

## **The Times They Are A Changin': Digital Content Supply Decisions of Students**

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**Abstract.** Software for trading MP3s and other files across the Internet is transforming music and other digital information into public goods. However, the zero-contribution thesis raises questions about why individuals would share files with others. This paper uses a logit model to identify factors shaping college students' willingness to supply MP3s to others. In doing so, it finds evidence which supports reciprocity models of human behavior and suggests the unauthorized supply of digital files is more robust than might be indicated under conventional economic assumptions. (Z110, Z130, H410).

### **I. Introduction**

Digitization, the Internet, and the rise of peer-to-peer (P2P) file sharing protocols allow individuals to obtain and distribute high-quality copies of music and other intellectual property without making payments to copyright holders. Owners of copyrighted material worry that illicit trading of digital files threatens profits. However, conventional economic theory suggests that the mechanisms which facilitate such file trading may themselves be on shaky ground. Specifically, file trading applications rely upon a level of cooperative behavior that is contrary to some economic theory. Self-interested agents may threaten the continued illicit supply of copyrighted material by downloading files from others but refusing to upload files in return. Significantly, the music industry has identified the supply side as a weak link in P2P networks and has targeted uploaders in its legal strategy against file trading.

We conducted an empirical investigation as to why individuals are willing to supply unauthorized copies of digital files to others, even at a net cost to themselves. The results have implications about the seriousness of the threat posed by P2P file trading and about the validity of reciprocity models of human behavior.

This paper proceeds with an overview of file trading, followed by a survey of the relevant economic theory and literature. Next, we include a section about our survey and data, followed by a section describing the results of our logit model. The final section is a brief summary and conclusion.

## **II. File Trading: Background and Demographics**

Downloading songs and other digital files has become common. Surveys conducted by the Pew Internet and American Life Project (PIP) show that from 2000 to 2002, the number of Americans downloading files grew from 21 million to 36 million people (Madden 2003, vii). A recent survey indicated that 67% of downloaders did not consider what they were doing to be a form of stealing (Madden and Lenhart 2003,1; Madden 2003, 62). As might be expected, only a fraction, 74%, of downloaders upload. Of these, 65% say “they do not care whether the files they share are copyrighted or not” (Madden and Lenhart 2003, 1).

Despite the downfall of the original Napster, many systems facilitate trading digital files. Napster's decentralized successors, some of which use non-proprietary, open-source software, are a tougher challenge for the recording industry. With no central ownership of either the hardware or software used for file trading, there is no individual entity that can be sued or arrested to stop the downloading. Consequently in the summer of 2003, the Recording Industry Association of America (RIAA), adopted a strategy of filing lawsuits

against hundreds of individual users, targeting individuals accused of uploading a thousand or more copyrighted songs (Rainie and Madden 2004, 5). This latest RIAA gambit seems to be meeting with some success. Surveys conducted by PIP show that the number of downloaders has been cut roughly in half from about 35 million users to around 18 million users over the period that the RIAA implemented its new strategy (Madden and Lenhart 2003).

However, declining activity at these sites cannot be fully attributed to the new RIAA policy. At the same time, commercial sites have started to offer a more viable substitute to unauthorized downloads. Most notably, Apple successfully launched its site, iTunes, in April of 2003. Commercial sites, however can still be poor substitutes for unauthorized downloads because files come with built-in use restrictions, and the selections are still less comprehensive. Accordingly, millions continue to download from unauthorized sources while programmers develop new ways of shielding users' identities. A growing trend, for example, is the use of darknets which are small private networks that operate like secret societies and use closed memberships, passwords, and even encryption to shield file-trading activity.

College students, the focus of our study, are twice as likely as the general population to have downloaded music and three times as likely to do so on any given day (Madden 2003 63). Interestingly, men are generally more likely to download than women and they do so more frequently. In October 2002, 35% of male Internet users had downloaded music and 7% were likely to do so on a typical day compared to 29% and 3% for women (Madden 2003, 63).

Certainly, oligopoly profits are not an inherent right, and the redistributive effects of technological advance are neither a market failing nor a surprise. Moreover, P2P file trading

offers very substantial social benefits, including enormous reductions in packaging and distribution costs, wide selection, and the ability to acquire songs individually rather than in album format. Nevertheless, industry concerns do hint at an important concern: free riding reduces incentives for the provision of new goods. The public policy challenge is to develop new institutions which secure the benefits of new technologies while providing sufficient incentives to ensure a continued and robust supply of music, television programs, movies, scientific information, and other forms of intellectual property. As the information economy grows in importance, the debate over technological prosperity, artificial scarcity, monopoly rents, and economic incentives will also grow.

One of the more interesting questions concerning file trading has to do with why people make such files available. While the Law of Demand explains why people seek music files that are virtually free, it is not as clear why individuals make such files available to others. Some uploading is explained by P2P software which is typically designed to reward or oblige downloaders into making their own files available to other network users. For example, file-trading software typically downloads files into a shared directory made available to other users. Also, individuals might be rewarded for uploading and performing quality control measures (Kazaa 2004). These rewards greatly enhance the speed and probability of acquiring desired files.

Nevertheless, there are ways to circumvent or minimize such technological constraints. Indeed, Duke is among those universities seeking to minimize legal exposure and large demands on their networks. Duke's Office of Information Technology's webpage gives detailed and illustrated instructions for disabling the uploading feature of a variety of popular file-trading programs (OIT 2003). Often this involves something as simple as typing a zero in

a box indicating the maximum number of simultaneous uploads. Alternatively, users can substitute out of overly restrictive applications. For example, one website, [afternapster.com](http://afternapster.com), provides information on, and links to, over 50 file-trading programs, most of which are free.

Downloading cannot take place in the absence of uploading, but uploading files poses the greatest risks and yields the lowest benefits. Remember, the RIAA lawsuits have targeted uploading. "You just don't share your music now," noted one student, "That's how you get caught" (Whitlatch, 2004). No doubt, this attitude is exactly what the RIAA would like to encourage. Targeting uploaders may be especially effective since uploading is more concentrated than downloading. Those who upload, whether by personal conviction or technological expedience, have both the incentive and the ability not to do so. Allowing uploading also ties up computing and networking resources and exposes individuals to possible sanctions from their Internet service providers (ISPs), employers, or universities. Somewhat ironically, one might expect these file traders to suffer a free-rider problem of their own. Uploading to others is the price downloaders pay for the privilege of acquiring "free" music. Self-interested downloaders may refuse to upload in the hope others will incur this risk instead.

### **III. Theory and Literature Review**

Free riding is a critical issue in file trading. Peter Alexander posits "the sustainability of a peer-to-peer sharing system is contingent upon whether users will be willing to share their resources with others, at a cost to themselves" (Alexander 2002, 158). Since each free rider essentially increases the costs and reduces the benefits to other users, one might expect any initial free riders to cause a cascading effect. "The simple Nash equilibrium of a peer-to-peer network," Alexander argues, "predicts a collapse of the network" (Alexander 2002, 159).

The economic argument that rational, self-interested, hedonistic maximizers will not act to secure shared interests can be traced back to Mancur Olsen's *The Logic of Collective Action* (1965) and is known as the "zero contribution thesis" (Ostrom 2000, 137). While the zero contribution thesis, free riders, and the prisoners' dilemma are all now part of the conventional wisdom of economics, it is becoming increasingly clear that these are not adequate models of human behavior. Reciprocity and collective action have long been emphasized in some schools of economic thought and other social sciences. Now, mainstream economics increasingly recognizes their importance. Specifically, evidence from field work suggests "that individuals in all walks of life and all parts of the world voluntarily organize themselves" to secure mutual benefits (Ostrom 2000, 138). Similarly, a growing body of experimental evidence points to the importance of reciprocity in human behavior (Fehr and Gächter 2000). With reciprocal behavior, "in response to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interested model; conversely, in response to hostile actions they are much more nasty or even brutal" (Fehr and Gächter 2000, 159).<sup>1</sup> Significantly, this is true even when the behavior comes at a net cost to the agent.

While Fehr and Gächter (2000, 178) argue against continued tweaking of the self-interest model, reciprocal-like behavior can certainly be modeled in a standard self-interest framework. Alexander (2002), cites research done by Cunningham, Alexander and Adilov, who used a Becker-inspired model to evaluate Internet file trading. Their model showed that "sharing emerges endogenously as an equilibrium because sharing is cost-reducing in terms of own-bandwidth, a result that emerges because users are self-interested maximizers" (Alexander 2002, 159). Anti-piracy polices could even promote cooperation among file

traders by increasing downloading cost. That is, sharing may be so stable as to cause “anti-piracy” policies to backfire.

Even if we move beyond the zero contribution thesis, there are good reasons to suspect free riding might make P2P file trading an unstable allocative mechanism. First, the propensity towards negative reciprocity (punishment) seems to be stronger than that for positive reciprocity (reward) (Fehr and Gächter 2000, 162). In general P2P file trading is largely based on positive reciprocity—rewarding others for making their files available by making your own available too. Negative reciprocity, such as denial of service, is possible but less common and not a part of the basic design. Second, reciprocity is more often observed in small groups rather than networks with millions of users. Additionally, experimental evidence shows that when communication takes place via computers, “much less cooperation occurs than in experiments allowing face-to-face communications” (Ostrom 200, 141). Indeed, the fact that file trading takes place anonymously and without direct human contact makes them almost the antithesis of the groups where one might expect to find reciprocity based on the stronger ties and better information of kinship and community (Gallaway and Kinnear, 2002).

#### **IV. Our Survey and Data**

To investigate this problem of collective action, we surveyed 1279 students at three universities in Missouri and Colorado. Our survey asked college students (a major segment of the file-sharing population) about their motivations for sharing music files on the Internet. We used the data to examine inter-group differences in the probabilities that individuals will make files available. These groups were defined by such factors as gender, university

affiliation, expenditure level, desire for more MP3 files, and attitudes toward sharing. Specifically, we use a logit model to identify factors affecting the probability of one making files available to other users.

In 2002 we administered the 25-question, 65-variable survey during class in multiple sections of principles of economics at each university.<sup>2</sup> While not a random sample of students, the principles courses are required for many students at all three universities. The survey asked about demographic information, respondents' use of Internet file-sharing systems, whether or not they make MP3s available for others, their reasons for doing or not doing so, their expected demand for future downloads, and other information. Overall, the response rate was high: 1-3% did not answer various questions on the survey, and based on our observations, 1-2% did not participate in the survey at all. Our sample includes 845 students who own songs in MP3 formats and answered all of the other questions relevant to this study. Of these students, 61% indicated they make MP3s available to other Internet users.

The variables listed throughout Tables 1-3 are assumed to influence students' supply decisions regarding MP3s. First, to control for differences in the universities, a dummy variable for each school is given. The University of Missouri-Rolla (UMR) is primarily an engineering and technological university. Southwest Missouri State University (SMS) has a public affairs mission and the students are considered less technologically oriented. Arguably, Colorado State University (CSU) falls in between the other two in terms of technology. Of these three universities, CSU has the broadest spectrum of majors, including engineering. Approximately 64% of the students were from CSU, 20% from SMS, and 15% from UMR.

Since women are less likely to download, we expect that female students will also be less likely to supply MP3s than male students. In general, women are less likely to major in the technological fields and they tend to spend less time on computers (see Table 2 below) than men. A dummy variable, FEMALE, is included to capture gender differences that might exist in MP3 sharing.

The average number of hours per day the student listens to music was included to control for differences in students' music-listening habits and preferences. We expect that students who spend more time listening to music each day will be more likely to be involved with trading MP3s. Similarly, we included a variable about the average number of hours per day spent on a computer to further control for differences in students' interests and technological capabilities.

To come up with a rough estimate of income, we asked the students a closed-ended question about their average total monthly expenses. We expect those with higher monthly expenses to be more likely to share MP3s for a couple of reasons. First students with higher expenses may have access to higher quality computer equipment. Second, such students might also have more MP3s because we expect music to be a normal good. Contrarily, high expenses may indicate a higher opportunity cost for time spent trading files. However, file trading is highly automated, so this inverse effect is expected to be very small.

We also asked students how many songs in MP3 or similar format they expected to acquire in the next 12 months. Their answers are found in the WANT variables. We expect students who want to acquire the most MP3s in the future are most likely to make their own MP3s available, whether the reason is because of software requirements or because of reciprocity.

Finally, to control for differences in attitudes about free riding and rule breaking, students were asked whether they agreed or disagreed with statements such as “I do not share MP3s because others will make them available.” The final four variables in the tables represent their agreement with these statements. Students who agree with statements about not sharing because others will, because it is illegal, or because it is otherwise discouraged, are expected to be less likely to share. Those who agree with the statement “I share to ensure they remain freely available on the Internet” are expected to be more likely to share.

Table 1 provides the means and standard deviations for the variables by whether or not they make their MP3s available to others. Relative to their means in the TOTAL sample, SMS students, female students, students with expenses less than \$500, and those who do not expect to obtain any more MP3s are all underrepresented in making their MP3s available. In fact, while 67% of UMR students and 61% of CSU students make their MP3s available, only 52% of the SMS students do. Similarly, 52% of the women make their MP3s available, while 66% of the men do. Table 1 also shows that the students who make their MP3s available listen to more hours of music, spend more time on the computer, have higher expenses, and want to obtain more MP3s than those who do not. The last four rows in Table 1 show differences in attitudes and motivations of the students. In general, only a small percentage of the students indicate a concern with rule breaking: 17% agree with “I am reluctant to share MP3s because it can be illegal”, and only 10% agree with “I am reluctant to share MP3s because my university or Internet service provider discourages it.” Similarly, only a small fraction, 15%, agrees with a statement that essentially identifies them as free riders: “I do not share MP3s because others will make them available.” The majority of these free-rider types are students

who do not make their MP3s available. The majority of all the students, 69%, agree with the statement "I share MP3s to ensure they remain freely available on the Internet."

Table 2 provides these means by gender. As predicted previously, women are less likely to make MP3s available. The UMR campus is approximately 75% male, so the under-representation of females there is to be expected. Women tend to listen to slightly more music, but spend less time on the computer. A gender difference in expenses is not apparent, but there is one in expecting to obtain more MP3s in the next year. Women expect to obtain fewer MP3s as they are over-represented in the WANT 0 and WANT 1-100 categories and under-represented in the WANT 101 or higher categories. No gender differences are evident in the statements about free-riding, but there are differences in their willingness to comply with rules and laws. The same percentage of women as men agrees with the statements "I do not share because others will" and "I share MP3s to ensure they remain freely available on the Internet." However, a higher percentage of women than men agree that they are reluctant to share because it might be illegal or their university or ISP discourages sharing. This is consistent with literature suggesting women are more risk adverse (Jianakoplos and Bernasek 1998).

## **V. Estimation and Results**

To estimate the likelihood of one making MP3s available, we use a logistic regression including variables representing school, gender, age, expenses, time spent listening to music, time spent on a computer, expectations about obtaining more MP3s, and attitudes about sharing. Table 3 shows the results from the logit model. The base category for the model is a CSU male with monthly expenses under \$501 who does not plan to acquire any MP3s in the

next 12 months. The model fits the data reasonably well for this type of survey.<sup>3</sup> The pseudo R-squared is 0.19, but the model correctly classifies 71% of the observations, using a cutoff point of 0.5.

The descriptive statistics suggested that SMS students were the least likely, and UMR students were the most likely, to make their MP3s available. The results from estimating the logit model confirm that SMS students are significantly less likely to make their MP3s available. In fact, SMS students are only about 61% as likely to share files as students from CSU, as shown by the odds ratio in Table 3. However, we do not find a significant difference in CSU and UMR students with regards to file sharing.

The logit model also confirms that female students are significantly less likely to make MP3s available, after controlling for the other variables. The odds ratio in Table 3 shows female students are only 65% as likely as male students to make MP3s available, even after controlling for differences in attitudes about sharing MP3s and desires to obtain more MP3s.

Age is insignificant, but this is not a surprise considering our sample. Looking back at Table 1, most of the students fall into the typical age range for undergraduate students. The average age of the students is 19.7 years with a standard deviation of only 1.75.

The results also confirm our expectation that students who spend more time listening to music will be more likely to share their music with others over the Internet. Time spent listening to music has a significant, positive, though slight, impact on making MP3s available. This might reflect a desire to share their interests with others or simply a strategy to acquire more music. Time spent on the computer has a positive but insignificant relationship to sharing MP3s over the Internet. File sharing may occur when a student is not actively

spending time on the computer but rather is doing other things (e.g., eating, sleeping, going to class).

Average expenses appear to have a positive relationship with sharing MP3s over the Internet. As expenses grow so does the probability of making MP3s available. This confirms our expectations about the relationship between expenses and making MP3s available.

The evidence shows the students who expect to obtain more MP3s in the future are much more likely to share their own MP3s. In fact, students who expect to obtain just a few more MP3s (1-100) are almost two times more likely to share while those who expect to obtain a lot (501+) are six times more likely to share as those who do not expect to get any. This suggests reciprocity agreements exist, either implicit or explicit in the sharing of MP3s over the Internet.

The fact that the desire to obtain more MP3s has such a large impact on the decision to share them led us to look more closely at students' motivations. It is possible the students share because the software makes them do so. To help distinguish between software requirements and reciprocal behavior, we looked at an additional survey question.<sup>4</sup> The question had students rank the importance of certain reasons for making files available, with 1 representing "not important" and 5 being "very important." The "software requires me to share" response was only the fourth most important answer out of eight and its mean of 3.09 was significantly different from the next highest mean of 3.33 at the 0.01 level for a t-test. The top three answers were "to return the favor to others," "to share music you enjoy," and "because CDs are overpriced." While many students may share because they feel they must, most sharing seems largely motivated by other factors. In fact, the top two factors are more consistent with reciprocal behavior than individual self interest.

Finally, the two variables addressing file sharing being illegal or otherwise discouraged were statistically insignificant, but the two statements about attitudes concerning free riding are significant at the 1% level and have the expected signs. Naturally, students who agreed that they did not share MP3s because others will are less likely to provide them. Similarly, those who agree with the statement about sharing MP3s to ensure they remain freely available are twice as likely to make them available than those who disagree with the statement. The fact that only 15% of the sample agreed with the former statement while 69% agreed with the latter statement is a stark contradiction to the conventional wisdom of the free rider problem and the zero contribution thesis. In fact, these figures are consistent with other studies indicating 40-66% of subjects act reciprocally while only 20-30% act completely selfishly (Fehr and Gächter 2000, 162).

While our sample included only college students, their passion for music and access to high-speed Internet connections make them the key demographic in the debate over downloading copyrighted material. Decisions for sharing files are positively affected by income, time spent listening to music, by being male, and by a desire to ensure they remain freely available, but the largest impact is from a greater desire to obtain MP3s for oneself. This is consistent with inferences that students are acting either strategically or reciprocally.

Our evidence suggests the recording and movie industries cannot take solace in the conventional notion that the supply of illicit files is untenable. Students seem to understand the pitfalls of free riding; in fact, only a small minority of students identified themselves as free riders. Students' lack of concern with rule breaking, and the fact that two-thirds of file traders do not consider their behavior to be unethical are additional reasons for the owners of copyrighted material to be apprehensive. The laws of supply and demand cannot be repealed

by those of copyright. Unauthorized downloading, we have shown, is effectively a black market with a surprisingly stable business model, low prices, and great selection. If the recording industry wants to counter the economic forces that create this black market, then, like other businesses, it must try keeping prices low while minimizing the transactions costs of their consumers.

## **VI. Summary and Conclusion**

Standard economic theory suggests individuals are strictly self-interested and that this self interest can be a serious impediment to the provision of public goods. Recent research, such as that surveyed by Ostrom (2000) and Fehr and Gächter (2000), supports a reciprocity model of human behavior and casts doubt on the zero contribution thesis and the inevitability of the free rider problem. This debate is highly relevant to P2P file trading of copyrighted material. While many see file trading as a threat to the continued creation of intellectual property, they have been able to take some solace in the notion that Internet file trading is contradictory to traditional models of self interest. That is, self-interested individuals would be expected to download files from others but refuse to upload files in return. Especially if legal sanctions were brought to bear against the uploaders, one might expect the free rider problem to cause file trading to collapse from the lack of people willing to upload.

Our research shows a substantial willingness among college students to contribute files to others. We found the desire “to return the favor to others” was a more important factor in students’ decisions to contribute files than was the file trading software, some of which is designed to reward or compel such behavior. We used a logit model to further examine supply decisions by identifying variables affecting the probability of contributing

files. Our research offers empirical evidence in support of reciprocity models of human behavior and against the zero contribution thesis. In doing so, it argues that P2P file trading is on a more solid footing than would be suggested by conventional economic theory.

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## Endnotes

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<sup>1</sup> Reciprocal behavior is different from cooperation, retaliation, or altruism. It is not meant to secure future benefits, and indeed often comes as a cost to the reciprocator. However, it is not unconditional or without antecedent. It is a response to another's actions (Fehr and Gächter 2000, 160).

<sup>2</sup> A copy of the survey is available from the authors upon request.

<sup>3</sup> We also ran a probit model for comparison purposes. The results were essentially the same.

<sup>4</sup> We are unable to include this in the model because the question of motivation was only asked of students who do make their files available to others.

TABLE 1: Means and Standard Deviations (sd) by Making MP3s Available

Variable*	DOES NOT MAKE MP3s AVAILABLE		MAKES MP3s AVAILABLE		TOTAL	
	N=329		N=516		N=845	
	Mean	(sd)	Mean	(sd)	Mean	(sd)
Makes MP3s Available					0.61	(0.49)
CSU	0.61	(0.49)	0.66	(0.47)	0.64	(0.48)
UMR	0.13	(0.33)	0.16	(0.37)	0.15	(0.36)
SMS	0.26	(0.44)	0.17	(0.38)	0.20	(0.40)
Female	0.43	(0.50)	0.30	(0.46)	0.35	(0.48)
Age (years)	19.85	(1.82)	19.62	(1.70)	19.71	(1.75)
Hours Listen to Music (average per day)	3.25	(2.72)	4.05	(3.23)	3.74	(3.07)
Hours Spend on Computer (average per day)	2.76	(2.20)	3.62	(2.78)	3.28	(2.60)
Expenses Less Than \$500	0.42	(0.49)	0.35	(0.48)	0.38	(0.49)
Expenses \$501-\$1000	0.39	(0.49)	0.42	(0.49)	0.41	(0.49)
Expenses Greater Than \$1000	0.19	(0.40)	0.23	(0.42)	0.21	(0.41)
Want 0 MP3s	0.14	(0.35)	0.04	(0.19)	0.08	(0.27)
Want 1-100 MP3s	0.50	(0.50)	0.29	(0.45)	0.37	(0.48)
Want 101-500 MP3s	0.28	(0.45)	0.44	(0.50)	0.38	(0.49)
Want 501+ MP3s	0.08	(0.27)	0.23	(0.42)	0.17	(0.38)
Do Not Share Because Others Will	0.28	(0.45)	0.07	(0.25)	0.15	(0.36)
Reluctant to Share Because Illegal	0.27	(0.44)	0.11	(0.31)	0.17	(0.38)
Reluctant Because University or ISP Discourages	0.16	(0.36)	0.06	(0.23)	0.10	(0.29)
Share to Ensure They Remain Freely Available on the Internet	0.56	(0.50)	0.78	(0.41)	0.69	(0.46)

\* All of the variables except for Age, Hours Listen to Music, and Hours Spend on Computer, are dummies variables where the mean is the percentage in that category.

TABLE 2: Means and Standard Deviations (sd) by Gender

Variable*	MALES		FEMALES		TOTAL	
	N=547		N=298		N=845	
	Mean	(sd)	Mean	(sd)	Mean	(sd)
Female					0.35	(0.48)
Makes MP3s Available	0.66	(0.47)	0.52	(0.50)	0.61	(0.49)
CSU	0.62	(0.49)	0.70	(0.46)	0.64	(0.48)
UMR	0.18	(0.38)	0.10	(0.30)	0.15	(0.36)
SMS	0.20	(0.40)	0.20	(0.40)	0.20	(0.40)
Age	19.77	(1.79)	19.60	(1.66)	19.71	(1.75)
Hours Listen to Music (average per day)	3.61	(2.93)	3.98	(3.29)	3.74	(3.07)
Hours Spend on Computer (average per day)	3.46	(2.74)	2.95	(2.30)	3.28	(2.60)
Expenses Less Than \$500	0.38	(0.49)	0.37	(0.48)	0.38	(0.49)
Expenses \$501-\$1000	0.40	(0.49)	0.41	(0.49)	0.41	(0.49)
Expenses Greater Than \$1000	0.21	(0.41)	0.22	(0.41)	0.21	(0.41)
Want 0 MP3s	0.05	(0.22)	0.13	(0.33)	0.08	(0.27)
Want 1-100 MP3s	0.35	(0.48)	0.42	(0.49)	0.37	(0.48)
Want 101-500 MP3s	0.38	(0.49)	0.37	(0.48)	0.38	(0.49)
Want 501+ MP3s	0.22	(0.41)	0.09	(0.28)	0.17	(0.38)
Do Not Share Because Others Will	0.15	(0.36)	0.15	0.36	0.15	(0.36)
Reluctant to Share Because Illegal	0.14	(0.35)	0.23	0.42	0.17	(0.38)
Reluctant Because University or ISP Discourages	0.07	(0.26)	0.13	(0.34)	0.10	(0.29)
Share to Ensure They Remain Freely Available on the Internet	0.69	(0.46)	0.69	(0.46)	0.69	(0.46)

\* All of the variables except for Age, Hours Listen to Music, and Hours Spend on Computer, are dummies variables where the mean is the percentage in that category.

Table 3: Logistic Regression for Making MP3s Available to Other Internet Users

	Coefficient	Std. Err.	Odds Ratio
UMR	0.122	0.254	1.13
SMS	-0.500**	0.205	0.61
Female	-0.430**	0.174	0.65
Age	-0.093	0.518	0.91
Age-squared	0.002	0.012	1.00
Hours Listen to Music	0.064**	0.031	1.07
Hours Spend on Computer	0.063	0.039	1.07
Expenses \$501-\$1000	0.342*	0.188	1.41
Expenses Greater Than \$1000	0.409*	0.228	1.51
Want 1-100 MP3s	0.570*	0.323	1.77
Want 101-500 MP3s	1.519***	0.335	4.57
Want 501+ MP3s	1.806***	0.388	6.09
Do Not Share Because Others Will	-1.564***	0.248	0.21
Reluctant to Share Because Illegal	-0.323	0.242	0.72
Reluctant Because University or ISP Discourages	-0.227	0.311	0.80
Share to Ensure They Remain Freely Available on the Internet	0.726***	0.176	2.07
Intercept	-0.148	5.671	
Log likelihood = -456.892			
Pseudo R-squared = 0.1911			

\* significant at the 0.10 level  
 \*\* significant at the 0.05 level  
 \*\*\* significant at the 0.01 level