

Title: Exploring individual characteristics affecting software downloaders' payment dilemma

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Authors: Jean-Philippe Charron ^{a*}, Ignacio Redondo ^a

^a Universidad Autónoma de Madrid, Departamento de Financiación e Investigación Comercial, C/ Francisco Tomás y Valiente 5, 28049 Madrid, Spain

* Corresponding author.

E-mail addresses: jp.charron@uam.es (J.P. Charron), ignacio.redondo@uam.es (I. Redondo)

Abstract

Three groups of software downloaders have emerged based on their respective payment pattern: Downloaders who never pay, downloaders who always pay, and the eclectic downloaders who only pay at times. One distinctive characteristic for each group of software downloaders is theoretically hypothesized. These three hypotheses are theoretically supported within the cognitive dissonance framework: Always-paying downloaders are consonant since they value innovative works and accept to compensate the copyright owners, although the passing of time will affect their cognition/behavior harmony. Never-paying downloaders are dissonant and need to undervalue innovation to release the tension associated with their cognition/behavior discord. The changing payment behavior characterizing the eclectic downloaders is best understood through the so-called "chameleon effect", adapting their compensation pattern according to the outlet. The results confirmed one of the three hypotheses: a high number of online activities distinguishes the eclectic downloaders from the always-paying and never paying software downloaders. However, findings suggest that the always-paying software downloaders tend to be older while the eclectic software downloaders are also attracted by higher quality products.

Key words: Digital piracy; cognitive dissonance; software downloading.

Introduction and objectives

The most common explanation for smokers' persistent, self-damaging behavior relies on cognitive dissonance theory (e.g., Halpern, 1994; McMaster & Lee, 1991), which explains that smokers will generate favorable arguments about tobacco use in order to reduce the psychological tension resulting from the inconsistency of smoking while knowing about cigarettes' harmful effects. This study proposes using that same theory to explain why unpaid software downloading is still prevalent after numerous anti-piracy campaigns. According to cognitive dissonance theory, many downloaders would underestimate/counter-argue the importance of compensating authors when obtaining digital copies of their works to reduce the tension arising from this behavioral inconsistency (i.e., downloading copyrighted software and not compensating rights' owners/authors).

Software downloading involves the ability to autonomously use, permanently retain, and indiscriminately share digital copies of computer programs whose intellectual property rights do not belong to the downloaders. Acquisition of these important capabilities is (not) reasonably justified when downloaders do (not) pay compensation to copyright owners. In practice there are (1) downloaders who, unjustifiably, never pay, (2) downloaders who, reasonably, always pay, and (3) eclectic downloaders who, inconsistently, only pay at times. While the cognitive dissonance theory was successful in explaining differences between groups of both music and movie downloaders (Redondo & Charron, 2013), to our knowledge, this is a first attempt to use the theory to explain differences between groups of software downloaders.

Conceptual Framework

Originally proposed by Festinger (1957), the cognitive dissonance theory has become one of the most influential and widely documented theories in social psychology (Cooper, 2007). This theory's central idea is that people experience an uncomfortable tension when perceiving that they simultaneously hold two dissonant cognitions (including any type of idea, belief, value, attitude, emotion, or behavior). This tension motivates people to work on reducing dissonance by modifying/reappraising the inconsistent cognitions or by acquiring/inventing new cognitions that increase cognitive consistency. For example, since the habit of smoking and the awareness of its potential harmful consequences are dissonant cognitions, smokers need to reduce tension by, among other options, smoking less cigarettes a day or willfully underestimating tobacco's harmful effects.

According to cognitive dissonance theory, software downloaders who never pay are in a state of cognitive disequilibrium because they simultaneously exhibit two dissonant behaviors. The state of cognitive disequilibrium involves such an uncomfortable tension that users downloaders keep downloading without paying need to underestimate/counter-argue the importance of compensating the owners of creative works. There is evidence that the more negative the consumers' attitude towards newness, the less their willingness to pay for copyrighted works (Hsu & Shiue, 2008). Based on this rationale:

H1: Among software downloaders, those who never pay differ from all others in terms of their comparatively more negative attitude towards newness.

Software downloaders who always pay are in a state of cognitive equilibrium because downloading copyrighted software and monetarily compensating their owners are consonant actions. However, such equilibrium can break down with the passing of time as a result of the gradual assimilation of dissonant actions that are very common in the online environment.

Assimilation-related evidence shows that when people engaged in consonant actions witness other people displaying dissonant actions, the former tend to become more tolerant of the latter's actions (Cooper & Hogg, 2007; Norton, Monin, Cooper, & Hogg, 2003). Internet use history (assessed in relation to the number of years using the Web) plays an important role in the equilibrium breakdown in two different ways. First, learning how to download without paying involves a significant period of time spent in acquiring the necessary downloading tools/skills. Second, the gradually acquired familiarity makes Internet users become more and more conscious of the degree to which downloading without paying is an accessible and widespread activity. Thus:

H2: Among software downloaders, those who always pay differ from all others by having a relatively shorter Internet use history.

Eclectic software downloaders alternate between equilibrium and disequilibrium states because at times they congruously compensate the copyright owners and other times they incongruously do not. These changing responses to the same activity (downloading copyrighted software) are fundamentally inconsistent and reveal the presence of a more or less conscious "doublethink," a notion introduced by George Orwell in his literary classic *Nineteen Eighty-Four* (1949). El-Sawad, Arnold, and Cohen (2004) found support for the existence of doublethink and also concluded that "doublethinkers" are not necessarily conscious of the intrinsic contradiction in their ideas/actions. The changing behavior characterizing the eclectic downloaders may be understood through the so-called "chameleon effect." According to this effect, humans have an innate tendency to mimic the behavior of interaction partners, usually in an unconscious way (Chartrand & Bargh, 1999; Chartrand, Maddux, & Lakin, 2005; Lakin, Jefferis, Cheng, & Chartrand, 2003). The more the social environments in which an individual personally interacts, the greater the variety of mimicry the individual will perform when interacting with others (van Baaren, Horgan, Chartrand, & Dijkmans, 2004). In the case of software downloaders, those who interact with a greater variety of Internet outlets (by participating in a greater breadth of online activities), are expected to change their payment patterns more easily to match the behavior found in each outlet. Hence:

H3: Among software downloaders, those who only pay at times differ from all others by their participation in a greater breadth of online activities.

Regardless of the preceding hypotheses, we are also exploring the potential influence of other factors on software downloaders' payment patterns. These additional factors are classified into three broad thematic areas: (1) Demographics: *sex, age, social class, size of municipality, and presence of children at home*; (2) psychographics: *confidence in using the Internet, price sensitivity, quality sensitivity, and level of cosmopolitanism*; and (3) variables related to Internet use: *home Internet usage time, social network participation, and home bandwidth capacity*.

Method

Data were obtained from the *2010 AIMC Marcas*, a secondary information source widely used in the Spanish advertising industry. This annual study contained questions relating to consumption habits, leisure activities, mass-media preferences, attitudes, etc. The company *Taylor Nelson Sofres (TNS)* dealt with the survey development, while the *Asociación para la Investigación de Medios de Comunicación (AIMC or Association for Media Research)* provided the survey guidelines and controlled the whole process. The target population included individuals aged 14 or older living in households in Spain. The sample was

distributed proportionally by region, municipality, sex, age, social class, family role, and household size. The final sample consisted of 10,409 valid subjects.

In relation to the demographics, *sex* was coded as 1 for males and 2 for females; *social class* (defined according to educational and professional levels of the household's main income earner) was measured through a five-category ordinal scale (1 = Lower, 2 = Lower-middle, 3 = Middle-middle, 4 = Upper-middle, and 5 = Upper); *size of municipality* was coded into seven ordinal categories (1 = Below 2,000 inhabitants, 2 = From 2,000 to 5,000, 3 = From 5,000 to 10,000, 4 = From 10,000 to 50,000, 5 = From 50,000 to 200,000, 6 = From 200,000 to 500,000, and 7 = Above 500,000); and *presence of children at home* was coded 1 if someone aged under 14 years lived at home and 0 otherwise.

Each one of the psychographics (*attitude towards newness*, *confidence in using the Internet*, *price/quality sensitivity*, and *level of cosmopolitanism*) was constructed by averaging the responses to six survey items (please see Appendix). These items were measured using a five-point Likert scale (1 = Completely disagree, 2 = Tend to disagree, 3 = Neutral, 4 = Tend to agree, and 5 = Completely agree). Reliability or internal consistency of these multi-item scales was assessed using Cronbach's alpha.

Consistent with previous studies (e.g., Leung, 2010; Sum, Mathews, Pourghasem, & Hughes, 2008), *Internet use history* was defined as the number of years using the Internet and was applied on a four-point scale (1 = Less than 1 year, 2 = From 1 to 2 years, 3 = From 2 to 4 years, and 4 = More than 4 years). Also consistent with earlier articles (e.g., Hinduja, 2003; Jung, Qiu, & Kim, 2001), *breadth of online activities* was calculated by counting how many of the ten suggested activities the respondent participated in – namely, buying over the Internet, playing/betting on lottery, poker, or other games, participating in online auctions, creating blogs, creating/updating a personal website, uploading videos (e.g., on YouTube), uploading photos, downloading podcasts, making voice calls over the Internet, and participating in the virtual world. *Home Internet usage time* was measured on a five-point scale (0 = Never, 1 = Less than 3 times a week, 2 = From 3 to 6 times a week, 3 = Once a day, and 4 = More than once a day). *Social network participation* was measured by the number of social networks the respondent participated in. *Home bandwidth capacity* was coded into six ordinal categories (0 = None, 1 = Less than 2 MB, 2 = 2 MB, 3 = 4 MB, 4 = 8 MB, and 5 = More than 8 MB).

The statistical analysis consisted of two stages. First, we conducted a one-way ANOVA comparing the three groups of software downloaders for all the potentially discriminating factors in order to identify the non-significant factors and filter them out for subsequent analysis (Table 1). Second, from the significantly discriminating factors, we built a multinomial logistic regression model to identify the combination of such factors that best explain the differences among the groups of software downloaders (Table 2). All calculations were performed with *PASW Statistics 18*, and the significance threshold was set at $p < .05$.

A multinomial logistic regression is a technique similar to a multiple regression but appropriate for categorical dependent variables. Since there are three categories in our dependent variables (software downloading groups), the multinomial logistic regression compares the three categories through a combination of two binary logistic regressions (always-paying vs. never-paying downloaders and eclectic vs. never-paying downloaders). Coefficients of each binary logistic regression are straightforward, robust, and easy to interpret: (1) A positive (negative) sign of the *B* coefficient indicates that the corresponding

group scores higher (lower) in the predictor than the reference group, which is the one that does not appear in results; and (2) the *Wald* statistic is used to assess whether or not the predictor is statistically significant in differentiating between the corresponding group and the reference group. Another very convenient feature of the logistic regression is its lack of strict assumptions, such as multivariate normality and equal variance-covariance matrices across groups (Hair, Black, Babin, & Anderson, 2010).

Findings

Based on the ANOVA results (Table 1), a collection of five candidate factors were included in the subsequent multinomial logistic regression predicting software downloader's online behaviors from the list of the 15 original factors: one demographic (*age*), two psychographics (*attitude towards newness, quality sensitivity*) and two factors related to Internet use (*breadth of online activities, social network participation*). From this point on, the remaining 10 non-significant factors were filtered out from the list of candidate factors.

TABLE 1: Differences in software downloading habits across individual characteristics

	Average per group			<i>F</i>	<i>Sig.</i>
	ALWAYS PAY (<i>N</i> =95)	ECLECS- TICS (<i>N</i> =198)	NEVER PAY (<i>N</i> =1,016)		
Demographics					
Sex	1.33	1.32	1.34	.080	.924
Age	40.21	37.25	35.52	6.283	.002
Social class	3.46	3.28	3.31	1.294	.274
Size of municipality	4.74	4.82	4.72	.376	.687
Presence of children at home	.25	.33	.29	.954	.385
Psychographics					
Attitude towards newness	3.14	3.21	3.07	5.544	.004
Confidence in using the Internet	3.19	3.29	3.20	1.806	.165
Price sensitivity	3.28	3.41	3.45	2.988	.051
Quality sensitivity	3.56	3.69	3.46	12.574	.000
Level of cosmopolitanism	3.07	3.18	3.09	2.051	.129
Factors related to Internet use					
Internet use history	3.57	3.65	3.67	.731	.482
Breadth of online activities	2.00	2.98	1.96	25.485	.000
Home Internet usage time	3.24	3.46	3.25	2.906	.055
Social network participation	1.27	1.69	1.46	3.300	.037
Home bandwidth capacity	3.05	3.09	2.91	1.171	.310

Through a forward stepwise selection procedure, we built a multinomial logistic regression for software downloading groups (Table 2) by choosing the predictors from the candidate factors – that is, those found to be significantly differentiating in the one-way ANOVAs. At each step, the candidate factor with the highest score statistic was selected to enter the model, whose improvement was measured through the chi-square test for the change in the log likelihood value (comparable to the overall *F*-test in multiple regression). The stepwise

procedure stopped when none of the remaining variables reached the significance threshold for entry.

TABLE 2: Multinomial logistic regression for software downloading groups

Step Summary						
Model	Effects	-2 Log Likelihood	Chi-Square	df	Sig.	
0	Intercept	1758.45				
1	Breadth of online activities	1715.47	42.983	2	.000	
2	Quality sensitivity	1694.01	21.465	2	.000	
3	Age	1683.46	10.550	2	.005	
Parameter Estimates						
		B	Std. Error	Wald	df	Sig.
ALWAYS PAY	Intercept	-3.915	.684	32.748	1	.000
	Breadth of online activities	.031	.062	.256	1	.613
	Quality sensitivity	.160	.184	.759	1	.384
	Age	.024	.008	9.426	1	.002
ECLECTICS	Intercept	-4.577	.530	74.571	1	.000
	Breadth of online activities	.241	.037	41.703	1	.000
	Quality sensitivity	.563	.139	16.462	1	.000
	Age	.009	.006	2.378	1	.123

The software multinomial logistic regression model (Table 2) consisted of a combination of three factors: *Breadth of online activities*, *quality sensitivity* and *age*. A likelihood ratio test confirmed a significant improvement over the null model (i.e., reduction in the -2 log likelihood), evidencing an overall relationship between the final predictors and software downloading groups [$\chi^2(6, N = 1309) = 74.998, p = .000$]. Concerning model usefulness, the predictive accuracy rate reaches 78.2%, a 15.2 percent point improvement over the by-chance accuracy rate (63.0%).

In *breadth of online activities*, eclectics scored significantly higher than never-paying downloaders who, in turn, did not differ from always-paying downloaders, which confirms H3. In *quality sensitivity*, eclectic downloaders scored significantly higher than never-paying downloaders who, once again, did not diverge from always-paying downloaders, meaning that being more sensitive to quality products is also a distinctive characteristic of eclectic software downloaders. In *age*, always-paying downloaders scored significantly higher than never-paying downloaders who, in turn, did not differ from eclectics, meaning that being older is a distinctive characteristics of always-paying downloaders. Two hypothesized factors failed in differentiating between groups of software downloaders: *attitude towards newness* (H1) and *Internet use history* (H2).

Discussion

Two characteristics from this study have strengthened the ability to extract general conclusions. First, the demographic composition of the sample is representative of all strata of society, hence involving a superior degree of generalizability versus a sample consisting of students only. Second, participants were not asked if they had “pirated” or “illegally downloaded” software, but rather if they had downloaded software and paid for such downloads. Not being designated as “pirates” or “illegals” in the questionnaire encouraged non-paying downloaders to feel more at ease in recognizing their actual online behavior. Respondents report their socially undesirable behavior more spontaneously when asked in a less assertive way (Cannell, Oksenberg, & Converse, 1977; Mooney & Gramling, 1991).

We can conclude that two groups of software downloaders possess at least one distinctive characteristic: First, downloaders who always pay differentiate themselves from the other downloaders by being older. Second, eclectic downloaders differentiate themselves from the rest through (1) their tendency to operate in a wider variety of Internet outlets, and (2) their higher sensitivity to quality products. Results were different than expected: from the three hypothesized factors, solely *breadth of online activities* remained in the final model. The cognitive dissonance theory came short of offering an adequate explanation to the different software downloading behaviors, something in contrast from music/movie downloading (Redondo et al., 2013).

Two exploratory factors emerged as significant differentiators of software downloading habits. First, findings indicate that always-paying downloaders are characterized by being older. This is in line with previous literature advocating that younger people are more likely to engage in software piracy (Gupta, Gould, & Pola, 2004) or older individuals (as opposed to younger college students) pirate less (Bhattacharjee, Gopal, & Sanders, 2003).

Additionally, results indicate that eclectic downloaders differentiate themselves from the rest through their higher sensitivity to quality products. Knowing that the main reason to acquire software is “it is required for work/study” (Cheng, Sims, & Teegen, 1997), eclectic downloaders’ behavioral duality could arguably be explained by the search of a quality software through “trial before purchase”. This conclusion finds support in Gupta et al. (2004) where functional risk minimization is achieved through software piracy: consumers use pirated software as a trial product in order to avoid purchasing a negative cost good.

Apart from *age*, main demographics (*sex, social class, size of municipality, presence of children at home*) are irrelevant at uncovering differences among groups of software downloaders. The same is true of some psychographics (*attitude towards newness, confidence in using the Internet, price sensitivity, level of cosmopolitanism*) as well as most factors related to Internet use (*Internet use history, home Internet usage time, social network participation, and home bandwidth capacity*).

Managerial implications

Differences found among various groups of downloaders can help the software industry in effectively guiding their decisions to prevent (take advantage of) threats (opportunities) in the market. First, the absence of a unique characteristic distinguishing the never-paying downloaders sends a startling message to the software industry: not compensating the creators of computerized programs is a generalized behavior present in all strata of the society.

The fact that eclectic software downloaders differentiate themselves by participating in more online activities can be used to persuade them to correct their contradictory behaviors. Eclectic downloaders operate in diverse Internet settings and replicate payment practices from the different environments. Thus, the industry aiming their campaigns at the eclectic downloaders should make them realize that (1) they are inconsistent in their paying behaviors, and that (2) the obligation to compensate the creators does not depend on an opportunity to download for free. Making people aware that they are acting hypocritically has been effective in changing inconsistent behaviors into socially desirable ones, such as safe driving (Fointiat, 2004) and recycling (Fried & Aronson, 1995). Additionally, since eclectics are also characterized by a higher sensibility to quality products, and adhering to the view that piracy may constitute a way to reduce functional risk (Gupta et al., 2004), offering free software trial should establish a persistent managerial practice over time.

Theoretical implications

Various theoretical frameworks have been used to explain digital piracy, such as the theory of planned behavior (Cronan & Al-Rafee, 2008; Wang & McClung, 2012; Yoon, 2011), the social cognitive theory (Jacobs, Heuvelman, Tan, & Peters, 2012; LaRose & Eastin, 2004; LaRose & Kim, 2007), the theory of reasoned action (Nandedkar & Midha, 2012; Woolley & Eining, 2006), and the general crime theory (Malin & Fowers, 2009). To our knowledge, this study is the first to use the theory of cognitive dissonance to understand software downloaders' payment patterns. Although mostly unsuccessful in confirming the proposed hypotheses, the present research has unveiled a paradigm shift about digital piracy: individual factors affecting downloaders' payment behaviors vary between content types, even though all content types are usually available together on the same downloading sites.

Another significant contribution from this study is the identification of three factors (*breadth of online activities, quality sensitivity* and *age*) that differentiate two groups of software downloaders. These factors' significant impact implies that they should be paid closer attention in the future than they have so far. Conversely, the lack of significance of other factors frequently addressed in the past casts doubt on the need to keep paying these factors so much attention in the future.

Limitations

This study suffers three main limitations. The first limitation is related to the limited geographical area covered. Although the data was representative of all layers of the Spanish society, available evidence suggests the existence of cross-cultural differences in Internet buying behaviors (Park & Jun, 2003). The second limitation stems from taking a fixed picture of a dynamic situation. Our model's predictive ability is conditioned by the stability of all factors although software downloading is continuously evolving over time. For example, the disproportional amount of never-paying downloaders could be lessened outside a period of economic crisis.

Further research

A possible avenue is to research the same phenomenon over time. A longitudinal study would help (1) distinguish whether each factor's influence is episodic or continuous (i.e., discover whether the large proportion of never-paying downloaders is restricted to periods of economic crisis), and (2) identify how downloaders evolve over time (i.e., observe if downloaders tend to always pay as they get older).

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APPENDIX: Items Forming the Psychographic Variables

Attitude towards newness

I aspire to a life filled with challenges, novelties, and changes.
I like trying new products.
I love buying new gadgets and appliances.
I like to change and try new food products and brands.
I am always looking for new ideas to improve my home.
When I see a new brand I usually buy it to see how it works.

Confidence in using the Internet

Buying and paying over the Internet is safe.
I would use the Internet to meet people.
Internet advertising allows one to get more product information.
Internet is the first place to look when I need information.
I usually check the Internet before making a purchase.
I would not mind buying fresh foods (yogurt, butter, etc.) over the Internet.

Price sensitivity

I usually buy the cheapest food available.
I usually take advantage of offers and promotions on grocery products.
I like to be informed of promotions, discounts, and deals through advertising.
I always look for the lowest prices when shopping.
I take advantage from discount coupons.
I always look for special offers.

Quality sensitivity

I do not mind paying more for quality food products.
It is worth paying a little more for a good beer.
I am willing to pay more for a good wine.
I like owning high-quality products.
It is worth paying a little more for high quality items.
I prefer a few but good articles to many cheap ones.

Level of cosmopolitanism

I am interested in international events.
I like the idea of traveling abroad.
I am interested in other cultures and countries.
I like to eat foreign food.
With food, I like to try foreign specialties.
I would rather go on vacation to another country rather than stay in Spain.