent mobile phone possession and its use relates to a specific form of deviant behavior, namely truancy. In this way we relate an opportunity factor with a subject that one of us (Junger) studied a lot, namely the generality of deviance. The generality thesis was developed in criminology by Gottfredson and Hirschi (1990). In their 'General theory of deviance' they stated that crime has two fundamental causes: opportunities and self-control. The concept op 'opportunities' is taken form Crime Science (at the time 'environmental criminology'). Low self-control is defined as the ability to delay gratification. It leads to the pursuit of immediate gratification while neglecting long term negative consequences. While opportunities for crime are crime specific, low self-control leads not only to crime, but to broad range analogous behaviors to crime, such as risky traffic behavior, substance abuse, including

tobacco smoking and alcohol abuse and truancy (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1994). On the basis of the generality-thesis we hypothesize in the present study that excessive phone use is positively related to truancy.

Method

Sample

Data were collected in December 2010 en January 2011 by means of a convenience sample of schools for secondary education in The Netherlands. However, a number of measures were taken to collect information on a meaningful sample. Care was taken to collect data in schools at different geographical locations within the Netherlands, to cover the entire age-range of high school students, and to include students from all educational levels, namely, VMBO: 478 students of the VMBO, 152 students at the HAVO and 71 from the VWO.

In total 49 schools were approached, in 14 cities. 7 schools participated in the study, spread over 4 cities, namely two schools in Gorinchem, two schools in Oldenzaal, one in Oss and two in Raalte, in the province of Overijssel, South Holland and North Brabant, in the East of the Netherlands. In each school, data were collected in different classes taking into account educational level and study year.

Data were collected at school. After a lecture, the students were asked to fill in a written questionnaire.[2] Anonymity of the students was guaranteed because students did not have to fill in their name. Three categories of questions were presented to the students: questions on truancy, on internet and mobile phone use and on truancy and two control variables.

Truancy. Truancy was measured with two questions: Did you play truant in the past? Do you still play truant today (categories: 0=no, 1=yes)?

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[2] This questionnaire can be obtained from the authors.

Mobile telephone use: 20 questions were asked about whether students have a mobile phone and how and how often they use it, especially at school. Questions include: '*Do you have a mobile phone?*', '*How many phones do you have?*', '*For how have you had the last one?*', '*Does it have internet?*'. The main variables are presented in tables 3 and 4. Information was also asked on the brand of the phone. In the cross-tabular analysis, the brands that were owned by at least 5% of the respondents were kept as separate categories, the brands that were owned by less than 5% of the respondents were combined in one category: 'other brands'.

Control variables: Control variables are 1) sex (categories: 0=female 1=male;) 2) class (categories: class 1=1 , class 2=2, class 3=3, class 4=4 and class 5 & 6=5, were class 1 is normally attended by 12 year olds and class 6 is for 17 year olds), and 3) school level: VMBO (reference category), HAVO and VWO (see also above).

Analysis

Cross tables were run to examine the frequency of internet and mobile phone use and truancy. To investigate whether mobile phone use is related to the frequency of truancy, stepwise multiple regression analysis was used. This regression analysis is performed in two steps, which results in two models (1 and 2).

The multivariate analysis was executed on the number of students who owned a phone. Due to missing values on other variables, the sample in this final multiple regression was based on 635 students.

In the first model only sex and school class are taken into account in order to investigate the effect of only one of those two variables, adjusted by the effect of the other one. In the second model, the variables that show a statistically significant bivariate relation with "playing truant nowadays" were added in the analysis (see also below).

Results

A total of 701 students completed the questionnaire. During the lectures that were visited for data collection, 16 students were marked as absent; accordingly, the response rate was 98%.

50% of the sample was female and 50% males. The age of the respondents was in the range from 12 to 18 years. Because the number of students in the sixth class was low (17 respondents), the fifth and the sixth class were combined.

Students from the three educational levels in The Netherlands filled in the questionnaire: 478 students of the VMBO (lowest level), 152 students from the HAVO (medium level) and 71 from the VWO (highest level).[3]

Truancy in the past and present: 47% of the respondents stated they have played truant in the past. From this group, 32% still plays truant today, which happens once a month per student on average. There is a difference between boys and girls: 43% of the girls but 50% of the boys played truant in the past. 12% of the girls play truant 'every now and then', against 19% of the boys.

Below, the main results are presented on the frequency of phone use among the high school students. Details can be found in table 3.

Mobile phone ownership and use: 99% of the students own a mobile phone. Only 7, all male, do not have a mobile phone. Most of the respondents have only one mobile phone (69%), 20% have two mobile phones, 5% three and 5% have four mobile phones or

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[3] In the Netherlands, after primary school, students can chose between three levels of high school: VMBO consists of four years of pre-vocational secondary education; HAVO is high school level, and consists of five years of senior general secondary education; and VWO is six years of pre-university education.

more. Males have slightly more phones then females (p<.03), but number of phones was unrelated to class (tables not shown).[4]

Almost half of the students have a *Samsung* phone (48%), followed by *LG* (19%) and *Nokia (*11%). Some brands are preferred by females (Samsung: males: 44% and females: 60%) and others are more common among males (Nokia: males: 13% and females: 9%; Sony Erickson: males: 8% and females: 3%), while others seem to be 'gender-neutral' (BlackBerry and LG) (p<.002). Brand was unrelated to class (tables not shown).

Length of ownership and reason of change: 36% of the students have their phone for more than a year; 32% own it for about half a year and 5% for a month or less. No differences were found by sex or class (tables not shown).

Reasons for change: The main reason to change to a different phone is that the phone broke; this is the case for 44% of the students who changed telephone during the past year. "Trend following" is the next most frequent reason to change phones (22%). "End of subscription" is a reason to change for 12% of the respondents. Only 6% of the respondents mention that their phone was lost or stolen as a reason for change. Reasons for change were unrelated to sex or class (tables not shown).[5]

Pre-paid or contract: Most of the students (68%) use pre-paid phones. Other students have a contract with a provider, generally a one (8%) or two year (21%) contract. Having a pre-paid phone was as common among males and females and unrelated to class (tables not shown).

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[4] Tables not shown can be obtained from the first author.

[5] One exception was: the 'no comment' answer was mentioned more often in the first class.

WiFi on the phone. 54% of the students report that they have internet on their mobile phone. 33% of all students have a WiFi port on their cell phone with which they could access the wireless LAN in the school, but 26% don't know if this about their phone. This is unrelated to sex, older students more often have WiFi.

Internet at school: 28% of the students say that there is a free WiFi connection available at school. Older students know more often that this is the case (88%) than younger students (5%).

Mobile phone use during the lectures: Most students (68%) report that they use their phone *during* the lectures and related to either sex or class. Phone use during lectures is higher in females (77%) than in males (58%) and in older students, varying between 50% in lowest class and 82% in the highest class.

24% of the students report that they use internet on their phone during lectures and this is unrelated to sex or class.

Mobile phone use between the lectures and during breaks. Between lectures mobile phone use is even higher: 75% of the male students and 92% of the female students use it between lectures. In the first class, mobile phone use between lectures is 71% and it increases to 94% in the highest classes. Between lectures, 29% of the students use their phone to access the internet.

Main purposes of phone use: 89% of the students use their mobile phone to send text-messages (SMS), 27% to make calls and 16% use their phone to access the internet. 3% use it to download music. Because many students combine these functions the percentages add up to more than 100%.

Other communication devices: 38% of the males and 53% of the females mention other means to communicate with the outside world during school. In 85% of the cases this is

a school-computer or a laptop. 6% of the respondents use an *iPod* to communicate with others.

Social networks. Students generally have an account on a social network: 93% on Hyves (the Dutch alternative to Facebook), 68% on another social network, and 65% on both. Again females are more involved than males and older students more than younger students. For example, 97% of the females and 90% of the males have an account on Hyves and 75% of the females and 61% of the males also have an account on another social network.

Tables 3 and 4 about here

Relationship with truancy

The multiple regression analysis shows that six out of eight variables were statistically significant and were related to truancy nowadays. The results show that male students (Beta= .08) and older students (Beta= .06) play truant more often than female students and younger students. School level is unrelated to truancy.

Several aspects of mobile phone use were also related to truancy. First, phone ownership: those who have had several phones (B= .05) and had their last phone for a short period of time (B= -.04) play truant more often than those who have less phones and for a longer period.

Second, phone use at school. Those who use their phone more often between lectures (B= .02) and during lectures (B=.02, p=.07) play truant more than those who use their phone less often at school. Please note that the relationship between phone use during lectures is on the verge of statistical significance.

Third, having a pre-paid phone is related to less truancy while having a subscription is related to more truancy (B=-.06).

The additional explained variance (R^2) of the mobile phone variables predicting truancy, on top of the R^2 of sex, class and educational level, is $R^2=.10$.

Table 5 about here

Discussion

The present study investigated whether adolescents in this digital age use their phone at school, and whether mobile phone use is related to truancy. A written questionnaire was submitted to 701 high school students at seven high schools in the Netherlands. We believe that three conclusions are warranted.

First, we found that the mobile phones have penetrated profoundly in the daily school life of high school students. Almost everyone (99%) owned a mobile phone, one third owns two phones or more. Furthermore, students use their phone a lot during as well as between classes: among males this is 58% and among females this is 77%. For older students classes these figures are even higher, and again they are higher for females than for males. Also, almost every student is active on a social network. Dutch high school students are very much 'online' even while at school, and even while in the classroom, during lectures. Thereby, they are able to communicate with others almost permanently. We wonder to what extent phone use during and between lectures intervenes with school tasks, but we could not find any research on this subject.

Second, there is a relationship between truancy and being highly or excessively '*phone-mobile*'. High school student who have many phones, who have their last phone for a short period of time, who use it a lot between lectures and who have a subscription, play truant more often. We are not aware of previous research relating online behaviors to deviance in the physical world. However, Van Wilsem (Van Wilsem, 2010, 2011) showed that a mixture of online and physical routine activities predict online

victimization in adults (6 years and older), thereby integrating physical and digital concepts.

We suggest that this corresponds with what Hirschi (1969) called – more than 40 years ago – being committed to 'working class adult activities'. Hirschi (1969) argued that delinquents were focused on working classes adult-like activities such as smoking, alcohol use, dating and owning a car. He implied that generally, adolescents involved in these activities had a low commitment to education. Excessive mobile phone use may constitute the modern version of these 'working class adult activities'. In his later work, this thesis has been transformed into the generality thesis as described by (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1994). Within this line of reasoning, excessive mobile phone use is a mild form of deviance that is related to other behaviors that are also expressions of low self-control.

Third, digitalization differs by sex: females score higher on most measures of mobile phone use and are more active on social networks than males. In other words, they are more at risk in terms of opportunities for crime. This fact seems to invert the victimization of rates of males and females. In the physical world, males are more at risk than females, for example, they go out more often. Consequently, males are more often victimized than females (Eggen, 2005; Hindelang, Gottfredson, & Garofalo, 1978). In the present study we found that opportunities differ by sex, in some parts of the digital world, females are more at risk than males. This was also reported in previous research (Juvonen & Gross, 2008). In agreement with this, a number of studies found that females indeed are more often the victim of online bullying than males (Jones, Mitchell, & Finkelhor, 2012; Juvonen & Gross, 2008; Wolak, Mitchell, & Finkelhor, 2007). For instance, Jones et al. (2012) reported that in 2010 – among adolescent internet users - 15% of the females were the victim of 'any harassment' in

comparison with 7% of the males. This stands in contrast to the physical world, where victims of bullying are more often male than female. For example, in a representative survey of more than 15,000 US school students, Nansel et al. (2001) estimated that 10.8% of the males were bullied on a weekly bases in contrast to 6.4% of the females ((Nansel et al., 2001) table 2, p. 2097). Also, for a different form of cyber crime, Copes, Kerley, Huff, and Kane (2010) found, in a representative sample of US adults, that women were more often the victim of existing account fraud (57%) and new credit card fraud (55%; (Copes et al., 2010) p. 1038). No difference by sex was found for credit card fraud. These findings suggest that the internet has changed something victimologists believed to be a golden rule, namely that males are victimized more often than females.

Our study has various limitations. We were not able to collect information on a random sample and the questionnaire contained a limited number of questions. New research should try to replicate these findings and also measure victimization in more depth.

We hope, Jan, that you will keep joining us to explore further the implications of digitalization on crime.

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Tabel 1: Reacties van voorbijgangers op een geval van fietsendiefstal

	In Den Haag		In Leiderdorp		In 7 dorpjes
	geen agenten aanwezig	wel agenten aanwezig	geen agenten aanwezig	wel agenten aanwezig	geen agenten aanwezig
aantal diefstallen	15	27	17	11	11
aantal voorbijgangers	128(100%)	253(100%)	99(100%)	78(100%)	30(100%)
aantal (en %) voor-bijgangers die keken	70(55%)	153(60%)	50(50%)	42(54%)	13(43%)
aantal (en %) voor-bijgangers die bleven staan	28(22%)	66(26%)	24(24%)	17(22%)	8(27%)
aantal (en %) voor-bijgangers die de dief aanspraken*	4(3%)	4(2%)	2(2%)	1(1%)	2(7%)
aantal (en %) voor-bijgangers die de politie waarschuwden	n.v.t.	9(4%)	n.v.t.	0	n.v.t.

* De dief werd meestal aangesproken met 'is die fiets van jou'? of 'wat moet dat'?

From: Röell et al. (1982)

Tabel 1: De mate van overeenstemming tussen het antwoord op een vraag in een post-enquête of men 's avonds om tien uur open doet wanneer een vreemde aanbelt en de feitelijke reactie op zo'n situatie een half jaar later

	deden open		deden niet open			
zeiden, dat ze open zouden doen	43	78,2	12	21,8	55	100,0
zeiden, dat ze niet open zouden doen	16	29,1	39	70,9	55	100,0
	59	53,6	51	46,4	110	100,0

$X^2 = 26.66$; df $= 1$; p $= < 0.001$; $r = +.49$

From: Dijk and Nijenhuis (2011)

Table 3: Main variables: frequencies

	codes	Frequency	%
Number of phones	0 None	7	1
	1 1	483	69
	2 2	139	20
	3 3	37	5
	4 More than 3	33	5
	Total	699	100
Phone brand	Samsung	329	48
	LG	129	19
	Nokia	78	11
	BlackBerry	44	6
	SonyEricsson	38	6
	iPhone	18	3
	HTC	14	2
	T-Mobile	*9*	*1*
	Vodafone	*9*	*1*
	Motorola	5	1
	KPN	*4*	*1*
	Alcatel	3	0.4
	Hi	3	0.4
	Sagem	1	0.1
	Total	684	100
Time the phone is owned	1 less than month	32	5
	2 between 1 and 6 months	223	32
	3 between 6 and 12 months	185	27
	4 more than 12 months	252	36
	Total	692	100
Reason to change phone	0 No comment	71	11
	1 End of subscription period	77	12
	2 Phone lost/stolen	42	6
	3 Follow actual trend	143	22
	4 Phone broke	294	44
	5 Other	35	5
	Total	662	100
Type of subscription	1 One year subscription	53	8
	2 Two year subscription	138	21
	3 Monthly subscription	27	4
	4 Pre-paid	455	68
	Total	673	100
Phone has internet	0 No	318	46
	1 Yes	369	54
Phone has WiFi port	0 No	282	42
	1 Yes	224	33
	2 Unknown	172	25
Use of phone during lectures	No	221	32
	1 between 0 and 5 minutes	259	38
	2 between 5 and 10 minutes	105	15
	3 between 10 and 15 minutes	43	6
	4 more than 15 minutes	59	9
	Total	687	100
Use of internet on phone during lectures	0 0	463	76
	1 between 0 and 5 minutes	79	13
	2 between 5 and 10 minutes	35	6
	3 between 10 and 15 minutes	15	3
	4 more than 15 minutes	17	3
	Total	609	100
Use of phone between lectures	0 None	110	16

	1 between some of the lectures	185	27
	2 only during breaks	108	16
	3 between all lectures	49	7
	4 between some of the lectures and during all breaks	167	24
	5 between all lectures and during all breaks	68	10
Use of internet on phone between lectures	0 0	444	71
	1 between 0 and 5 minutes	85	14
	2 between 5 and 10 minutes	39	6
	3 between 10 and 15 minutes	21	3
	4 more than 15 minutes	33	5
Main purpose to use phone	1 Call	39	6
	2 SMS	413	61
	3 Internet	31	5
	4 Call & SMS & Internet	36	5
	5 SMS & Internet	36	5
	6 Call & Internet	3	0.4
	7 Call & SMS	101	15
	8 SMS & Music	17	3
	10 Music	6	1
	Total	682	100
Other comm. devices at school	Computer	272	39
	Computer/iPod	7	1
	Computer/Laptop	1	0.1
	i iPod	31	4
	iPod/Computer	1	0.1
	Laptop	3	0.4
	Laptop/iPod	1	0.1
	No	374	53
	PSP	2	0.3
	No Response	9	1
	Total	701	39
WiFi available at school?	0 No	238	34
	1 Yes	195	28
	2 I don't know	262	38
Do you use school's WiFi	0 No	99	50
	1 Yes. always	27	14
	2 Yes. a lot	25	13
	3 Yes. now and then	48	24
	Total	199	100
Has Hyves account	0 No	47	7
	1 Yes	651	93
	Total	698	100
Has other social network account	0 No	221	32
	1 Yes	468	68
	Total	689	100

Table 4: phone and internet use at school by sex and class (N=69[1]

	Sex		Class				
	Female N= 352	Male N = 349	1 N=60	2 N=109	3 N=278	4 N=237	5 & 6 N=17
Truancy							
Student played truant in the past (yes) ns °°	43	50	18	25	45	65	53
Student plays truant nowadays (yes) ** °°	12	19	5	6	15	21	35
Phone (use) at school							
Student has mobile phone with internet (yes) ns ns	52	56	55	61	52	53	44
Student has mobile phone with WiFi port (yes) ns °	31	35	21	29	32	40	20
Student uses mobile phone *during* lectures (yes) ** °°	77	58	49	55	73	72	81
Student uses internet on mobile phone *during* lectures (yes) ns ns	26	22	15	19	26	27	7
Student uses mobile phone *between* lectures (yes) ** °	92	75	71	81	84	88	94
Student uses internet on mobile phone *between* lectures (yes) ns °	30	28	11	25	32	32	8
Other communication/Wi-Fi at school							
Other communication devices (yes) ** °°	53	38	18	37	49	51	77
Student knows whether WiFi/WLAN is available in school (yes) ns °°	29	28	5	36	35	18	88
Social network							
Student has *Hyves* account (yes)** °°	97	90	82	93	95	94	100
Student has account with other social network (yes)** ns	75	61	65	69	69	68	53

[1] N can vary due to missing values. The number is missing values is relatively high for internet use during (N=92) and between lectures (N=79)
Sex differences: p < 0.05, ** p < 0.01
Class differences: ° p < 0.05, ° ° p < 0.01

Table 5: Independent variables predicting truancy nowadays (multiple regression analysis, N=634)[1]

Model		B	Std. Error	Beta	
Step 1	Constant	-0.09	0.05		
	Sex	0.08	0.03	0.11	**
	School class	0.07	0.02	0.18	**
	VWO	-0.04	0.05	-0.04	
	HAVO	0.00	0.02	0.00	
Step 2	Constant	-0.03	0.10		
	Sex	0.11	0.03	0.15	**
	School class	0.05	0.02	0.14	**
	VWO	0.02	0.05	0.01	
	HAVO	0.02	0.02	0.04	
	Number of mobile phones	0.05	0.02	0.11	**
	Time the phone is owned	-0.04	0.02	-0.09	*
	Phone has wifi port	-0.02	0.03	-0.03	
	Usage during lectures (mins)	0.02	0.01	0.08	[2]
	Usage between lectures (mins)	0.02	0.01	0.10	*
	Wifi available at school?	0.05	0.03	0.07	
	Student uses free internet at school	0.00	0.00	-0.02	
	Students has a prepaid connection	-0.06	0.03	-0.08	*

[1] Step 1: R^2 = .04, p<.001; Step 2: R^2 = .04, ΔR^2 = .10, p<.001

* $p < 0.05$, ** $p < 0.01$

[2] p<.07