



Why do people file share unlawfully? A systematic review, meta-analysis and panel study



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ABSTRACT

Unlawful digital media sharing is common and believed to be extremely damaging to business. Understanding unlawful file sharers' motivations offers the opportunity to develop business models and behavioral interventions to maximize consumers' and businesses' benefit. This paper uses a systematic review of unlawful file sharing research, and the Theory of Planned Behavior, to motivate a large-scale panel study in which initial determinants were used to predict subsequent behavior. A meta-analysis found Attitudes, Subjective Norms and Perceived Behavioral Control were all associated with unlawful file sharing. Media type and demographic differences in the importance of Perceived Behavioral Control were found and attributed to more accurate evaluation of familiar activities, i.e., greater experience increases the influence of Perceived Behavioral Control but age does not.

The panel study confirmed that greater past experience was associated with Perceived Behavioral Control and Intention. We conclude that past experience increases the efficacy of the Theory of Planned Behavior and specifically Perceived Behavioral control in predicting behavior, contrary to some widely held beliefs about the role of experience. The role of experience is therefore crucial to understanding people's choices. Practically, improving social approval, positive evaluation and access to lawful media should reduce unlawful behavior.

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1. Introduction

Approximately half the adult population of the United States share digital media unlawfully (Karaganis & Renkema, 2013) at an estimated cost of \$12.5 billion per year (Siwek, 2007). Unlawful file sharing, is where people copy, share or download media without the consent of the copyright holder. Unlawful file sharers are a vast source of potential customers who are viewed by the industry as a threat which must be countered to prevent the collapse of the legal marketplace (RIAA, 2015). This is not just a legal issue – legal interventions alone are often insufficient to motivate change. For example, a recent study has identified that reported file sharing behavior was predicted by the perceived benefit of the activity to

consumers, but not by perceptions of legal risk (Watson, Zizzo & Fleming, *in press*).

1.1. File sharing behavior

There are several different behaviors which are included in research on file sharing. While copying media has a long history and concerns with music and video piracy predate the internet, digital media are generally easier to copy than analogue media (Towse, *in press*). Uploading or sharing media is qualitatively different to downloading and requires different knowledge and actions. Uploading also carries different risks and benefits; specifically, it is riskier, with greater penalties and greater efforts expended to track uploaders than downloaders. In some countries downloading can be lawful when uploading is not. At the time of writing downloading is the most common form of unlawful file sharing with the widest availability, and requires low effort for high benefit (Ofcom, 2013; Watson, Zizzo & Fleming, *in press*). Lawful

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streaming, as opposed to downloading, is increasingly popular (Weijters, Goedertier, & Verstreken, 2014) but the legal position is complex – legal sites can host media which does not have copyright holder consent. There is little psychological research on streaming. Research into file sharing has often considered the different behaviors together, although they are distinct (Watson, Zizzo, & Fleming, 2015).

A successful intervention for unlawful file sharing requires an understanding of the problem, but there is a significant lack of existing data – a recent scoping review identified only 209 empirical articles (Watson et al., 2015). Of those articles, 32% used psychological models (of which the most common was the Theory of Planned Behavior, used in 13% of all empirical papers). The remaining research primarily focused exclusively on externally observable variables such as sales data (40%) or considered psychological determinants of file sharing using descriptive or ad hoc measures of attitudes/perceptions or qualitative interviews (28%).

1.2. The Theory of Planned Behavior

The Theory of Planned Behavior is an excellent starting point as it examines whether the causal motivations of opportunity, social norms or general attitude, separately, or in combination, motivate file sharing behavior within a validated, data-driven framework. Moreover, it was by far the most common model utilized in explaining file sharing identified in the review by Watson et al. (2015).

The Theory of Planned Behavior (TPB) is a socio-cognitive decision-making model that explains behavior by intention and three precursors to intention, *Attitude*, *Subjective Norms* and *Perceived Behavioral Control* (Ajzen, 1991). *Attitude* is a disposition to respond consistently favorably or unfavorably to an object, person, institution or event and could be influenced by advertising that highlights the potential costs of file sharing or benefits of legally-sourced media (Ajzen, 2005). *Subjective Norms* involve perceptions of 'significant others' preferences about whether one should, or should not, engage in the behavior; others' perceived approval increases the likelihood of intention and can be influenced by providing information about an alternate norm (Ajzen, 1991). *Perceived Behavioral Control* is influenced by beliefs concerning whether one has access to the necessary resources and opportunities to perform the behavior successfully (Ajzen, 1991). Both internal (personal deficiencies, skills, abilities) and external (opportunities, barriers, dependence on others) variables are important for determining Perceived Behavioral Control (Conner & Sparks, 1996). For example, Perceived Behavioral Control (PBC) could predict how barriers, such as website closures, are effective in deterring the behavior of file sharers. PBC is of particular interest because attempts to deter file sharers by affecting their perceived opportunities to access unlawful files have had mixed success. Studies have shown interventions can be effective in altering behavior via PBC for example with unlawful driving behavior (Elliott & Armitage, 2009). Danaher and Smith (2014) explored the impact of the shutdown of a major file sharing website and identified a statistically significant increase in digital movie sales. However, it is impossible to determine from this study whether the observed increase would last beyond the 18-week follow-up period. Poort and Leenheer (2012) found that the blocking of the Pirate Bay website had led to 21% of participants reporting less unlawful file sharing, but had no effect on 72%, while 5% said they downloaded more. One problem with these studies is that the effects may be moderated by the availability of substitute websites, and the ability of downloaders to swap to alternative unlawful sources. Presumably more experienced file sharers may be better able to identify and use alternative sites to the ones they are used to. PBC and experience may therefore

critically determine the effectiveness of blocking attempts and the variability in the reported behavior of Poort and Leenheer's (2012) data. Ajzen (2002b) argues that behavior is only unlikely to change if the environmental stimulus changes without a shift in the motivational and cognitive factors. The unavailability of a major downloading website does not necessarily imply change in people's intentions to unlawfully file-share. It is more likely that people will modify their behavior to match their intentions so long as they believe themselves capable of doing so (via PBC). It is argued that past experience only determines future behavior insofar as the past behavior fits the person's current intentions. For example, the 72% of unchanged behavior reported by Poort and Leenheer (2012) could be because, despite the environmental context changing, unchanged cognitive and motivational factors produce behavior that remains the same.

The predictive power of the basic TPB components with respect to intentions and behavior are addressed in this paper, first in a systematic review and then in a follow-up panel study. In the systematic review we consider unlawful file sharing broadly because the reviewed literature includes copying, sharing and downloading. In the subsequent panel study we focus on downloading.

2. Systematic review and meta-analysis

We used a systematic review of a decade's research (using the PRISMA framework; Liberati et al., 2009) to compare and aggregate the effects of Attitude, Subjective Norms and PBC across existing TPB studies. We wished to compare student and non-student groups – because we know student groups are much more likely to file share and therefore may have different motivations. There is a long tradition of caution in assuming that results from young, educated students automatically generalize to the wider population and here we can test if this is the case (Gordon, Slade, & Schmitt, 1986; Henrich, Heine, & Norenzayan, 2010). Specifically, we would expect students to have greater online experience and perhaps skills; there is some evidence that student social network use is similar in intention to non-student use but students are less likely to experience cybercrime, which supports the idea of their greater online skill (Benson, Saridakis, & Tennakoon, 2015). A similar rationale was used to compare age – which is associated with, but not identical to, student status and younger people have, in general, more rather than less past experience of file sharing (Bonner & O'Higgins, 2010; Coyle, Gould, Gupta, & Gupta, 2009; Rob & Waldfoegel, 2007; Sinha & Mandel, 2008). We were also interested in cross-cultural effects as unlawful file sharing varies by country which may be due to cultural, legal or economic differences (Watson et al., 2015). Here we compared individualistic with collectivist cultures (Hofstede, 2001) because it has been argued that this is a critical consideration when comparing the influence of different elements of the TPB. Specifically, it is argued that the role of social norms is greater in collectivist over individualist cultures (Al-Rafee & Dashti, 2012). Finally, we compared across different media types (e.g. videogames, music, software, movies) because they are shared and used differently and we wished to test whether socio-cognitive motivations differed across media (Watson et al., 2015). It was not possible to compare different types of file sharing (e.g., copying, sharing, downloading, general) because there were insufficient studies in the different categories to compare. The inclusion and exclusion criteria are summarized in Table 1 and the scope of the search is summarized in Table 2. The search string was utilized in four academic databases encompassing a range of disciplines: Web of Knowledge, EconLit, Communication and Mass Media, and PsychInfo. Search terms were applied to the "topic" of articles in Web of Knowledge and to the full text of

Table 1

Summary of inclusion and exclusion criteria.

Inclusion Criteria
<i>To be included research must:</i>
Estimate the relationship between at least one TPB construct (Attitudes, Subjective Norms or Perceived Behavioral Control) and either intentions to unlawfully download a media file for free from the internet or else actual unlawful downloading behavior
Include at least one of the following media: Music, movies, software, TV shows, videogames, e-books, or legal pornography
Be published in the English language
Be published after January 1st 2003 inclusive
Exclusion criteria
<i>Research is excluded where:</i>
Media files are acquired via a financial transaction
Media files contain illegal material (e.g. child pornography)
No novel data is presented (e.g. reviews, opinion pieces, dual publications)

Table 2

Search strategy for academic databases.

Population:
<i>Modes of sharing:</i>
(File sharing OR file sharing OR DRM OR Digital rights manag* OR digital medi* OR File upload* OR File download* OR Torrent file* OR peer-to-peer OR peer to peer OR p2p OR usenet OR freenet OR Newsgroup OR File transfer protocol OR ftp OR shared directory OR Piracy OR pirat* OR online piracy OR copywrit* OR intellectual property OR forum OR digital economy OR kazaa OR Limewire OR bittorrent OR Pirate Bay OR Napster OR isohunt OR eDonkey OR gnutella OR megaupload)
AND: Relevant media
(software OR video game OR video-game OR game OR gamer OR gaming OR electronic games OR digital game* OR digital music OR Music OR iTunes OR Album OR sound record* OR Music record* OR artist OR record sales OR DVD sales OR music purchas* OR DVD purchas* OR DVD OR film upload* OR film download* OR movie upload* OR movie download* OR motion picture* OR ebook OR e-book OR e book OR digital book* OR TV OR television OR tele vision OR tele-vision OR tele OR pornography OR porn OR xxx OR adult entertainment OR adult movie OR creativ* OR creator OR artist* OR entertain*)
AND: TPB terms (independent variables and outcomes)
(attitude* OR intention OR social norm* OR PBC OR perceived behavior* OR control OR TPB OR Theory of planned behavior* OR theory of reasoned action)
NOT: Noise inducing keywords
(Medical OR medicine OR medieval OR Navy or naval or maritime)

articles for the remaining databases. The database search was conducted on 21st October 2013. Additionally, articles which had already been identified via a scoping review of the file sharing literature (Watson et al., 2015) were also incorporated.

2.1. Data analysis

Where possible the correlations identified between the TPB constructs and intentions to unlawfully download media or else actual downloading behavior were subject to meta-analysis. Random effects meta-analysis was used on correlation coefficients (Rosenthal & Rosnow, 2008). Unfortunately, due to variation in model structure it was not possible to include articles that used only multivariate analyses and where bivariate correlations could not be obtained from the authors. The use of multivariate analyses prevents the accurate identification of the strength of the bivariate association between variables of interest necessary for meta-analysis (Peterson & Brown, 2005). The tabulated results of all studies and non-included studies as well as heterogeneity and publication bias tests are available in the supplementary information.

2.2. Results and discussion

The search identified 4968 articles in total which, after screening, yielded 33 studies for inclusion, with a total sample size of 13,267 participants; see Fig. 1 and Table 3 for details. 12 studies were omitted from the meta-analysis because we could not obtain correlation coefficients for them. One study only measured intentions to engage in lawful behavior (Papies & Clement, 2008). All of the omitted studies identified positive associations where reported, and so their omission is unlikely to result in falsely identifying a significant correlation between variables in meta-analysis. All but one of the studies used a cross sectional design (Taylor,

2012). Taylor (2012) used software to track the actual downloading of media via p2p networks in student dormitories. This was also the only study to correlate intentions with future behavior with all other studies that estimated the correlation between the TPB constructs and behavior utilizing a measure of past experience ($k = 7$). Most studies either did not specify which media were of concern in their surveys ($k = 11$), or else were interested in unlawful sharing of software ($k = 11$). The remainder focused on the downloading of music, videogames, and movies. Culturally, 20 studies were conducted in individualistic (Western) countries, and 13 in collectivist (Eastern) countries. Studies primarily drew their samples from university student populations ($k = 22$). The average age ranged from 19.1 to 37.5 years.

We tested across student status (student versus non-student samples), media (music, movies, software, etc.), and culture (individualist/Western versus collectivist/Eastern). See Fig. 2 for subgroup analyses of the association between TPB constructs and file sharing intentions. Non-overlapping confidence intervals indicate meaningful differences between Pearson's correlation coefficients (Higgins & Green, 2009). This method is appropriate where there is insufficient power for formal tests of interactions (Dijkman, Kooistra, & Bhandari, 2009; Matt & Cook, 2009). Lower, non-overlapping correlation coefficients between PBC and intention were observed for the non-student population and for software as compared to the student population and other media respectively indicating a potentially meaningful difference between these groups. It should be noted that the number of studies in different subgroups did vary, especially for comparisons between student and non-student populations. This is reflected in differences in confidence in the combined effect size estimate, where we have greater confidence in estimates of population effects for student over non-student samples. Age was also examined directly by regressing TPB components against average sample age; no effect was found for Attitude or Subjective Norms ($p > 0.05$) but PBC, i.e.

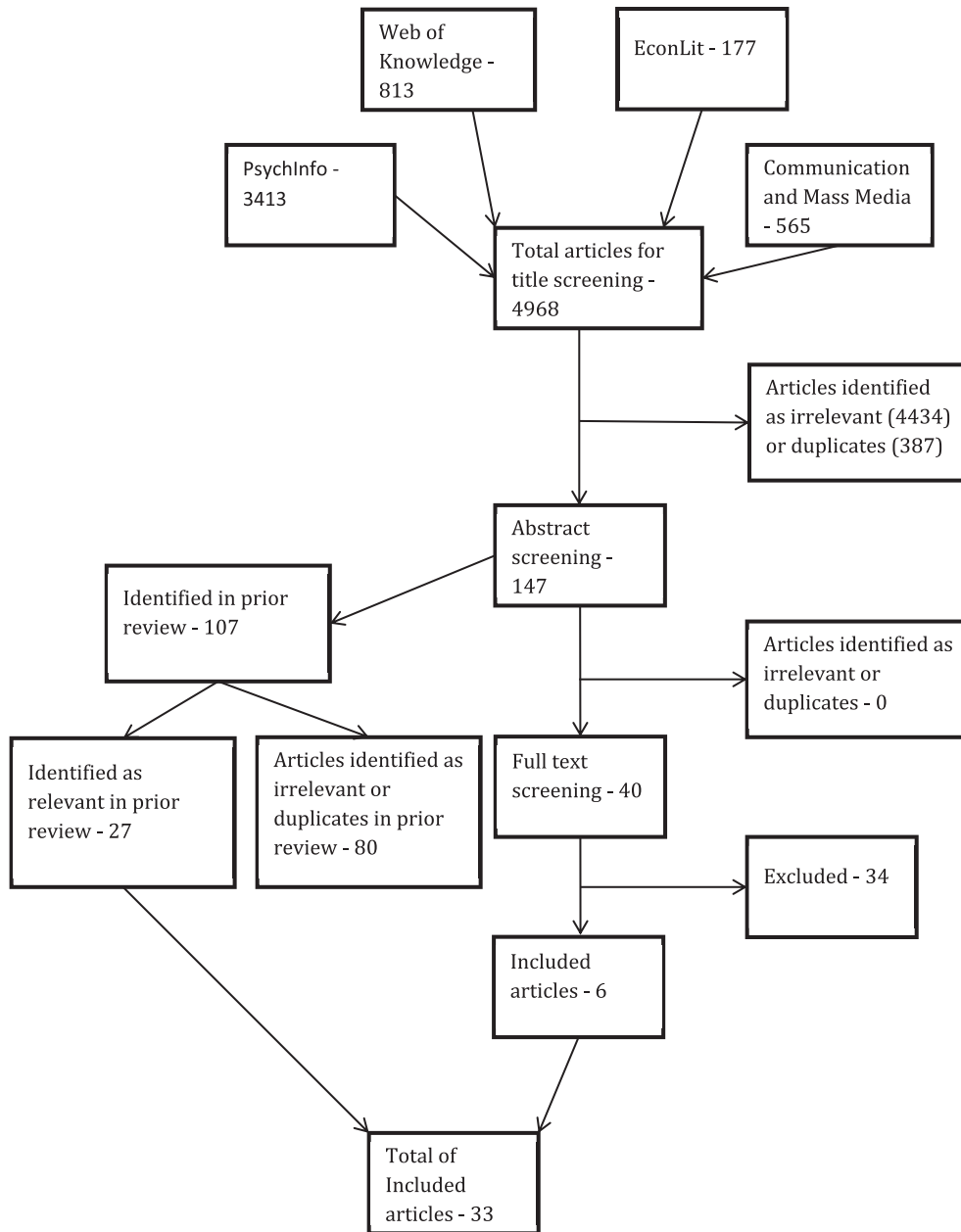


Fig. 1. Flow diagram of articles included in the review.

personal skills and opportunities, were significantly more predictive for younger participants ($k = 13$, $B = -0.845$, $p = 0.004$, $R^2 = 0.715$).

We found the influence of PBC on intention was diminished when considering the downloading of software compared to music and generic file sharing estimates (see Fig. 2). We conclude that evaluation of personal skills and opportunities will be less accurate when downloading obscure pieces of software (Sheeran, Trafimow, Finlay, & Norman, 2002). No effect was found for Attitudes or Subjective Norms across media.

We expected the importance of Subjective Norms to vary by culture, as individual and collectivist cultures are said to have different perceptions of cultural goods (Al-Rafee & Dashti, 2012; Oyserman, Coon, & Kemmelmeier, 2002). However, no cultural differences were found in the meta-analysis.

File sharing is predominantly carried out by young people and

students and therefore age and student status differences were expected, and found. PBC was more influential in determining intentions in student and younger samples (see Fig. 2). Our meta-analysis cannot distinguish the extent to which the effect is mainly due to age or student status. Although typically, in domains such as health, the influence of TPB moderators increases with age (Hagger, Chatzisarantis, & Biddle, 2002), file sharing is learned at a young age and it could be expected that TPB components would be more predictive among students and younger people (Malin & Fowers, 2009).

All three components of TPB predicted file sharing intention but PBC was more influential in determining intentions in student and younger samples and in relation to music and media other than software (Fig. 2). Past experience, i.e., the amount of previous within-domain (e.g. music) file sharing, can explain both cases. Typically, people become more familiar with their own capabilities

Table 3
Summary of included study characteristics.

First Author	Year	Study design	Media	Sample origin	Population	Setting	Avg. age	% male	n	Model description
Aleassa	2011	Cross-section	Software	Jordan	University business students	Not described	20.3	41	323	TRA
Allen	2010	Cross-section	Digital media	Australia	Adults recruited from university notice boards. 50% were students.	Online questionnaire	25.61	59	174	TPB
Al-Rafee	2012	Cross-section	Digital media	USA/ Kuwait	University business students in the USA and Kuwait	Questionnaires completed during classes	23 USA, 19.7 Kuwait	58 USA, 39 Kuwait	285 USA, 328 Kuwait	Extended TPB, which incorporates moral reasoning as an additional predictor of intentions
Anwar	2012	Cross-section	Software	Malaysia	Information management students	Not described	21.44	42	397	Novel model which utilises attitudes and subjective norms as measured in the TPB to predict intentions, although the TPB is not mentioned in the article. Model also utilises procedural and reciprocal fairness to estimate intentions.
Blake	2013	Cross-section	Digital media	USA	University Business and Economics students	Not described			179	TPB
Chan	2013	Cross-section	Software	China	Frequent computer users with access to the internet	e-mailed survey	33	52	503	Extended TPB incorporating moral judgement as a factor related to attitudes and intentions, and moral intensity as a factor influencing moral judgement and intentions.
Chen	2009	Cross-section	Software	China	Internet users of an online questionnaire website	Online questionnaire	24.5	55.14	584	Extended TPB incorporating moral judgement and intensity as a factor that moderates PBC, subjective norms and attitudes, as well as directly influences intentions
Chullasang	2009	Cross-section	Digital media	Thailand	Computer and internet users over 6 years old	Online questionnaire distributed via e-mail and online communities	28	41.1	355	Extended TPB incorporating past behavior as an influence on intentions
Cronan	2008	Cross-section	Digital media	USA	Students from a Business college	Questionnaires completed during classes	23.5	58.6	280	Extended TPB incorporating past behavior and moral obligations as an influence on intentions
d'Astous	2005	Cross-section	Music	Canada	Business students	Not described	22	60.4	139	Extended TPB incorporating past behavior, personal consequences, and ethical predispositions as an influence on attitudes. Past behavior also proposed as an influence on intentions.
Goles	2008	Cross-section	Software	USA	Business students	Pen-and-paper questionnaires and internet completion	23	47.58	455	Novel model which utilises attitudes as defined in the TPB.
Huang	2007	Cross-section	Software	China	University students (n = 95), IT workers (n = 62), and middle managers (n = 42)	Not described			199	Extended TPB incorporating price and perceived legal punishment as factors affecting intentions
Jaafar	2008	Cross-section	Software	Malaysia	University students that use computers frequently (Schools of Management, Science and Education)	Not described	21.72	52	150	Novel model which utilises attitudes and intentions from the TPB
Koklic	2012	Cross-section	Digital media	Slovenia	Slovenian consumers	Self-completed, otherwise not described	37.5	45.2	843	Novel model which utilises attitudes and intentions from the TPB
Kwan	2008	Cross-section	Software, movies, music	China	Members of an e-government portal site (approx. 250,000 members)	Online questionnaire distributed via e-mail to online community	30.84	49.07	971	Extended TPB incorporating moral beliefs as an antecedent of attitude based upon perceptions of lawfulness and perceive punishment severity
Kwong	2008	Cross-section	Music	USA	University Students	Invited during class to complete survey			217	Extended TPB with perceived service quality influencing PBC and perceived ease of use. Perceived ease of use influencing PBC and perceived attitudes, and perceived usefulness, and perceived usefulness influencing attitudes
Liao	2010	Cross-section	Software	Taiwan	Forum and message board users	Web based survey distributed via forums and message boards in Taiwan	24.5	55	305	Extended TPB with perceived risks (performance, social, prosecution and psychological) influencing attitudes and intentions

(continued on next page)

Table 3 (continued)

First Author	Year	Study design	Media	Sample origin	Population	Setting	Avg. age	% male	n	Model description
Moore	2009	Cross-section	Software	USA	Business students	Questionnaires completed during classes	25.7	52	103	Extended TPB with knowledge of software piracy influencing perceived likelihood of punishment and fear of legal consequences, and these then impacting upon attitudes
Morton	2008	Cross-section	Music	USA	University students aged 18+	Paper questionnaires completed during class	25.12	51.9	216	Extended TPB with punishment severity and probability influencing attitudes
Nandedkar	2012	Cross-section	Music	USA	University students	Online questionnaire	20	55.25	219	Novel model based on TRA. Incorporates only attitude intentions relationship, with attitudes impacted upon by risk perceptions as mediated by optimism bias, habit, and facilitating conditions
Papies	2008	Cross-section	Movies	Germany	Users of a major media download service in Germany and website of a popular German movie magazine	Online survey distributed via media websites	33.9	61.6	1050	Extended TPB with attitudes impacted by the advantage of the new legal service over old, the complexity of the service, and compatibility of the service with everyday life. Intention impacted by past behavior, planned use for service, the innovativeness of the service, and price consciousness
Peace	2003	Cross-section	Software	USA	Working adults taking part time MBA evening classes	Paper questionnaires completed during class	29	61	201	Extended TPB with punishment severity and probability influencing attitudes, and punishment probability also impacting upon PBC. Software costs also presented as influencing attitudes
Phau	2012	Cross-section	Video-games	Australia	University sample - not specified if all students	Self-administered after being intercepted on campus	21.5	47.8	344	Novel model which utilises attitudes and intentions from the TPB
Phau	2010	Cross-section	Software	Australia	University students	Questionnaires completed during classes	21	48	206	Novel model which utilises attitudes and intentions from the TPB
Plowman	2009	Cross-section	Music	Australia	University students	Questionnaires completed during classes	19.09	44	206	Extended TPB with deterrent effect of laws and desire for equitable relationships impacting upon attitudes and intentions. Intentions also impacted by price of music, de-individuation, and perceived quality of online music
Taylor	2012	Prospective	Digital media	USA	Students living in campus dormitories with a personal computer and comfortable unlawfully file sharing	Questionnaire completed in university computer laboratory upon invite. MovieLab software monitored unlawful file sharing activity remotely without knowledge of participants			267	Model based on the model of goal directed behavior, including intention and observed behavior
Taylor	2009	Cross-section	Movies and music	USA	University population including students and staff	e-mail invitation to online survey			1799	Modified model of Goal Directed Behavior. Includes TPB constructs.
Wang	2009	Cross-section	Music	Taiwan	Teenagers, although included a number of participants aged over 20	Intercept questionnaires in areas frequented by teenagers	19.69	34.1	261	TPB
Wang	2011	Cross-section	Digital media	USA	University students	Online questionnaire	20.7	39	574	TPB
Wang	2012	Cross-section	Digital media	USA	University students	Online questionnaire	20.8	37	547	Extended TPB with past behavior and anticipated guilt and emotions as moderators on intentions
Yoon	2011	Cross-section	Digital media	China	University students	Questionnaires completed during classes	24.5	50.6	270	Extended TPB with habit and perceived risk impacting upon attitudes, perceived benefit impacting upon attitudes and intentions, justice beliefs impacting upon subjective norms, and moral beliefs impacting upon subjective norms and intentions
Yoon	2012	Cross-section	Digital media	South Korea	University students	Not described	24.5	49.5	317	TPB

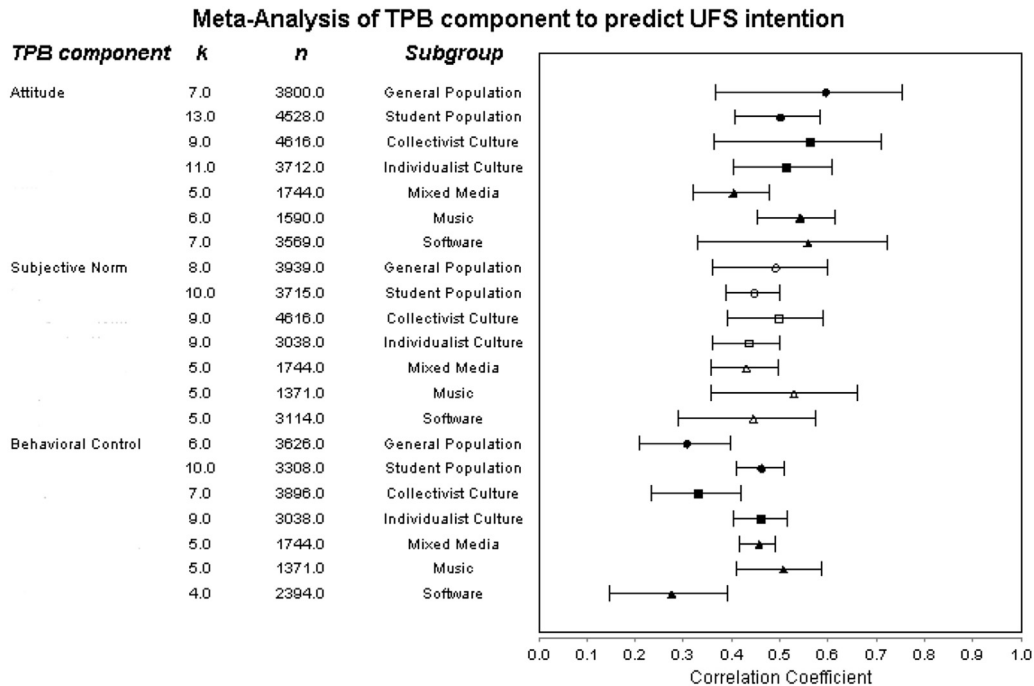


Fig. 2. Subgroup Analyses Exploring Sources of Heterogeneity Between Estimates of Effect Size Between the TPB Constructs and Intention to File Share, bars indicate confidence intervals.

with age; however, it is plausible to assume that, given the pace of technological innovation, in the case of file sharing older people are less familiar and younger people, more familiar. This is supported by average reported file sharing (Poort & Leenheer, 2012). Software file sharing is less frequent than music and general media and is therefore also less familiar (Ofcom, 2013). In both cases past experience is likely to be greater where PBC was more influential, with students and music.

There are two competing hypotheses for the role of past behavior in the Theory of Planned Behavior. One view is that greater past experience with a behavior leads to more accurate self-assessments of opportunity/ability and therefore better behavioral prediction based upon those assessments (Ajzen, 2002a; Fazio & Zanna, 1981; Hagger et al., 2002). Alternatively, past behavior can suggest that a habit has formed where rational evaluation and mindfulness is diminished and socio-cognitive prediction is attenuated (Triandis, 1977). Although it may be that both habit and intention are predictive of behavior (Lheureux, Auzoult, Charlois, Hardy-Massard, & Minary, 2016). Past experience, age and student status are positively associated in other domains because most behaviors become more familiar with age (older people are typically relatively experienced, non-students). However, unlawful file sharing offers a contrast to previous research on the role of experience because younger people typically have more experience, with consequent higher self-knowledge and predictive power (Allen, Shepherd, & Roberts, 2010; Bonner & O'Higgins, 2010; Filiciak, Hofmokl, & Tarkowski, 2012; Rob & Waldfogel, 2007). This distinction is important; if past experience enhances the accuracy of TPB models, then the most commercially important group of highly experienced file sharers can be targeted more effectively with psychologically-based interventions but if the opposite view is correct intervention may be more difficult.

3. Panel study

The meta-analytic findings show PBC is more influential in

situations where greater experience is likely; this suggests greater past experience leads to more accurate self-assessments of opportunity/ability and improves prediction of behavior (Ajzen, 2002a; Hagger et al., 2002). However, this research did not measure past experience directly, and sub-group analyses relied on limited samples, with corresponding limitations in power. To verify the robustness of our findings, we carried out a large panel survey and examined the role of past experience on reported eBook and music downloading behavior two months later. The panel survey focused on downloading, instead of other aspects of file sharing, as this is currently the most common form of unlawful file sharing (Ofcom, 2013). The systematic review revealed an effect of PBC across varied types of file sharing in different studies. The use of a more specifically defined behavior while investigating file sharing should reduce measurement error and give a more in depth and accurate understanding of downloading behavior (Watson et al., 2015). This comes at the cost of not examining the file sharing behaviors of copying or uploading. Music files and eBooks were chosen as comparison media. Music is the most commonly studied medium and can act as a benchmark. eBooks are a relatively more recent medium and of more interest to older consumers; both factors should reduce the familiarity of downloading this medium (Poort & Leenheer, 2012).

Based on the theoretical predictions and the results of the meta-analysis, the panel study tested the idea that greater past experience influences PBC-intention predictions for unlawful downloading. Specifically, we hypothesized that: as in the meta-analysis, the three main factors of TPB will predict intention (H1), that intention will predict behavior (H2), that age will associate negatively with past experience (H3) and that modeling past experience would have an indirect impact on the association between PBC and intention (H4). Finally, we predicted that for a low familiarity medium (eBooks) the TPB factors, and PBC in particular, would be less predictive of intention (H5).

4. Panel study - methods

4.1. Participants

Email invitations were sent to UK residents via a market research company for participation in a two-part panel study. Quotas were determined in advance to be approximately representative of the UK population across ages and gender and to ensure a sufficient sample of declared unlawful downloaders based on estimates from existing work. It is estimated that of UK internet users that consume media online 30% have consumed some unlawful online content. However, estimates for specific media are lower (26% for music, and 9% for eBooks) (Ofcom, 2013). Therefore, large sample sizes are necessary to ensure adequate samples of unlawful content consumers. Recruitment for part 1 was halted at 2500 completions. Participants were randomly allocated to one of two media types: eBooks (N = 1036, 406 men, 646 women, aged 16–84, $M = 46.3$ years, $SD = 15.57$ years) or music files (N = 959, 397 men, 557 women aged 16–82, $M = 45.0$ years, $SD = 15.80$ years). 5198 participants attempted part 1 (56% response rate); 2693 failed to complete, 101 withdrew, 110 were excluded for completing the questionnaire in less than six minutes and 88 were removed for inconsistent demographic data between part 1 and part 2. The questionnaire had 150 questions and excluding participants who on average spent less than 2.4 s on each question was a way of removing participants who clearly did not take the task seriously. All participants were randomly allocated to either have their IP address revealed to them or not. However, this manipulation did not identifiably alter participant responses and so is not reported here. Two months later invitations were sent for Part 2 which added the variable of reported behavior, therefore all analyses with this variable include only the 737 (eBooks, 309 men, 396 women, aged 16–84, $M = 47.2$ years, $SD = 15.35$ years) and 658 (music files 286 men, 346 women, aged 16–83, $M = 47.3$ years, $SD = 15.36$ years) participants who completed both parts. 1543 participants attempted Part 2 (74% response rate), 41 failed to complete, and 19 participants withdrew. These samples were somewhat representative of the UK population (49% men, $M = 40$ years, Office for National Statistics, 2012).

4.2. Materials and procedure

The eBooks and music unlawful downloading questionnaires were identical except that all references to eBooks were replaced with *music files*. Part 1 was a multi-item online questionnaire including past behavior and TPB measures of Attitude, Subjective Norm, PBC, and intention to download over the following two months. Median time to complete was 15 min. Part 2, taken two months later, began with a measure of self-reported downloading over the previous two months. It also included a separate experiment (not reported here). Median time to complete part 2 was 7 min.

4.2.1. Past experience

Participants were asked two open response questions on separate screens: "How many *music tracks* have you downloaded in the past year? If you are unsure give your best estimate." And "Of the *music tracks* that you have downloaded in the last year, how many were paid for?" The scores were subtracted to calculate the total number of unpaid downloads in the last year. These questions were based on Ofcom (2013); a third item was included to distinguish unlawful free downloads but comprehension of the question was

low and it is not included in the primary analyses.¹ While it was desirable to directly examine unlawful past behavior for the increased specificity it provides, there was insufficient unlawful-declared behavior for meaningful SEM analysis.²

As an alternative proxy for unlawful downloads, we use unpaid downloads. Although lawful and unlawful downloads are not distinguished in the following analyses, unpaid downloads can proxy for unlawful downloads because a high volume of unpaid for downloads are unlawful (Peha & Mateus, 2014) and because many consumers cannot tell the difference between the two (Huygen, Helberger, Poort, Rutten, & Van Eijk, 2009). In either case, they offer general experience with the process of downloading which we wish to measure. The resulting past experience scores were skewed; many respondents stated that they had downloaded no unpaid files. This was also the case for intention and subsequent behavior. Three categories were used for these variables, the *minimum score* (zero for past experience), and the remaining participants were grouped into *low* and *high* reported past experience or intention based on a median split of the non-zero data. This produced the following distribution between the groups: zero past behavior (music n = 396; eBooks n = 304), low past experience (up to and including 3 files; music n = 92; eBooks n = 260), and high past experience (more than 3 files; music n = 170; eBooks n = 173).

4.2.2. Age

Participants' age was measured in Part 1 and Part 2; the Part 2 score was used to examine the difference identified in the meta-analysis between age groups and students/non-students.

4.2.3. Theory of Planned Behavior measures

Items to measure Attitude, PBC, Subjective Norms and intention were all gathered on Likert-type scales anchored from 1 *strongly disagree* to 7 *strongly agree*. Attitude was measured by three items, e.g. "Overall I believe unlawfully downloading eBooks in the next two months would be favorable" ($\alpha = 0.848$ eBooks/ $\alpha = 0.894$ music). Two items measured PBC, e.g. "I have the skills required to download *e-books* unlawfully in the next two months" ($\alpha = 0.730$ eBooks/ $\alpha = 0.739$ music). A further item assessing external control in PBC was removed as it lowered reliability. Subjective norms were measured using four items, e.g. "Unlawfully downloading eBooks is a very common activity among people like me" ($\alpha = 0.742$ eBooks/ $\alpha = 0.822$ music). Finally, intention was measured using a four-item scale, e.g. "Over the next two months I intend to download *e-books* unlawfully for my own personal use" ($\alpha = 0.937$ eBooks/ $\alpha = 0.953$ music). As with past experience, intention was categorized based on a median split of the non-minimum score data, and specifically as minimum intent (a score of 4; music n = 409; eBooks n = 495), low intent (a score of 5–11; music n = 107; eBooks n = 123), and high intent (a score of 12 or higher; music n = 142; eBooks n = 119).

4.2.4. Subsequent behavior

In part 2 of the questionnaire, two items were combined to calculate unlawful downloading behavior in the intervening two months that were the target of the intention items. Firstly,

¹ 74 people gave a response for the lawful unpaid downloads that, when added to the paid downloads, was greater than the total downloads.

² Using the third question to identify unlawful downloading behavior for music we find 608 with 0 unlawful files, 11 people with 1–3 files and 36 people with more than 3 files. For eBooks we find 701 people with 0 unlawful files, 21 people with 1–3 files and 12 people with more than 3 files. This is much lower than the subsequently reported unlawful behavior which used a revised question. This supports the view that participants misinterpreted the final past behavior question. Using this data set results in small minimum cell sizes when predicting intention and very low power.

Table 4
eBooks Descriptives and Non-parametric Correlations.

	M	SD	2	3	4	5	6	7
1 Attitude	6.5	3.93	0.682***	0.341***	−0.228***	0.019	0.544***	0.174***
2 Subjective Norm	11.6	5.22		0.422***	−0.241***	0.016	0.490***	0.242***
3 Perceived Behavioral Control	7.1	3.71			−0.109**	0.006	0.263***	0.123**
4 Age	47.2	15.35				−0.005	−0.259***	−0.169***
5 Past Experience (Zero/Low/High)	304	/260	/173				0.038	0.091*
6 Intended Behavior (Min/Low/High)	495	/123	/119					0.268***
7 Reported Behavior (Zero/Low/High)	644	/57	/36					

Note. Age, Past Experience, Intended Behavior and Reported Behavior are reported frequency by category, not mean or standard deviation. Two-tailed uncorrected p-values are reported * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

participants were asked “How many eBooks have you downloaded in the past two months (of all kinds)?” then they were asked, “What percentage of those eBooks were lawful?” The second score was transformed to calculate the unlawful remainder from 100% and then multiplied by the total number of downloads to calculate the total number of unlawful downloads. As with past behavior and intention, subsequent behavior was categorized based on a median split of the non-zero data, and specifically as zero (music $n = 540$; eBooks $n = 644$), low behavior (up to and including 3 files; music $n = 43$; eBooks $n = 57$), and high behavior (more than 3 files; music $n = 75$; eBooks $n = 36$).

4.3. Results

Data were analyzed via structural equation modeling using EQS 6.1 (Bentler & Wu, 2002). The hypothesized model was tested separately for (1) music files and (2) eBooks. For models containing ordinal categorical variables (such as our intention, behavior, and past experience measures) the least squares estimation method was utilized (Lei, 2009). For such models, EQS uses polychoric or polyserial correlations and an analytical approach developed by Lee, Poon, and Bentler (1995). A robust chi-square statistic ($S-B\chi^2$; Satorra & Bentler, 1994) and robust parameter standard errors (Bentler & Dijkstra, 1985) are produced to correct for non-normality in large samples (200–500 cases; West, Finch, & Curran, 1995).

The degree of model fit was evaluated using multiple fit indices, such as the robust chi-square statistic, the robust comparative fit index (RCFI), the robust non-normed fit index (RNNFI), the standardized root mean residual (SRMR), and the robust root mean square error of approximation (RRMSEA). Tables 4 and 5 present descriptive statistics and intercorrelations among all of the music file and eBook variables used in the study, respectively. Cronbach's alpha was employed to assess the internal reliability of the attitude, Subjective Norms, and PBC measures. These three constructs were tested as latent variables using the items in each scale as indicators (i.e., 3 attitude items, 4 Subjective Norms items, two PBC items). All latent factors were inter-correlated and one item from each factor was fixed to 1.0 for purposes of identification and latent variable scaling. In line with the recommended two-step approach (Anderson & Gerbing, 1988), the proposed 3-factor measurement model was tested using confirmatory factor analysis (CFA) prior to testing the full structural equation model in relation to (1) music files and (2) eBooks. Intention, behavior, and past experience were all tested as observed categorical variables.

4.3.1. Music files

The results supported the fit of the three-factor measurement model and, therefore, the use of these items as indicators of latent Attitude, Subjective Norms, and PBC factors: $S-B\chi^2(24) = 150.20$, $p < 0.001$, RCFI = 0.98, RNNFI = 0.97, SRMR = 0.03, RRMSEA = 0.07

(90% CI = 0.06 - 0.09). Subsequently, intention, behavior, past experience, and age were added to the model as observed variables and the hypothesized structural paths were also tested. The full structural equation model demonstrated a good fit to the data: $S-B\chi^2(59) = 195.29$, $p < 0.001$, RCFI = 0.97, RNNFI = 0.96, SRMR = 0.06, RRMSEA = 0.06 (90% CI = 0.05 - 0.07). The standardized path coefficients are presented in Fig. 3. As illustrated in Fig. 3, an intention to unlawfully download music was predicted by Attitude only, and so H1 is only partly supported, with Subjective Norms and PBC not predictive of intention. This is an interesting finding that diverges from the meta-analytic results. It may be that Attitudes are more important than Subjective Norms for music because people are very familiar with music downloading and are confident in their beliefs on whether they should be doing it or not. There is a trend which supports this finding in the meta-analytic results.

As expected, intention positively predicted actual behavior, and so H2 is supported. A negative relationship between age and past experience was also observed, which supports H3. This is an important control because the systematic review found PBC was less predictive for older participants; this negative relationship indirectly supports this finding. It is not age but past experience which influences the effect of PBC on intention. There was evidence of an indirect effect of PBC on intention via past experience, which supports H4. In other words, past experience is positively associated with one's capacity to control unlawful downloading behavior. It is important to remember that past experience in this instance includes lawful and unlawful unpaid downloads. Even including unpaid lawful download experience, there is still a positive association with capacity to control unlawful downloading behavior. Confirmation of the moderating effect of past experience was found using a bootstrapped linear regression to predict the untransformed intention scale; an interaction was found between past experience (binary: none vs some past experience) and PBC. Attitude, past experience and age were also significant predictors, but Subjective Norms was not. We wished to test if this analysis would hold with the subset of the data for unlawful unpaid past experience. A second bootstrapped linear regression analysis was carried out using the unlawful downloading data to test whether the pattern of results remained significant. Again, a moderating effect of past experience was found. The structural equation model explained 93% of the variance in categorical intention (i.e., high, medium, low; $R^2 = 0.931$) and, in turn, intention explained 52% of the variance in self-reported behavior at the second time point ($R^2 = 0.517$).

4.3.2. eBooks

Similarly, the three factor CFA measurement model demonstrated an acceptable fit to the data: $S-B\chi^2(24) = 178.18$, $p < 0.001$, RCFI = 0.97, RNNFI = 0.95, SRMR = 0.04, RRMSEA = 0.08 (90% CI = 0.07 - 0.09). Subsequently, intention, behavior, past

Table 5
Music descriptives and non-parametric correlations.

	M	SD	2	3	4	5	6	7
1 Attitude	7.5	4.39	0.643***	0.348***	-0.157***	0.322***	0.670***	0.388***
2 Subjective Norm	13.9	5.97		0.459***	-0.240***	0.253***	0.522***	0.324***
3 Perceived Behavioral Control	7.9	3.69			-0.104**	0.125**	0.319***	0.206***
4 Age	47.3	15.36				-0.020	-0.178***	-0.111**
5 Past Experience (Zero/Low/High)	396	/92	/170				0.348***	0.363***
6 Intended Behavior (Min/Low/High)	409	/107	/142					0.422***
7 Reported Behavior (Zero/Low/High)	540	/43	/75					

Note. Age, Past Experience, Intended Behavior and Reported Behavior are reported frequency by category, not mean or standard deviation. Two-tailed uncorrected p-values are reported * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

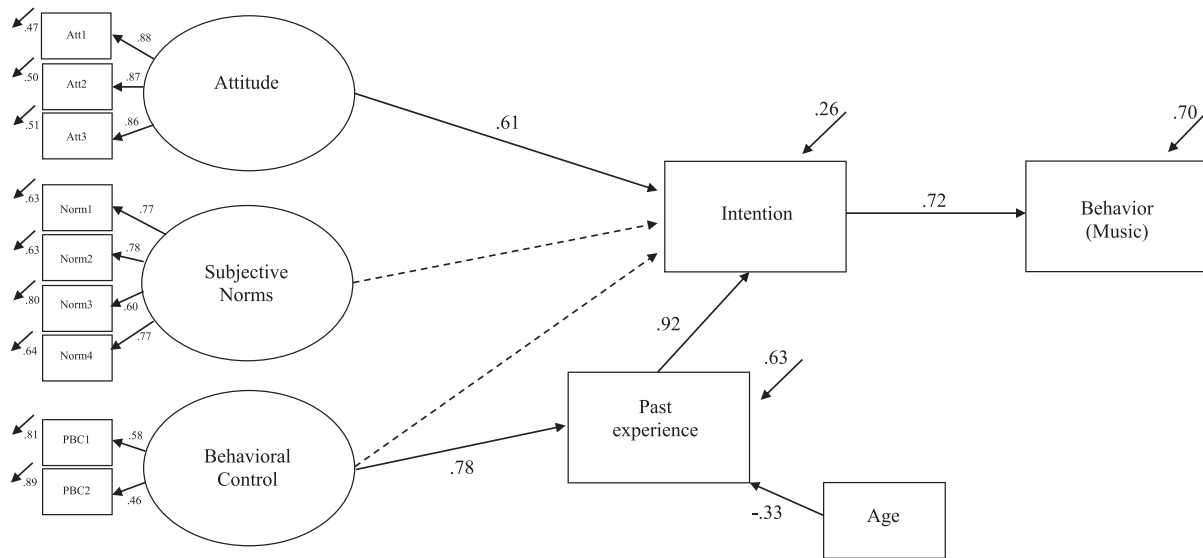


Fig. 3. TPB model predicting unlawful downloading of music files (controlling for past experience and age). Note: Dotted lines represent non-significant parameters. Standardized beta coefficients are presented on the significant pathways. Other figures represent disturbance terms. Correlations between latent factors were: Attitudes-Norms = 0.75, Attitudes-Perceived Behavioral Control = 0.71, and Norms-Perceived Behavioral Control = 0.84.

experience, and age were added to the model and structural pathways were specified. The full model demonstrated a good fit to the data: $S-B\chi^2(59) = 138.41$, $p < 0.001$, $RCFI = 0.97$, $RNNFI = 0.97$, $SRMR = 0.05$, $RRMSEA = 0.04$ (90% CI = 0.03 - 0.05). The standardized path coefficients are presented in Fig. 4. As illustrated in Fig. 4, and in contrast to the findings relating to music, intention to unlawfully download eBooks was predicted by Subjective Norms only, providing partial support for H1. This finding is opposite to what we found for music where Subjective Norms failed to predict intention. It may be that, because eBook downloading is less familiar, people are less confident in their own beliefs and more willing to rely on the perceived judgments of others. In support of H5, regression paths between Attitude and PBC and intention were not significant, and, in addition, non-significant pathways were observed between behavioral control and past experience and, in turn, past experience and intention. With a comparatively new medium such as eBooks, past experience across many years remains limited and unable to make a difference. It is also possible that less eBooks downloading is unlawful in the first place, that is our proxy of unpaid downloads for unlawful downloads may be less accurate. Age was also unrelated to past experience. As expected (H2), intention positively predicted actual behavior. This suggests media specific psychological determinants. The model explained 89% of the variance in categorical intention (i.e., high, medium, low; $R^2 = 0.890$) and, in turn, intention explained 25% of the variance in self-reported behavior at the second time point ($R^2 = 0.245$), which

is less than the variance in self-reported behavior at the second time point for music files.

5. Discussion

To address unlawful file sharing stakeholders need to understand why people file share. This paper uses the first systematic review of its type to demonstrate multiple determinants of intentions and behavior, and a moderating effect of past experience. The subsequent panel study showed a similar pattern for unlawful downloading behavior. In both studies Attitude, Subjective Norms and PBC were generally predictive of intentions and behavior, although the panel study found that substantial variance was shared by Attitude and Subjective Norms (see Tables 4 and 5) and unlike the meta-analysis Subjective Norms were not predictive for music, while Attitude was not predictive for eBooks.

The strength of the relationship between the TPB components and the behavior is dependent upon the type of behavior being examined and the context in which it is enacted (Ajzen, 1991; Armitage & Conner, 2001). It means that some situations may be attitudinally controlled and/or that some individuals may be attitudinally controlled (Trafimow & Finlay, 2001). This could explain why we find that Subjective Norms were predictive for eBooks but not music. This is in contrast to research which has found that when media is more social (e.g. music), than non-social (e.g. software) that Subjective Norms are more influential (Taylor, Ishida, &

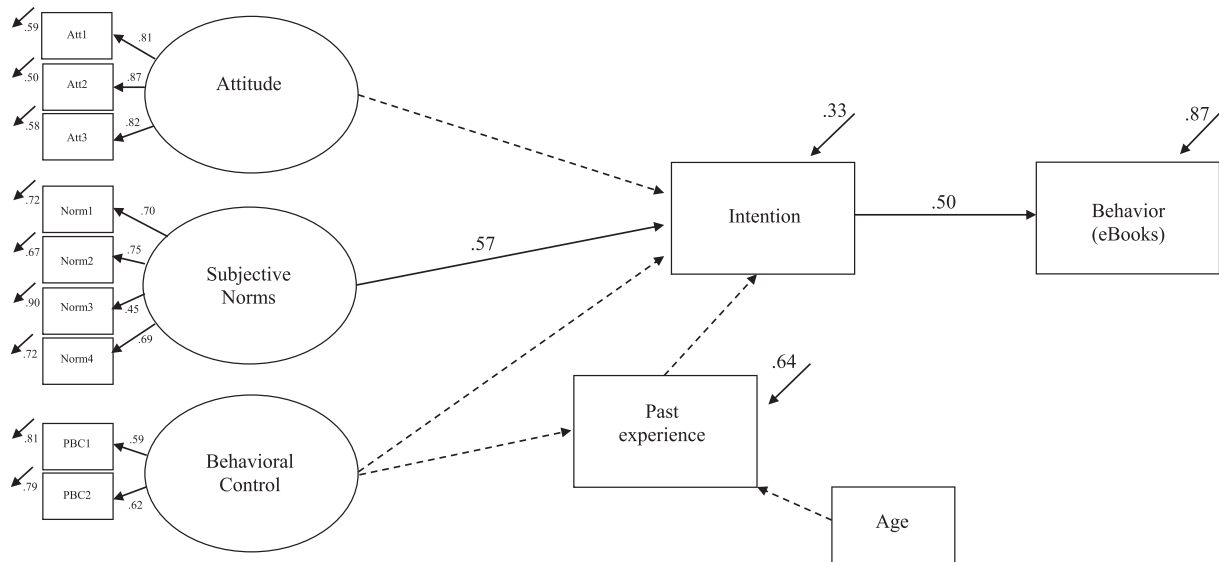


Fig. 4. TPB model predicting unlawful downloading of eBooks (controlling for past experience and age). Note: Dotted lines represent non-significant parameters. Standardized beta coefficients are presented on the significant pathways. Other figures represent disturbance terms. Correlations between latent factors were: Attitudes-Norms = 0.86, Attitudes-Perceived Behavioral Control = 0.54, and Norms-Perceived Behavioral Control = 0.70.

Wallace, 2009). In the present study participants may not have placed importance on others' approval or disapproval regarding music downloading, but used their own individual evaluation of the behavior in question because it was familiar and they were confident in their own view (i.e. Attitude was dominant for often practiced behaviors, and was found to predict unlawful music downloading). Attitudes are more predictive when easier to recall (Glasman & Albarracín, 2006). Conversely for the downloading of eBooks we have found that individuals are not attitudinally controlled but rather controlled only by their social beliefs. This could be because people have less experience downloading eBooks and are therefore more likely to be led by social norms.

PBC was moderated by age, student-status, and media-type in the meta-analysis; we proposed past experience as a moderator of the PBC – intention pathway. Unlawful file sharing experience is lower for older people, non-students and software, and consequently PBC was less predictive of intention for these groups. We tested this prediction in the panel study on downloading behavior and found that past experience of unpaid music downloads was associated with PBC and intention to unlawfully download music. Regression analyses found that past experience moderates the effect of PBC on intention. The same result was found with both a more general measure of past experience and with specifically unlawful downloading past experience. PBC was not predictive of intention to unlawfully download eBooks and we ascribe this to less past experience with eBook downloading. While caution should be taken when extrapolating from downloading to file sharing and across different media, our findings have implications for the direction of future research, policy and potential interventions.

The systematic review and panel study results provide important insights into the relationship between past experience, PBC and intention. Increased past experience is associated with a stronger relationship between PBC and intention. This supports existing evidence implicating judgment accuracy based on experience as a factor in intentional and behavioral prediction (Ajzen, 2002a), as opposed to the alternative view where rational evaluation and mindfulness is diminished and socio-cognitive prediction is attenuated (Triandis, 1977). This research robustly demonstrates

this finding in a domain where age does not imply greater past experience. This powerful effect has its own practical and theoretical implications which we now discuss in turn. From a practical viewpoint, research and policy should discriminate between student/young/file-sharing-experienced and non-student/older/less file-sharing-experienced samples. Psychological measures and interventions may appear more effective on student samples, which are typically used in university research, particularly if they are associated with PBC. One benefit is that campaigns based on accessibility will be particularly effective on high frequency file sharers. There is evidence that targeting accessibility is effective, at least temporarily, in reducing unlawful file sharing via web site access (Poort & Leenheer, 2012) or legal changes (Adermon & Liang, 2014). However, interventions may be more likely to succeed in the long term when changes to the environment are accompanied by a change in an individual's beliefs and motivation (Ajzen, 2002a). Where an individual has the technical skills to adapt to a new environment and has the opportunity to continue engagement in a behavior (e.g. a multitude of alternative file sharing websites or the ability to use a proxy IP address to access blocked websites), past experience may continue to determine future behavior, at least in part, unless there is an accompanying change in the intention, and socio-cognitive determinants (Ajzen, 2002a; Lheureux et al., 2016).

In contrast the evidence suggests that campaigns focused on less experienced file-sharers and new media would be more effective if they focused directly upon social interventions. We observe that Subjective Norms primarily determine eBook downloading. This contrasts to music downloading where the role of PBC is critical. Thus strategies that either increase new file sharers' cognitive engagement with their behavior or else seek to change perception of social norms may prove most effective. More generally, our findings have implications for other behaviors where our theoretical constructs – in terms of role of experience relative to habit - are of importance. Our evidence provides support for the former rather than the latter.

From a theoretical viewpoint, this paper demonstrates the role of past experience in the Theory of Planned Behavior. People with greater experience are more influenced by perceived ease of the relevant action. Our findings suggest that the role of experience is

to enhance the accuracy of perceptions of behavioral control, permitting these beliefs to become a stronger determinant of behavior; rather than behavior becoming mindlessly habitual. This supports previous work demonstrating that individuals become less reactive and more thoughtful when they gain experience (Pomery, Gibbons, Reis-Bergan, & Gerrard, 2009).

There are limitations to this paper. The meta-analysis, while comprehensive, may exclude unpublished work (the ‘file drawer problem’). The TPB itself is a broad framework; while there is considerable evidence for the importance of Attitude, Subjective Norms, and PBC, more specific factors are unspecified which could provide more detail in predicting behavior. This paper covers a range of definitions of file sharing and a range of media types. Future research should consider specific areas of file sharing; both streaming and uploading are significant and under-represented. Further evidence is also needed about the specific factors associated with file sharing across a wider range of specified media types. Previous literature has shown that determinants of file sharing do vary across media (Watson et al., 2015). While we have selected the media of music and eBooks to provide conceptual breadth there are clear limits to generalizing to other media types. Finally, the effect of PBC was similar for both students and younger participants; examining the similarities and differences between these groups could provide greater insight into the exact mechanisms that contribute to the differences with older, non-student samples.

6. Conclusions

What our findings show is that past experience can play a determining role in shifting the response from reactive to reasoned. We see in our sample that for music downloading, which has a long history, PBC is a key determinant of reported behavior. In contrast Subjective Norms principally determine reported engagement in the relatively new phenomenon of eBook downloading. In terms of the TPB, this means that higher past experience implies an increased awareness of what is likely to happen in the future, as well as “increased contemplation of the behavior and its consequences...” (Pomery et al., 2009, p. 896). This has also wider implications for our understanding of how decision-making occurs in behavioral contexts that are characterized by past experience.

The finding that Attitude, Subjective Norms and PBC are all predictive of intentions and behavior to file share unlawfully suggests that a single mechanism is not predictive of behavior and therefore that an intervention on only one socio-cognitive process is unlikely to be effective. A legal approach is unlikely, by itself, to be effective in future (Watson et al., 2015, in press). Despite an estimated \$12.5 billion annual cost (Siwek, 2007), policy makers and industry should be cautious about using heavy-handed legal tactics (five years in jail and fines of up to \$250,000, RIAA, 2015) which alienate and criminalize their customers; more file sharing is associated with more purchasing (van Eijk, Rutten, & Poort, 2010). Stakeholders interested in file sharing behavior should consider the social, attitudinal and behavioral control of consumers with regard to both file sharing and alternative media sources, as well as the effect of experience in moderating effects.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.chb.2017.02.014>.

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