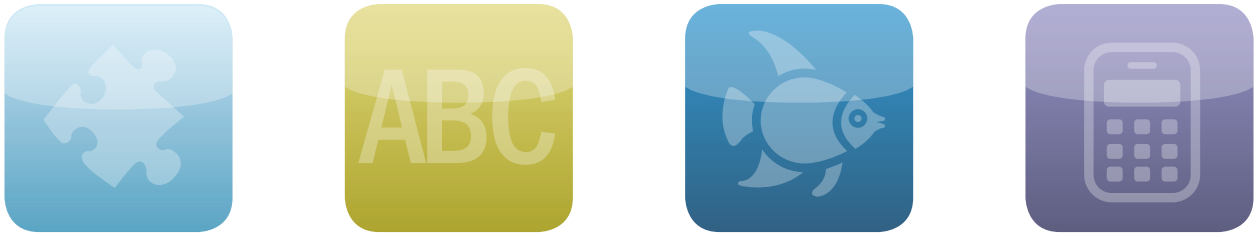
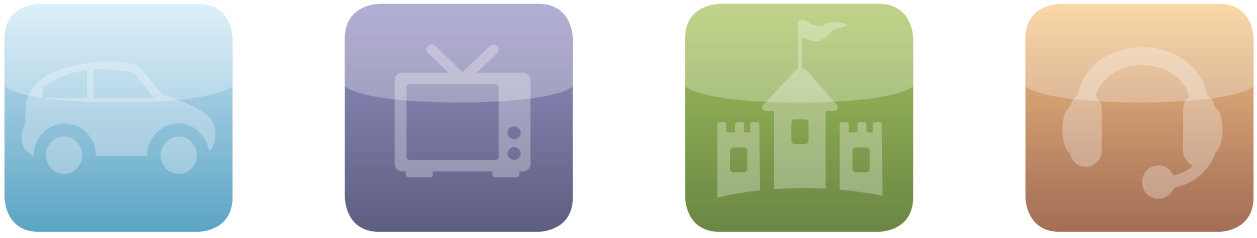


Mobile Apps for Kids:

Current Privacy Disclosures are Dis*app*ointing



FTC Staff Report
February 2012

Mobile Apps for Kids:

Current Privacy Disclosures are Dis*app*ointing

February 2012 | Federal Trade Commission

This report is available on the internet at http://www.ftc.gov/os/2012/02/120216mobile_apps_kids.pdf. The online version of this report contains live hyperlinks.

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FTC Staff Report

Overview[1]

The market for mobile applications has experienced explosive growth over the past three and a half years. When Apple's iTunes App Store and Google's Android Market first launched in 2008, smartphone users could choose from about 600 apps.[2] Today, there are more than 500,000 apps in the Apple App store[3] and 380,000 apps in the Android Market,[4] which consumers can access from a variety of mobile devices, including smartphones and tablets. Consumers have downloaded these apps more than 28 billion times,[5] and young children and teens are increasingly embracing smartphone technology for entertainment and educational purposes.[6] As consumers increasingly rely on their mobile devices for multiple activities, the quantity and diversity of mobile apps continue to expand.

This rapidly growing market provides enormous opportunities and benefits for app users of all ages, but raises questions about users' privacy, especially when the users are children and teens. Mobile apps can capture a broad range of user information from the device automatically – including the user's precise geolocation, phone number, list of contacts, call logs, unique device identifiers, and other information stored on the mobile device – and can share this data with a large number of possible recipients. These capabilities can provide beneficial services to consumers – for example, access to maps and directions, and the ability to play interactive games with other users – but they also can be used by apps to collect detailed personal information in a manner parents cannot detect.

Protecting children's privacy is one of the Commission's top priorities. In order to better understand and evaluate the emerging app market and the products and services it offers to children, Federal Trade Commission staff designed and conducted a survey of the apps offered for children in the two largest U.S. app stores, the Android Market and the Apple App store. Staff focused in particular on the types of apps offered to children; the age range of the intended audience; the disclosures provided to users about the apps' data collection and sharing practices; the availability of interactive features, such as connecting with social media; and the app store ratings and parental controls offered for these systems. This report highlights the lack of information available to parents prior to downloading mobile apps for their children, and calls on industry to provide greater transparency about their data practices.[7]

Staff searched the app stores using the word "kids," and examined hundreds of pages promoting apps, which ranged from alphabet and word games, math and number games, and memory games to books and stories, flash cards, and puzzles. Most of the apps' descriptions specifically indicated that the apps were intended for use by children, and some promoted use by children of certain ages, stating, for example, "teach young children, ages 2 to 5." Prices ranged from free to $9.99, but most apps were $0.99 or less, and free apps were overwhelmingly the most frequently downloaded.

While staff encountered a diverse pool of apps for kids created by hundreds of different developers, staff found little, if any, information in the app marketplaces about the data collection and sharing practices of these apps. Staff found almost no relevant language regarding app data collection or sharing on the Apple app promotion pages,[8] and minimal information (beyond the general "permission" statements required on the Android operating system[9]) on just three of the Android promotion pages. In most instances, staff was unable to determine from the promotion pages whether the apps collected any data at all, let alone the type of data collected, the purpose of the collection, and who collected or obtained access to the data.

As part of its mission to protect children, the Commission vigorously enforces the Children's Online Privacy Protection Act ("COPPA") and the FTC's implementing Rule, which require operators of online services (including interactive mobile apps) directed to children under age 13 to provide notice and obtain parental consent before collecting items of "personal information" from children.[10] Since collecting the data for this survey, the FTC settled its first COPPA enforcement action against a mobile app developer[11] and issued a Notice of Proposed Rulemaking to amend the Commission's COPPA Rule.[12] Those initiatives, along with this report, are a warning call to industry that it must do more to provide parents with easily accessible, basic information about the mobile apps that their children use.

Most of the apps in the study appear to be intended for children's use, and many may, in fact, be "directed to children" within the meaning of COPPA.[13] This survey focused on the disclosures provided to users regarding their data practices; it did not test whether the selected apps actually collected, used, or disclosed personal information from children. Over the next six months, staff will conduct an additional review to determine whether there are COPPA violations and whether enforcement is appropriate.[14] Staff also will evaluate whether the industry is moving forward to address the disclosure issues raised in this report.

Recommendations

FTC staff believes that all members of the kids app ecosystem – the app stores, developers, and third parties providing services within the apps – should play an active role in providing key information to parents who download apps. The mobile app marketplace is growing at a tremendous speed, and many consumer protections, including privacy and privacy disclosures, have not kept pace with this development. Parents need easy access to basic information so they can make informed decisions about the apps they allow their children to use.[15]

App developers should provide this information through simple and short disclosures or icons that are easy to find and understand on the small screen of a mobile device. Parents should be able to learn what information an app collects, how the information will be used, and with whom the information will be shared.[16] App developers also should alert parents if the app connects with any social media, or allows targeted advertising to occur through the app. Third parties that collect user information through apps also should disclose their privacy practices, whether through a link on the app promotion page, the developers' disclosures, or another easily accessible method.

The app stores also should do more to help parents and kids. The two major app stores provide the basic architecture for communicating information about the kids apps they offer, such as pricing and category information. However, the app stores should provide a more consistent way for developers to display information regarding their app's data collection practices and interactive features. For example, app stores could provide a designated space for developers to disclose this information. The app stores also could provide standardized icons to signal features, such as a connection with social media services. Although the app store developer agreements require developers to disclose the information their apps collect, the app stores do not appear to enforce these requirements.[17] This lack of enforcement provides little incentive to app developers to provide such disclosures and leaves parents without the information they need. As gatekeepers of the app marketplace, the app stores should do more. This recommendation applies not just to Apple and Google, but also to other companies that provide a marketplace for kids mobile apps.

Additional work is needed to identify the best means and place for conveying data practices in plain language and in easily accessible ways on the small screens of mobile devices. Staff encourages industry members, privacy groups, academics, and others to develop and test new ways to provide information to parents – for example, by standardizing language,

creating icons, or using a layered approach. To this end, the Commission currently is engaged in a project to update its existing business guidance, "Dot Com Disclosures," about online advertising disclosures.[18] As part of this project, the agency will host a public workshop in 2012 to gain input from interested parties, including industry representatives, consumer groups, and consumer disclosure experts. One of the topics that will be addressed is mobile privacy disclosures, including how they can be short, effective, and accessible to consumers on small screens. Staff anticipates that the workshop discussion will spur further development in this area.

Methodology

In July 2011, FTC staff searched on the desktop version of Apple's App Store and the browser-based version of the Android Market for the term "kids."[19] The search yielded over 8,000 results in the Apple App Store and over 3,600 in the Android Market. Staff collected the app promotion pages for the first 480 results returned by each app store,[20] for a total of 960 apps. Both app stores provide a promotion page for each app offered, which typically lists the name of the app developer directly under the app title and includes a textual description of the app. The app promotion page also displays information such as the app's price, publication date, app store category, content maturity rating, user feedback ratings, number of user feedback ratings, screenshot previews, developer contact information, and, in many instances, a link to a developer website.[21]

Staff then conducted a closer review of the promotion pages for 200 Android apps and 200 Apple apps chosen randomly from each pool of the 480 "kids" results. Staff examined the information listed on the app store promotion page and the first page ("landing" page) of the associated developer's website. On the app store promotion page, staff looked for language and terms in the app description in order to sort the apps by type and intended audience. Staff also looked to see if the app linked to any social media, allowed users to make purchases ("in-app" purchases), included advertising, displayed developer contact information, and provided information about the app's data collection practices. On the landing page of the developer website, staff looked for additional information about the app, as well as contact and data collection information for the developer.[22]

Staff notes two additional points with respect to the methodology. First, staff did not download any of the apps surveyed, and did not test the apps' information collection, use, or disclosure practices. Rather, staff reviewed the information that a consumer easily could access either from the app store or from the developer's website prior to downloading the app.

Information provided to parents after downloading an app is, in staff's view, less useful in the parent's decision-making since, by then, the child may already be using the app and the parent already could have been charged a fee.[23]

Second, staff reviewed only the app store pages made available to desktop computer visitors, which allowed staff to electronically collect and preserve the app promotion pages at a specific moment in time. Staff recognizes that there are a few differences between the content offered through the desktop interface and the content offered through the mobile device interface, but does not believe these differences are material or change the conclusions of this report.[24]

I. Range of Apps Offered

Staff found a wide range of kids apps offered at low prices by hundreds of developers.

Types of Apps for Kids

To get a sense of the types of apps available for kids, staff categorized each of the 400 apps based on language contained in the app name or description.[25] For example, a multiplication flash card app would fall into the "educational," "math," and "flash cards" categories. Staff found that education, games, math, spelling, and animals were the most popular app categories. The percentage of apps found by subject category is listed in Table 1.

Table 1: Categories of "Kids" Apps

	Apple App Store	Android Market
Category	**% of Apps**	**% of Apps**
Educational	51.0%	50.0%
Game	49.5%	41.0%
Animal-related	22.0%	23.0%
Alphabet/Spelling/Words	20.5%	17.0%
Math/Numbers	20.0%	16.5%
Matching	16.0%	9.5%
Memory	14.0%	15.5%
Book/Story	12.5%	6.5%
Coloring	9.0%	17.0%
Musical	7.0%	6.0%
Puzzle	6.5%	8.0%
Learning a language	6.5%	11.0%
Flash Cards	3.5%	3.5%
Photo-related	2.5%	4.0%
Quiz/Test	1.5%	3.5%
Jokes	1.0%	1.0%
Other[26]	8.5%	14.5%
	n=200	n=200

Intended Audience

Staff also reviewed the app descriptions for cues to the intended audience, looking for both general and specific age groups. Almost all of the apps reviewed appeared to be intended for use by kids, and many provided specific age ranges. Staff looked for words in app names or descriptions suggesting that the apps were recommended for, or were appropriate for, certain general groups, such as "infants," "toddlers," "preschoolers," "children," "kids," "parents" and "teachers."[27] Table 2 lists the percentage of apps on each platform promoted for use by certain age groups.

Table 2: Intended Audience – General Age Groups

General Age Group	Apple App Store % of Apps	Android Market % of Apps	Combined % of Apps
Infant/Toddler	11.5%	4.0%	
Child	56.0%	40.5%	
Kid	63.5%	76.5%	89.75%
Preschool	7.5%	10.5%	
Elementary School	1.5%	1.5%	
Parent	17.5%	20.0%	
Teacher	3.5%	2.5%	24.25%
Adult	7.5%	2.5%	
Family	6.0%	4.5%	5.25%
Everyone	5.0%	1.0%	3.00%
No Indication	8.0%	2.0%	5.00%
	n=200	n=200	n=400

Most of the app promotion pages suggested that the apps were for kids (or some subset of kids, such as infants) as shown in Table 2. Twenty-four percent of the 400 app descriptions contained language suggesting that the apps were intended for use by an adult, such as a parent or teacher, but most of those apps indicated they were for use by kids too. While 5% (twenty) of the 400 app descriptions did not include language suggesting any intended audience, all but two of these apps appeared to include content that kids may enjoy, such as games like checkers, table tennis, and basketball. Overall, staff estimates that about 95% of the 400 apps reviewed in detail were apps intended for kids' use.[28]

Twenty three percent of the 400 apps specified a particular age range or school grade level. For these apps, staff recorded the recommended age ranges, converting any grade levels to ages.[29] Over 50% of the apps that listed an age or grade range listed a range beginning at 2 years old or younger; over 80% listed a range beginning at age four or younger; and over 90%

specified an age range starting at 6 years old or younger.[30] Conversely, over 75% of the apps that specified an age range specified one ending at 12 years old or younger, and roughly 45% specified an age range ending at 6 years old or younger. Table 3 lists the number of apps for specified age ranges.

Table 3: Intended Audience – Specific Age Ranges

		Maximum recommended age					% of apps with this min. age
		3-4	5-6	7-8	9-12	13+	
Minimum recommended age	0-2	9	27	6	2	11	60%
	3-4		1	8	5	9	25%
	5-6		4	1	1	1	8%
	7-8			3	2		5%
	13					1	1%
% of apps with this max. age		10%	35%	20%	11%	24%	n=91

Most Kids Apps Are Inexpensive

While prices ranged from free to $9.99, most of the 960 app store promotion pages listed a price of $0.99 or less. Indeed, 77% of the apps in the survey listed an install price of $0.99 or less, and 48% were free.[31] Free apps appeared to be the most frequently downloaded.

The Android Market provides a "download range" and a "feedback" field on the promotion page of each app. The "download range" is an estimate of the number of times a particular app has been downloaded (such as "100 – 500" or "10,000 – 50,000") while the "feedback" field reveals the number of app users that have provided comments or feedback regarding their experience with the app. Staff used the download ranges to estimate the relative popularity of apps in each price category.[32] Using this indicator, staff found that the free Android apps accounted for 99% of all downloads in the Android survey results, even though they accounted for only 62% of the apps returned by the "kids" search. Staff then compared these findings to the results obtained by using the "feedback" information to infer app popularity. As shown in Table 4, the "feedback" method closely tracked the "download" method.

Table 4: Android Market Price and Popularity

Price	% of Apps	% of Downloads[33]	% of Feedback Ratings
Free	61.7%	99.43%	97.64%
$0.01 to $0.99	14.0%	0.13%	0.19%
$1 to $1.99	9.2%	0.09%	0.27%
$2 to $2.99	2.9%	0.23%	1.43%
$3 to $3.99	1.6%	0.09%	0.37%
$4.00+	1.6%	0.01%	0.03%
Foreign	9.0%	0.02%	0.07%
	n=480		

Apple's App Store does not provide download ranges for its apps, but it does display the number of users that have provided feedback for each app. As with Android, staff used the number of feedback ratings to infer the relative popularity of the Apple apps. Staff found that free Apple apps appeared to be more popular than paid apps, accounting for 68% of all "ratings," even though they only accounted for 35% of the search results (see Table 5).

Table 5: Apple App Store Prices and Popularity

Price	% of Apps	% of Ratings
Free	34.80%	68.29%
$0.99	43.95%	22.08%
$1.99	14.58%	9.15%
$2.99	3.75%	0.19%
$3.99	1.04%	0.10%
$4.99	1.88%	0.19%
	n=480	

Number of Developers

Staff found that hundreds of developers were responsible for the apps in the study. Staff encountered 441 unique developers in this study, only twelve of which had apps on both platforms. Table 6 presents the number of developers responsible for the apps in the search results.

Table 6: Number of Apps Per Developer and Popularity Indicators

	Apple App Store			Android Market		
# of Apps Per Developer	**# of Developers**	**% All Apps**	**% Feedback Ratings**	**# of Developers**	**% All Apps**	**% of Downloads**
1	142	29.6%	49.8%	150	31.3%	50.2%
2	43	17.9%	18.8%	48	20.0%	9.7%
3	11	6.9%	6.0%	11	6.9%	2.2%
4	5	4.2%	4.4%	6	5.0%	9.1%
5-9	13	17.7%	19.8%	14	16.9%	7.3%
10+	5	23.8%	1.1%	5	20.0%	21.4%
		n=480			n=480	

Only a handful of app developers were responsible for more than 10 apps in our sample. Developers with one app in our sample were popular, accounting for about 50% of all downloads/feedback ratings, even though they were responsible for only about 30% of the apps. In contrast, those developers with more than 10 apps in our sample accounted for about 1% of the feedback ratings for Apple, (and 20% of the downloads for Android) despite accounting for about 20% of all of the apps in the survey. This finding illustrates the broad and diverse nature of the mobile app marketplace.

Contact Information

Many of the developers provided some type of contact information directly on their app's promotion page, or linked to a developer website that contained contact information. Staff found that 13% of the 400 kids apps listed an email address somewhere on the promotion page.[34] Eighty-one percent of the 400 app promotion pages linked to a functioning English-language developer website, a number of which provided contact information.[35] Sixty-five percent (of the 400) linked to a functioning developer website whose landing page contained either some form of contact information or a link to contact information.[36] Within this group, 23% (of the 400) linked to a developer website that listed an email address on the landing page, 8% linked to a landing page providing a phone number, 6% linked to a landing page with a mailing address, 2% provided all three types of contact information on the landing page, and 38% linked to a landing page containing a link that appeared to lead to contact information.[37]

II. Data Collection and Sharing Practices

The survey findings regarding data collection and sharing were of greatest concern to FTC staff. Indeed, across the wide range of "kids" apps examined in the survey, staff found very little information about the data collection or sharing practices of these apps. Apple's and Google's mobile operating systems and app stores provide limited notice to users regarding app capabilities, and leave the bulk of disclosure to individual app developers. In most instances, staff was unable to determine from the information on the app store page or the developer's landing page whether an app collected *any* data, let alone the type of data collected, the purpose for such collection, and who collected or obtained access to such data.[38] This is troubling given the ability of mobile apps to access users' information on devices automatically and to transmit this information invisibly to a wide variety of entities.

The Mobile App Stores and Operating Systems

Apple's iOS and Google's Android operating systems offer powerful capabilities to the mobile applications that run on them.[39] For example, they enable mobile apps to determine the user's precise geolocation and communicate with other devices via the Internet. For mobile gaming apps, these systems may allow a child to identify and connect with others playing the same game nearby. The operating systems also may provide apps with access to sensitive information such as a user's call logs, contacts, and unique device identifiers, or enable the app to use the phone service on the mobile device to make or answer calls or send text messages. Depending on the type of service the app provides and how the app has been configured, this broad access to data may or may not be necessary to provide the service and may occur without the user's knowledge.

The app stores and operating systems take different approaches to managing the information and capabilities that apps may access. Android requires its apps to declare any potentially sensitive capabilities on a "permissions" screen, which displays just before installing the app.[40] While helpful, these disclosures do not explain clearly (or provide an easy means for consumers to learn) why an app has the permissions it does, what the app does with such access, or whether the app shares any information with third parties. Providing clear and accessible information is especially important in the kids app space, where any data accessed and collected would likely be from a mobile device used by a child, and could reveal information that a parent may not want shared with unknown third parties, such as a child's precise geolocation or phone number. Faced with concerns about what data an app may or may not collect, a parent may be forced to choose between downloading the app, and running

the risk that the child's sensitive information will be shared with unknown third parties, or not downloading the app, and depriving the child of an enjoyable game or activity.

Of the 182 Android apps indicating they were intended for use by kids, only 24% specified that the app required "no special permissions to run" – *i.e.,* that a child could use the app without the app accessing any information or capabilities from the mobile device. Conversely, 76% indicated that the app required at least one "permission" to run. In fact, staff found that over half of the Android app promotion pages listed a "permission" for "full Internet access," meaning that the "permission" enables the app to access and receive a wide variety of content while the app is running.[41] Table 7 lists the percentage of Android apps that contained some of the more potentially sensitive permissions.[42]

Table 7: Android Market "Kids" Apps Permissions

Permission	% of Apps	% of Free Apps	% of Paid Apps
Network communication: full Internet access	60.99%	78.81%	28.13%
Phone calls: read phone state and identity[43]	20.88%	29.66%	4.69%
Modify/delete SD card[44]	15.93%	16.95%	14.06%
Your location -	8.24%	11.02%	3.13%
Fine (GPS) location	6.04%	7.63%	3.13%
Coarse (network-based) location	5.49%	7.63%	1.56%
Both fine and coarse location	3.30%	4.24%	1.56%
Hardware controls: take pictures and videos	3.85%	4.24%	3.13%
Services that cost you money: directly call phone numbers	2.20%	3.39%	0.00%
Modify global system settings	2.75%	3.39%	1.56%
Hardware controls: record audio	1.65%	2.54%	0.00%
Your personal information: read sensitive log data	0.55%	0.85%	0.00%
No special permissions	24.18%	13.56%	43.75%
	n=182	n=118	n=64

In contrast to Android's "permissions" approach, Apple states that it relies on an app review process in which it screens and approves apps before permitting them to be offered in Apple's app store.[45] Because Apple's App Store does not require its apps to display "permissions" to users prior to download, staff could not measure the degree to which the Apple kids apps were capable of accessing device information.[46] Apple states that it reviews every application "in order to protect consumer privacy" and "safeguard children from inappropriate content,"[47] and that "any App that targets minors for data collection will be rejected."[48] The details of this screening process are not clear.

Location information is treated differently from other information by each system but follows essentially an "on/off" model. Both operating systems can signal the user when an

app requests the user's location by displaying a specific icon.[49] Both systems also provide a global setting that allows users to turn off their devices' location capabilities.[50] As described above, Android's operating system requires developers to declare a "permission" for access to location information. After an app is downloaded, Apple's operating system provides: 1) a notice the first time that an app attempts to acquire the user's location; and 2) an on/off switch in the device's settings allowing users to permit an app to access their location information on an app-by-app basis.[51] These additional protections offered by Apple apply only to an app requesting location information.

Beyond the basic technological models, both app stores require developers by agreement to disclose the information their apps collect,[52] though neither store specifies how or where such information should be provided. Both stores' privacy policies also state that the privacy policies of the app developers control the practices of a mobile app offered in the app stores.[53] Under this model, the information provided by developers is critical for transparency. Nevertheless, as described below, such information is rarely provided.

Disclosure of App Data Collection and Sharing

Staff's review of both the app store promotion pages and developer websites of the 400 closely examined apps in the survey revealed very little information about the apps' data practices.

Indeed, the Apple app promotion pages that staff examined provided almost no information on individual developers' data collection and sharing practices. Similarly, the Android app promotion pages that staff examined provided little information other than the mandatory "permissions." Only three (1.5%) of the 200 Android apps even attempted to convey information about the purpose for the "permissions." These three apps made the following disclosures (respectively) on their promotion pages:

- "Needs Location permission for Ads. If you prefer, get the AD FREE version."
- "Permissions are required by the Ad networks, which keep the app free."
- "All requested permissions are for ads only."

All three statements put the user on notice that the app provides information to an ad network, but do not identify what information is collected, by whom, how it is used, and whether it is shared with others.

Staff also looked for information about the apps' data collection and sharing practices on the landing pages of the developers' websites.[54] As with the app promotion pages, staff

found very little information. Sixteen percent of the 400 kids app promotion pages linked to a developer landing page that contained or linked to disclosure information. Within this group, 13% (of the 400) linked to a landing page that displayed a link labeled "privacy policy," and the remaining 3% linked to developer sites that provided links to some other disclosures. These other disclosures had labels such as "terms of use," "terms and conditions," "terms of service," "Legal Notices," and "disclaimers."[55] Out of the entire set of 400 app promotion pages examined, only two (0.5%) linked to a developer landing page that disclosed information about data collection and sharing on the landing page itself.

Disclosure of Additional Interactive Features

Staff also examined the app store promotion pages for features that may serve as a platform for data collection, such as the ability to make purchases within the app, connect with social media, and serve targeted advertising. These features often are provided to the app developer by various third parties, who may gain access to kids' data as a result.

In-App Purchase Mechanism

Some developers offer app users the ability to purchase additional content via an in-app purchase mechanism. For example, a storybook application may come with a single story, but then allow the app user to purchase additional stories without having to leave the app. The ability of children to purchase items within mobile applications has been a subject of concern in media reports and by members of Congress, as parents may not know about such capabilities prior to download.[56]

Staff found that 11.0% of the 200 Apple App Store promotion pages, and 0.5% of the 200 Android pages indicated that the app had some form of in-app purchase mechanism. While Apple includes a box disclosing "Top In-App Purchases" on the promotion page for apps with in-app purchase mechanisms, Android appears to require only those developers that use Android's own in-app purchasing mechanism to display a permission discussed above.[57] In light of the significant concerns raised by in-app purchase capabilities in apps for children, staff is evaluating what types of protections should apply to these capabilities. It is clear, however, that confusing and hard-to-find disclosures do not give parents the control that they need in this area.

Staff believes that parents need consistent, easily accessible, and recognizable disclosures regarding in-app purchase capabilities so that they can make informed decisions about whether to allow their children to use apps with such capabilities.

Social Network Integration and Other Social Features

Staff found that 5% of the 400 app promotion pages indicated that the app was integrated with a social network – that is, a user could access a social network, and thus share information, through the app. Staff found that 3.5% of the 400 promotion pages indicated integration with Facebook, 2% with Twitter, and 2% with various other social networks.[58] Because the app stores do not appear to require disclosure of these social features on the promotion page, it is likely that the survey numbers understate the prevalence of social functionality. In addition, some apps have their own internal sharing functions – for example, automatically sharing game results, usernames, and other information with unknown users on the app's scoreboard or news feed. Staff believes that the presence of social features within an app is highly relevant to parents selecting apps for their children, and that such functionality should be disclosed prior to download.

In-App Advertising

The existence of advertising within an app may be significant to parents for several reasons. First, parents may want to limit the data collected by advertisers and ad networks about their children.[59] Second, even if the advertising is not based on any information collected by the user, parents may want to limit their children's exposure to ads. Finally, ads running inside an app may incorporate various capabilities allowing the user to do things like directly call phone numbers or visit websites appearing in the ad, and parents may not want these options available to their children.

Staff found that about 7% of the 400 app store promotion pages indicated that the app contained advertising. As above, this number is likely to understate the number of apps containing advertising because app stores do not appear to require developers to disclose in-app advertising on their promotion pages, and because advertising is a common way to monetize apps.[60] Some of the disclosures appeared to be designed to warn parents about the potential exposure of their children to ads. For example, one promotion page indicated that the app would only display ads during the initial download, when parents would be the likely audience. Other statements attempted to address the information collection aspect of targeted in-app advertising. As previously discussed, three of the Android apps attempted to explain (though fairly cryptically) that a permission to access certain information was related to in-app advertising.

Still others included language addressing the "click-to" functionality often found within advertisements – for example, stating that the developer had moved the placement of banner ads to the top of the screen within the app in order "to avoid accidental clicks by the little fingers." Some app developers appeared to be offering certain protections to users as a selling-point in the competitive app market. For example, several app promotion pages included language indicating that the app was "ad free," and one disclosed that, "[f]or security reasons," the app switched the device to "airplane mode" when in use in order to "protect you [sic] children from any risk."

The presence of these statements to parents and other users suggests that certain developers are aware of parents' concerns and are taking some steps to respond. However, parents need clear, easy-to-read, and consistent disclosures regarding the advertising that their children may view on apps, especially when that advertising is personalized based on the child's in-app activities. And to the extent that third parties providing the advertising (or other interactive features) gain access to kids' data in providing these services, they also must ensure that their data practices are disclosed to parents in a clear and meaningful way.

App Rating Systems and Parental Controls

Both app stores and operating systems offer rating systems and controls that can provide parents with useful tools to manage their children's access to and use of mobile apps. The systems allow parents to restrict access to mobile content and features, and can limit the collection of data from the mobile device, such as limiting the sharing of geolocation information. These systems are not designed, however, to provide specific information about the data collected and shared by apps.[61]

Rating Systems[62]

The Apple App Store and the Android Market assign various content ratings to the apps they offer indicating a recommended level of maturity. Some of the parent controls rely on these content ratings to screen out inappropriate material.[63] Apple's and Android's content ratings are unique to the particular app store, and the methods for evaluating content and assigning ratings rely largely on the app developer to supply the initial rating.[64]

Apple's content ratings consist of four different age indicators ("4+," "9+," "12+," and "17+") that are assigned to apps as part of Apple's approval process. Prior to submitting an app to Apple for approval, app developers must fill out a ratings matrix.[65] The matrix requires the developer to select the frequency (e.g., "none," "infrequent/mild," or "frequent/

intense") of different types of content ("Cartoon or Fantasy Violence," "Sexual Content or Nudity," "Profanity or Crude Humor," etc.), and assigns a rating based on the developer's input.[66] Staff did not evaluate the appropriateness of any of the ratings assigned, but notes that nearly all of the Apple apps reviewed in this survey contained the lowest content rating of "4+." See Table 8.

Table 8: Content Ratings for Apple App Store "Kids" Apps

Apple Content Rating	Apple App Store
"4+"	97.5%
"9+"	1.5%
"12+"	1.0%
"17+"	0%
	n=200

Content ratings in the Android Market also are largely determined by the app developer, and consist of four different maturity indicators ("Everyone," "Low maturity," "Medium maturity," and "High maturity").[67] Android's ratings do not map directly to specific ages but, like Apple's, are tied to violent or mature content. Android provides content-based guidelines to developers, and requires that maturity ratings be tied to the app's functionality.[68] For example, the guidelines state that "Apps rated 'Everyone' must not ask users for their location."[69] As shown in Table 9, an overwhelming majority of the Android apps reviewed by staff contained the lowest content rating of "Everyone." A number of the Android apps involved in this survey did not contain a maturity rating because they pre-dated Android's introduction of the content rating requirement in November 2010. Twenty-two such apps appeared in staff's review and are not included in the percentages presented in Table 9.

Table 9: Content Ratings for Android Market "Kids" Apps[70]

Android Content Rating	Android Market
"Everyone"	83%
"Low maturity"	12%
"Medium maturity"	2%
"High maturity"	2%
	n=178

Parental Controls

Both app stores provide various controls allowing parents to restrict which apps may be downloaded onto their children's mobile devices, based on app content ratings.[71] In addition, Apple's mobile operating system incorporates controls that allow parents to password-protect

access to a number of specific applications, such as Apple's Internet browser (Safari), the online video website YouTube, the iTunes App Store itself, the device's camera application, as well as some device capabilities, such as location sharing and in-app purchase mechanisms.[72] Although the Android operating system does not have such built-in parental controls, a number of available apps allow parents to password-protect access to various content and device capabilities.[73]

On both systems, parents can set the device settings to limit the flow of some information – for example, blocking GPS location sharing or setting the device on "airplane mode" in order to restrict the interactive features of an app. However, a parent needs to set these limits each time the child uses an app, and taking such actions may adversely limit desirable app functionality.[74] Further, while these types of controls may help parents manage the use of the device by their children, they do not provide information about the data practices associated with the apps that run on them. Thus, parents may be forced to choose between allowing their child to use an app, with all the unknown risks associated with such use, and cutting off their child's use of the app altogether. With better information about the data practices of these apps, parents can make informed decisions about which apps their children can use safely, and which apps parents wish to avoid.

Conclusion

The mobile apps marketplace is a constantly evolving new media that offers parents many new options for entertaining and educating their children. Staff's survey shows, however, that parents generally cannot determine, before downloading an app, whether the app poses risks related to the collection, use, and sharing of their children's personal information. Although the two major U.S. mobile app stores provide some information and controls governing apps, all members of the mobile app ecosystem – the app stores, the developers, and the third parties providing services within the apps – must do more to ensure that parents have access to clear, concise and timely information about the apps they download for their children. Parents should be able to learn, before downloading an app for their children, what data will be collected, how the data will be used, and who will obtain access to the data. Armed with such information, parents can make knowledgeable decisions about the apps they choose for their children, and embrace these technologies with more confidence. Staff is committed to working with all stakeholders on these issues, and also plans to continue its vigorous enforcement of the COPPA statute and Rule. Staff hopes that this report will spur greater transparency and meaningful disclosure about the data collection practices in apps for children.

Endnotes

1. The primary authors of this FTC staff survey and report are Patricia Poss and Andrew Hasty of the FTC's Bureau of Consumer Protection. They received valuable assistance from Andrew Bristow, a Princeton student on temporary staff at the FTC, and staff from throughout the Bureau of Consumer Protection. Robert Letzler and Michael Shores of the Bureau of Economics provided valuable assistance with presentation of the empirical results.
2. Apple offered 552 apps at launch in July 2008. Michael Arrington, *iPhone App Store Has Launched (Updated),* TechCrunch (July 10, 2008), **http://techcrunch.com/2008/07/10/app-store-launches-upgrade-itunes-now/**. Google's Android Market offered 50 apps when it launched in October 2008. Dean Takahashi, *Google Releases Details on Android Market Launch,* VentureBeat (Oct. 22, 2008), **http://venturebeat.com/2008/10/22/google-releases-details-on-android-market-launch/**.
3. Press Release, Apple, *Apple's Mac App Store Downloads Top 100 Million* (Dec. 12, 2011), **http://www.apple.com/pr/library/2011/12/12Apples-Mac-App-Store-Downloads-Top-100-Million.html.**
4. *Google Android Market,* Distimo, **http://www.distimo.com/appstores/app-store/19-Google_Android_Market** (last updated Dec. 30, 2011).
5. *See* Press Release, Apple, *Apple's Mac App Store, supra* note 3 (more than 18 billion downloads from Apple App Store); Eric Chu, *10 Billion Android Market Downloads and Counting* (Dec. 6, 2011), **http://android-developers.blogspot.com/2011/12/10-billion-android-market-downloads-and.html**.
6. Common Sense Media reported that half (52%) of all children in the United States have access to a smartphone (41%), a video iPod (21%), or an iPad or other tablet device (8%). Common Sense Media, *Zero to Eight: Children's Media Use in America* 9 (Fall 2011), *available at* **www.commonsensemedia.org/sites/default/files/research/zerotoeightfinal2011.pdf**. Another study indicated that two-thirds of the children ages 4-7 stated they had used an iPhone, often one owned by a family member and handed back to them while riding in an automobile. Cynthia Chiong & Carly Shuler, Joan Ganz Cooney Center, *Learning: Is there an App for that?* 15 (Nov. 2010), *available at* **www.joanganzcooneycenter.org/upload_kits/learningapps_final_110410.pdf**. In addition, recent research states that "In the third quarter of 2011, teens age 13-17 used an average of 320 MB of data per month on their phones, increasing 256 percent over last year and growing at a rate faster than any other age group." *New Mobile Obsession: U.S. Teens Triple Data Usage,* Nielsen (Dec. 15, 2011), **http://blog.nielsen.com/nielsenwire/online_mobile/new-mobile-obsession-u-s-teens-triple-data-usage/**.
7. These recommendations are consistent with the FTC staff's preliminary privacy report that called on companies to be more transparent as to their data collection practices and encouraged companies to offer short, easy-to-read disclosures (or icons) that consumers are likely to see, read, and understand. *See* FTC Preliminary Staff Report, *Protecting Consumer Privacy in an Era of Rapid Change: A Proposed Framework for Businesses and Policymakers* 69-71 (Dec. 1, 2010), *available at* **http://ftc.gov/os/2010/12/101201privacyreport.pdf**.
8. A promotion page is the screen in the app store where a developer provides certain basic information about its app.
9. As discussed further below, "permissions" are phrases describing an app's capabilities that appear on the mobile screen prior to downloading an app in the Android app store.
10. The Commission's COPPA Rule was promulgated pursuant to the Children's Online Privacy Protection Act of 1998, 15 U.S.C. §§ 6501-6506. The text of the COPPA Rule can be found at 16 C.F.R. Part 312.
11. *United States v. W3 Innovations, LLC*, No. CV-11-03958 (N.D. Cal. Sept. 8, 2011) (FTC consent order with developer of child-directed mobile apps for alleged violations of the COPPA Rule), *available at* **http://ftc.gov/os/caselist/1023251/110908w3order.pdf**.
12. Children's Online Privacy Protection Rule, 76 Fed. Reg. 59,804 (proposed Sept. 27, 2011) (stating that "online services" currently covered by the COPPA Rule "includes mobile applications that allow children to play network-connected games, engage in social networking activities, purchase goods or services online,

receive behaviorally targeted advertisements, or interact with other content or services."), *available at* **http://www.gpo.gov/fdsys/pkg/FR-2011-09-27/pdf/2011-24314.pdf**.

13. *See* 16 C.F.R. § 312.2 (defining "[w]ebsite or online service directed to children").
14. FTC investigations are nonpublic until the Commission takes a public action such as issuing a complaint or announcing a settlement.
15. A number of organizations have issued guidance for app developers. *See* Press Release, Future of Privacy Forum, *FPF and CDT Release Best Practices for Mobile Apps Developers* (Dec. 21, 2011), **http://www.applicationprivacy.org/?p=1947**; Press Release, Mobile Marketing Association, *Mobile Marketing Association Releases New Privacy Policy Guidelines for Mobile Apps for Public Comment* (Oct. 17, 2011), **http://mmaglobal.com/news/mobile-marketing-association-releases-new-privacy-policy-guidelines-mobile-apps-public-comment**; Privacy Choice, *PrivacyChoice Challenges Developers to "Get Their Apps in Gear"* (Oct. 18, 2011), *available at* **http://blog.privacychoice.org/2011/10/18/get-your-apps-in-gear/**.
16. If the app is directed to children and in fact collects information from children, the app must provide a notice and obtain parental consent prior to collection pursuant to COPPA. *See* 16 C.F.R. § 312.3. In addition, Commission staff has stated more generally that when companies collect sensitive information about children and precise geolocation data, companies should seek affirmative express consent before the data is collected or shared. *See* FTC Preliminary Staff Report, *supra* note 7, at 61.
17. *See Best Practices for Mobile Applications Developers,* Future of Privacy Forum, 3, **http://www.futureofprivacy.org/wp-content/uploads/Apps-Best-Practices-v-beta.pdf** (last visited Jan. 24, 2012) (citing section 3.3.10 of the iOS Developer Program License Agreement, stating that "Developers must provide clear and complete information to users regarding collection, use and disclosure of user or device data."); Android Market Developer Distribution Agreement, 4.3, **http://www.android.com/us/developer-distribution-agreement.html** (last visited Oct. 31, 2011) ("If the users provide you with, or your Product accesses or uses, user names, passwords, or other login information or personal information, you must make the users aware that the information will be available to your Product, and you must provide legally adequate privacy notice and protection for those users."); s*ee also* Scott Thurm & Yukari Iwatani Kane, *Your Apps are Watching You*, Wall St. J., Dec. 18, 2010, *available at* **http://online.wsj.com/article/SB10001424052748704694004576020083703574602.html** (reporting that numerous Apple and Android applications transmitted user information, and numerous apps did not provide privacy policies on their websites or inside the apps at the time of testing).
18. *See* Press Release, FTC, FTC Seeks Input to Revising its Guidance to Business About Disclosures in Online Advertising (May 26, 2011), *available at* **http://www.ftc.gov/opa/2011/05/dotcom.shtm**.
19. The report focuses on the information available to parents selecting apps for children, who would in most instances be under 13 years of age. Parents of teens, however, may have similar concerns about the collection of information from apps their older children use.
20. Staff does not know what factors the app stores use to determine the rank order of the apps returned from their search functions. The apps appeared relevant to the search term "kids."
21. The Android Market also provides an estimated range of the number of times an app has been downloaded and a list of "permissions" associated with every app.
22. As shown in the tables below, some of the findings in the survey are based on an analysis of the 960 apps while others are based on the more detailed analysis of the subset of 400 apps.
23. Most apps are not expensive but all sales are final in the Apple App store (s*ee* iTunes Store Terms and Conditions, **http://www.apple.com/legal/itunes/us/terms.html#GIFTS** (last visited Jan. 17, 2012)) and refunds for apps obtained through the Android Market must be made within 15 minutes from download (s*ee Returning Apps,* Android Market Help Articles, **http://support.google.com/androidmarket/bin/answer.py?hl=en&answer=134336** (last visited Jan. 17, 2012)).
24. S*ee* Appendix, pages A2-A3 for additional information about the differences; *see also* Armando Rodriquez, PC World, "Web-based Android Market Looks Good" (Feb. 2, 2011), **http://www.pcworld.com/article/218532/webbased_android_market_looks_gocd.html** ("Essentially it is

the same information you would get from browsing the Market on your phone only in a much nicer-looking package.").

25. *See* Appendix, page A3-A4 for more information about how staff categorized the apps.
26. The "Other" category mostly included apps offering parenting guides, and children's television or movie recommendations. Staff also encountered three apps for parents to use to monitor their child's geolocation.
27. *See* Appendix, page A3-A4 for additional information.
28. In total, 5% of the 400 apps closely reviewed by staff were likely not intended to be used by kids, based on the apps' descriptions. Except where noted, staff did not remove these apps from the analysis in this report. *See* Appendix, page A7.
29. Staff converted the grade kindergarten to the age 5, first grade to the age 6, second grade to the age 7, etc.
30. A recent study looking at the paid apps in the Apple App Store's Education category found 58% of the apps were for toddlers and preschool age children. Carly Shuler, Joan Ganz Cooney Center, *iLearn II: An Analysis of the Education Category of Apple's App Store,* 13-14 (Jan. 2012), *available at* **http://joanganzcooneycenter.org/Reports-33.html.**
31. Developers do not receive compensation from the app stores when a user downloads a free app. Developers can still make money from such apps, however. As discussed below, one of the common business models is to partner with a mobile ad network that will pay a developer to include code in the app software that allows the ad network to serve ads.
32. Several apps in the study appeared to be quite popular. One Android app appeared to have been downloaded between 5,000,000 and 10,000,000 times; six Android apps showed 1,000,000 to 5,000,000 downloads; five Android apps showed 500,000 to 1,000,000 downloads; and 19 Android apps showed that they had been downloaded 100,000 to 500,000 times.
33. The percentages reported were calculated using the lower values of the download ranges. *See* Appendix, page A4 for more information about the download calculation.
34. Currently, both the mobile and desktop versions of the Android Market include an email contact on the app promotion pages. At the time staff collected the information for this report, however, only the mobile version of the Android Market included this information. Therefore, the 13% figure would likely be higher if staff had captured the mobile version of the app promotion pages, or if staff were to repeat the information collection today. *See* Appendix, page A2.
35. Staff used an English language configured browser to visit developer websites, but nevertheless encountered five foreign language websites.
36. Because staff only reviewed the landing page of the associated websites, there may have been apps that included contact information on subsequent pages of the associated site. *See* Appendix, page A4-A5.
37. These percentages do not add up to the 65% total because the landing pages contained different combinations of contact information.
38. As noted, staff encountered a significant number of apps for very young children. These children are unlikely to be able to type sensitive personal information into the mobile device. Nevertheless, the app may collect and share information about the device and/or child, such as the device's location or phone number, or other information stored on the device by the user.
39. *See Press Release, Future of Privacy Forum, supra* note 15 ("Application developers can access a considerably broader range of information about users than traditional web developers"); Lookout Mobile Security, *App Genome Report* (Feb. 2011), *available at* **www.mylookout.com/appgenome/** (finding that 28% of the free apps in the Android Market and 34% of the free apps in the Apple App Store have the capability to access user location information, and 7.5% of the free apps in the Android Market and 11% of the free apps in the Apple App Store have the capability to access user contacts); Thurm & Kane, *supra* note 17 (documenting the data collection that occurred through many popular smartphone apps).
40. *See, e.g., Consumer Privacy and Protection in the Mobile Marketplace: Hearing before the Subcomm. on Consumer Protection, Product Safety and Insurance of the S. Comm. on Commerce, Science and*

Transportation. 112th Cong. 6-7 (May 10, 2011) (prepared statement of Alan Davidson, Director of Public Policy, Google Inc.), *available at* **http://commerce.senate.gov/public/?a=Files.Serve&File_id=517bc26f-ab89-4339-ad0f-441879598ed1** (the user may choose to trust the application by completing the installation or the user may choose to cancel the installation).

41. Android provides consumers with a very technical description of this permission stating that it allows "an application to create network sockets." *See* Appendix, page A5.
42. For purposes of Table 7, staff removed any apps determined by staff not to be for kids.
43. "Phone calls: read phone state and identity" allows the app to determine if the mobile device is currently making a telephone call – presumably so that it can avoid interrupting the call. It can also determine the mobile device's telephone number. A more descriptive list of the Android operating system permissions found in this survey is provided on pages A5-A6 of the Appendix.
44. "Modify/delete SD card" means the app would have the ability to save and erase data on the mobile device's memory card. *See* Appendix, pages A5-A6.
45. *See Apple Answers the FCC's Questions*, Apple Inc. (Aug. 21, 2009), *available at* **http://www.apple.com/hotnews/apple-answers-fcc-questions** (stating that it provides guidelines to developers that are used in considering whether to approve applications, and describing Apple's review process).
46. At least one survey of free apps in the Apple App Store and the Android Market, however, found little difference between the two stores in the prevalence of access to sensitive data. Lookout Mobile Security, *supra* note 39, Figs 9-10; *see also* Thurm & Kane, *supra* note 17, (documenting the data collection that occurred through many popular smartphone apps).
47. *Apple Answers the FCC's Questions*, *supra* note 45.
48. *See Consumer Privacy and Protection in the Mobile Marketplace: Hearing before the Subcomm. on Consumer Protection, Product Safety and Insurance of the S. Comm. on Commerce, Science and Transportation,* 112th Cong. 3 (May 19, 2011) (prepared statement of Catherine Novelli, Vice President, Worldwide Government Affairs, Apple Inc.), *available at* **http://commerce.senate.gov/public/?a=Files.Serve&File_id=4e365814-c929-4785-9d39-596052ab3a7d** (stating "we make it very clear in our App Store Review Guidelines that any App that targets minors for data collection will be rejected.").
49. *See* Statement of Catherine Novelli, *supra* note 48, at 4-5 ("An arrow icon alerts iOS 4 users that an application is using or has recently used location-based information"); *Understanding the LocationListener in Android*, DoityourselfAndroid.com (Dec. 25, 2010) **http://blog.doityourselfandroid.com/2010/12/25/understanding-locationlistener-android/** (discussing the GPS icon on Android and stating that "No GPS icon will be shown in the title bar, unless a certain application (like Google Maps) triggers it to request a location.").
50. *See* Statement of Catherine Novelli, *supra* note 48, at 4; Statement of Alan Davidson, *supra* note 40, at 5-6.
51. *See* Statement of Catherine Novelli, *supra* note 48, at 4.
52. *See Best Practices for Mobile Applications Developers,* Future of Privacy Forum, 3, **http://www.futureofprivacy.org/wp-content/uploads/Apps-Best-Practices-v-beta.pdf** (last visited Jan. 24, 2012) (citing section 3.3.10 of the iOS Developer Program License Agreement, stating that "Developers must provide clear and complete information to users regarding collection, use and disclosure of user or device data."); Android Market Developer Distribution Agreement, 4.3, **http://www.android.com/us/developer-distribution-agreement.html** (last visited Oct. 31, 2011) ("If the users provide you with, or your Product accesses or uses, user names, passwords, or other login information or personal information, you must make the users aware that the information will be available to your Product, and you must provide legally adequate privacy notice and protection for those users.").
53. Apple Privacy Policy, **http://www.apple.com/privacy** (last visited Jan. 17, 2012) ("Information collected by third parties, which may include such things as location data or contact details, is governed by their privacy practices. We encourage you to learn about the privacy practices of those third parties."); Android Privacy Policy, **http://www.android.com/privacy.html** (last visited Jan. 17, 2012) ("Information collected by the third party application provider is governed by their privacy policies.").

54. The desktop version of the Apple App Store provides standardized locations on each app's preview page for placing links to the developer's website, a support site, and an application license agreement. Staff only reviewed the developer website link. *See* Appendix, pages A4-A5.

55. As noted in the FTC staff's preliminary privacy report, consumers are unlikely to read disclosures buried in privacy policies or "terms of service" agreements because they are not easily accessible and are invariably long, legalistic, and difficult to understand. These concerns are heightened in the mobile space, where consumers are interacting with very small screens. The privacy report encouraged companies to offer short, easy-to-read, "just in time" disclosures (or icons) that consumers are likely to see, read, and understand. *See* FTC Preliminary Staff Report, *supra* note *7,* at 69-71.

56. *See* Cecilia Kang, *Lawmakers urge FTC to investigate free kids games on iPhone*, Washington Post, Feb. 8, 2011, *available at* **http://www.washingtonpost.com/wp-dyn/content/article/2011/02/08/AR2011020805721.html**.

57. *See Administering In-app Billing,* Android Developers Guide, **http://developer.android.com/guide/market/billing/billing_integrate.html** (last visited Jan. 17, 2012).

58. A few applications indicated integration with more than one social network.

59. In-app advertising typically involves a relationship between the app developer and an ad network, where the ad network pays the developer to incorporate the ad network's code into the developer's application. When the app is running, the ad software allows the ad network to send ads to the user's device. Depending on how the ad network software is configured, the ad network may collect information from the user to provide targeted ads. *See* Thurm & Kane, *supra* note 17 ("[M]any ad networks offer software 'kits' that automatically insert ads into an app. The kits track where users spend time inside the app."); *see generally Google Ads for Mobile FAQ,* **http://code.google.com/mobile/afma_ads/kb/** (last visited Jan. 17, 2012) (describing the integration of ad software for targeted advertising); iAd, **http://developer.apple.com/iad/** (last visited Jan. 17, 2012) (describing the integration of ad features in iOS).

60. *See* Jolie O'Dell, *The Rise of Mobile In-App Ads* (July 16, 2011), **http://mashable.com/2011/07/16/in-app-ads/** (43% of the app developers used in-app advertising in 2011).

61. Other organizations review mobile apps and provide ratings and recommendations to help parents select content appropriate apps for kids. *See, e.g.,* Common Sense Media, *Best apps: Our recommendations for families,* **http://www.commonsensemedia.org/mobile-app-lists** (last visited Jan. 17, 2012).

62. While reviewing the app promotion pages in the survey, staff did not encounter any references to the age and content ratings found on many computer and video games, which are assigned by the Entertainment Software Rating Board (ESRB). Staff also notes that the ESRB and the wireless trade association CTIA have recently created a new mobile app rating system that uses its traditional icons to inform users. *See* Press Release, ESRB, *CTIA-The Wireless Association and ESRB Announce Mobile Application Rating System* (Nov. 29, 2011), *available at* **http://www.esrb.org/about/news/downloads/CTIA_ESRB_Release_11.29.11.pdf**. Like the Apple and Android rating systems, this new ratings system considers whether the app contains violence, language, or sexual content. It also considers whether the app has a minimum age requirement, allows the exchange of user-generated content, or enables users to share their location with other app users. However, this system also relies on developer provided information. Apple and Google are not currently participating in this initiative. *See* Kevin Fitchard, *Apple, Google Absent From ESRB's New Mobile App Rating System,* Gigaom (Nov. 29, 2011), **http://gigaom.com/2011/11/29/apple-google-absent-from-esrbs-new-mobile-app-rating-system/**.

63. *See, e.g.,* Statement of Catherine Novelli, *supra* note 48, at 2; *iTunes: Using Parental Controls,* Apple, **http://support.apple.com/kb/ht1904** (last modified Sept. 23, 2011). The Android Market allows users to filter apps displayed in the market based on app content ratings. *Application Content Ratings,* Android Market, **http://support.google.com/androidmarket/bin/answer.py?hl=en&answer=1075738** (last visited Jan. 17, 2012).

64. *See* Apple, *iTunes Connect Developer Guide, Version 7.2* 52-53 (Oct. 17, 2011), *available at* **https://itunesconnect.apple.com/docs/iTunesConnect_DeveloperGuide.pdf**; Statement of Alan Davidson, *supra* note 40, at 7.

65. *See iTunes Connect Developer Guide, supra* note 64, at 52.

66. *Id*.

67. *Rating Your Application Content for Android Market*, Android Market for Developer, **http://support.google.com/androidmarket/developer/bin/answer.py?hl=en&answer=188189** (last visited Jan. 17, 2012).

68. *Id*.

69. *Id*.

70. Staff did not evaluate the appropriateness of the Android ratings, but noticed that four of the Android "kids" apps listed a "medium maturity" rating, and four others listed a "high maturity" rating. Upon further review of these app descriptions, only five of these eight apps appeared to be intended for a child to use. These five apps consisted of three flashcard games, one painting game, and one "animal sounds" game. Based on the information available, staff could not determine why these five apps had such high maturity ratings.

71. *See* Apple, *iOS: Understanding Restrictions*, *available at* **http://support.apple.com/kb/ht4213** (last modified Oct. 24, 2011); Kids and Media, *Parental Controls for Android* (Dec. 5, 2011), **www.kidsandmedia.org/parent-controls-for-android/**; *see also Application Content Ratings*, Android Market, *supra* note 63.

72. *See* Apple, *iOS: Understanding Restrictions*, *supra* note 71.

73. *See* Kids and Media, *Parental controls for Android, supra* note 71; iKid Apps, *How to Setup Parental Controls on Android* (July 22, 2011) *available at* **http://www.ikidapps.com/2011/07/how-to-setup-parental-controls-on-android.html.**

74. For example, a child may not be able to access higher levels of a game or additional content if the internet connection has been blocked.

Appendix

Methodology

This section provides additional information about the data collected and reviewed in the attached FTC Staff Report on Kids Apps.

Apple Data Collection

On July 14, 2011, staff used a desktop computer with the Windows 7 operating system to locate and copy the app store promotion pages for 960 mobile applications using the following steps. Staff first searched on the term "kids" in the desktop version of Apple's iTunes app store and noted that each app had its own nine-digit unique identifier number and its own app store promotion page describing the app. The app store promotion page for each app was viewable by typing in the specific web address within the itunes.apple.com website, which contained the unique app identifier number, into the Internet Explorer browser on the desktop computer. Thus, staff could locate the unique web address for each app store promotion page using the following convention "http://itunes.apple.com/us/app/id[9-digit-unique-app-identification-number]?mt=8." Staff then used software to visit and copy the browser-viewable app promotion pages for the first 480 apps returned by the "kids" search in the Apple app store.

Android Data Collection

On July 14, 2011, staff used the same desktop computer with the Internet Explorer browser to access the desktop version of the Android Market, available at https://market.android.com. Staff searched on the term "kids" and noted that each app had its own unique identifier and its own app store promotion page describing the app. Like Apple, the Android Market app promotion page for each app was viewable by typing in the specific web address within the market.android.com website, which contained the unique app identifier, into the browser. Staff could locate the unique web address for each app store promotion page using the following convention, "https://market.android.com/details?id=[unique-app-id]&feature=search_result." Staff then used software to visit and copy the app promotion pages for the first 480 Android Market apps returned by the "kids" search.

Data Extraction

Staff saved each app store promotion page as a .txt file and as an .html file. Staff identified the relevant fields, such as price, developer, and number of ratings, found within the

copied app promotion pages and extracted that data into an electronic database. This automated extraction was the source of all of the n=480 tables in the report.

Reviewing the Random Sample of App Store Promotion Pages

Staff completed a review of 400 randomly selected app store promotion pages. For each of the pools of the 480 app promotion pages, staff used a random number generator to select 200 unique numbers and created a separate database that contained only the 200 app store promotion pages that corresponded with the 200 randomly selected numbers. Reviewers were instructed to examine the electronically captured app promotion pages (that had been saved as .html files), and to answer a series of questions about things like app topic, age range, and disclosures related to their review of the app promotion page using the database form. The specific instructions related to this review are detailed below. Once staff completed the review, two additional reviewers rated the sample, and found almost complete agreement between the first and second review, suggesting that the application of staff's criteria was relatively unambiguous.

Reviewers were also instructed to click on the website address listed on the app promotion page in the field for "[developer's] website." Staff then saved and reviewed the resulting webpage (the "landing page" of the developer's website), and entered the answers to a series of questions using the database form. Tables containing calculations that list "n=200" specify that the calculations were obtained from one of the two random samples.[1]

App Store Desktop Interface v. Mobile Device Interface

Staff collected the information in this report only from the content offered in the desktop interface of the two app stores. There are two relevant differences between this content and the content available through the mobile device interface, but staff does not believe these differences change the conclusions of this report.

App store promotion pages viewed in the Android Market using a mobile device include a field that displays a developer email address. At the time staff collected the information for the survey, this field was not found on the desktop version of the Android Market, and, thus, was not captured in the survey. Therefore, more email addresses were likely available for the Android apps in this survey than staff collected.

1. The specific random sample used is identified by the column heading under which the "n=200" specification is found.

Similarly, app store promotion pages viewed in the desktop version of Apple's App Store included a field that displayed a web address labeled "[Developer Name] Support," even though this field was not found in promotion pages viewed from an iPhone. As noted in the report, staff did not review these additional web addresses and does not know if they contained additional contact information or disclosure information. Staff did note that 61% of the promotion pages listed the same address for both the developer's website and the support website.

Categorizing Apps based on Type

Staff categorized the apps in the random sample based on a number of categories according to words found within the app descriptions and titles. The following is a list of the categories and any additional words used to classify an app into the categories: Educational ("learn," "teach," or any variation of the word "educate"); Game ("play"); Animal-related ("animal," "creatures," or the names or icons of different types of animals); Alphabet/Spelling/Words ("letters"); Math/Numbers ("arithmetic," "counting," "addition," "subtraction," "multiplication," or "division"); Matching ("match," or "find 2 of the same"); Memory; Book/Story ("chapters"); Coloring ("paint" or "draw"); Musical ("music" or "song"); Puzzle; Learning a language[2]; Flash Cards; Photo-related ("photo" or "picture"); Quiz/Test; Jokes; and other. Apps could fall into more than one category. For example, a matching game that involved pictures of animals would be categorized under "Game," "Matching," and "Animal-related."

Categorizing Apps based on Intended User

Staff categorized the 400 apps in the random sample based on whether the app title or description identified any one of the following groups as an audience for whom the app was intended or recommended: Infant; Toddler; Child; Kid; Teen; Adult; Parent; Teacher; Family; Mature; Everyone; Preschool; Elementary; Middle School; High School; Age Range; Grade Range; Other; and No Indication. Grade and age range information have been presented separately from the qualitative categories in the report. Simply containing one of these audience groups in the app title or description was not sufficient to trigger an intended use category. The app title or description had to indicate in some way that the app was for one or more of these groups' use. For example, one of the promotion pages described an app containing recipes for child-friendly meals. Although the description included the term "child,"

2. This category only included apps that had the word "learn" plus a language in the title or description.

the app was intended for use by parents or caretakers to make meals for children and therefore was not included in the "child" category.

Price Level Popularity

To estimate price level popularity for the Android apps in the survey, staff summed the lower bound of the download range for each app within a given price level. Next, staff divided these price level sums by the sum of the lower bound of the download ranges for all 480 Android apps. Using this method, staff found that the free Android apps returned by the "kids" search, which accounted for 62% of the search results, accounted for 99% of all downloads. Table 7 of the report contains the results obtained using the lower bound method.

Staff then repeated its calculations using the upper bound and midpoint of each download range. Staff found that the results returned by each method were nearly indistinguishable from the results obtained using the lower bound of the download ranges.

Both the Android Market and the Apple App Store display the number of users that have provided feedback for a particular app. Staff used this feature to estimate price level popularity for the Apple apps, and as a second estimate of app popularity for the Android apps, by repeating the calculations described above substituting the number of feedbacks for downloads.

Developer Websites

Both the Apple App Store and the Android Market provide a specified field on the app store promotion page for developers to list their website. Although some app store promotion pages additionally listed web addresses in other places (such as the text of the app description), staff restricted its review to the landing page of the developer website address listed in the developer web address field. Staff found that a sizeable number of the website addresses listed in the developer web address field did not lead to relevant or functioning websites.

Of the 400 randomly selected "kids" app promotion pages reviewed by staff, 43 (11%) did not list a web address in the specified field for developer website; 17 (4%) listed a web address that staff was unable to examine; and 10 (3%) listed a web address that either led back to the app promotion page, or was not related to the app or developer in any apparent way. Staff was unable to examine websites when they encountered problems including: error messages (such as "site not found" or "site under construction" messages); never-ending redirects; "access forbidden" messages; and one Facebook page that required the visitor to be logged into Facebook in order to access the webpage. In addition, 5 (1%) of the web addresses led to websites that were entirely in a foreign language (even though staff used an English

language browser and browsed US app stores), and therefore were not counted. In the end, 324 (81%) of the 400 "kids" app promotion pages listed a web address in the specified field that led to a functioning and relevant English language webpage.

Web Addresses in the Standardized Locations in the Apple App Store

The Apple App Store desktop version provides developers with standardized locations on each app's promotion page for placing links to the developer's website, a support site, and an application license agreement. Most Apple app store promotion pages in the survey contained a link to a developer website (469 out of 480, or 97.7%), and all of the pages contained a link to a support website. A few contained a link to an application license agreement (6 out of 480, or 1.3%). As stated above, 61% of the promotion pages listed the same address for both the developer's website and the support website. Staff did not look at the remaining 39%; it is possible that more of the pages linked to additional privacy disclosures or developer contact information.

Other Websites

Reviewers also noted any web addresses listed on the app promotion pages outside of the app store standardized locations. While a number of developers used their app description space on the page to encourage readers to like them on Facebook, or follow them on Twitter, only 8% of the 400 app promotion pages reviewed by staff provided an address to an additional website.

Android Permissions Language

Below is a list of the Android disclosures identified in Table 7 of the report, taken verbatim from the app promotion pages encountered in this survey. While each disclosure is reported in its entirety, the list is not exhaustive of those used in the Android Market or found in the samples associated with this report.

- "Network communication > full Internet access > Allows an application to create network sockets."
- "Phone calls > read phone state and identity > Allows the application to access the phone features of the device. An application with this permission can determine the phone number and serial number of this phone, whether a call is active, the number that call is connected to and the like."
- "Modify/delete SD card contents > Allows an application to write to the USB storage. Allows an application to write to the SD card."

- "Your location > coarse (network-based) location > Access coarse location sources such as the cellular network database to determine an approximate device location, where available. Malicious applications can use this to determine approximately where you are."
- "Your location > fine (GPS) location > Access fine location sources such as the Global Positioning System on the device, where available. Malicious applications can use this to determine where you are, and may consume additional battery power."
- "Hardware controls > take pictures and videos > Allows application to take pictures and videos with the camera. This allows the application at any time to collect images the camera is seeing."
- "Services that cost you money > directly call phone numbers > Allows the application to call phone numbers without your intervention. Malicious applications may cause unexpected calls on your phone bill. Note that this does not allow the application to call emergency numbers."
- "System tools > modify global system settings > Allows an application to modify the system's settings data. Malicious applications can corrupt your system's configuration."
- "Hardware controls > record audio > Allows application to access the audio record path."
- "Your personal information > read sensitive log data > Allows an application to read from the system's various log files. This allows it to discover general information about what you are doing with the device, potentially including personal or private information."

Implications of Methodology and Interpretation of Results

Survey designs inevitably make tradeoffs; presenting evidence in ways that shed the most light on some questions necessarily leave other issues unaddressed. Searching the app stores using the word "kids" is a transparent methodology that works in both app stores and generates a diverse and relevant set of results; however, it is important to bear in mind the following implications of the survey design:

> The first 480 apps returned by each query[3] were given both equal importance and equal likelihood of inclusion in the random sample. This means that the report's findings relate to overall performance from the field of apps for kids, rather than giving extra weight to those with more downloads.

3. Searches on the Android Market only yield 480 accessible results. Staff considered all 480 Android Market results, and truncated the results from the Apple App Store to 480 in order to make the samples comparable.

Staff did not remove the small handful of apps from the random sample that may not be intended for kids. However, these non-kid apps are rare enough that excluding them would not significantly change the report's findings.

The algorithms responsible for returning search results differ between the Android Market and the Apple App Store, which likely rely on keywords and other information to render search results.[4] Staff is not privy to the precise formulas, and using other search terms or selecting apps in different ways might generate somewhat different results.

These issues suggest exercising caution in claiming that the percentages found in the report extend to samples of apps beyond that used by this report. However, none of these issues change the conclusion that kids' app promotion pages that make few disclosures are widespread and easy to find.

4. For this reason, it is not surprising that only 61.5% of the Apple app promotion pages and 72.5% of the Android app promotion pages indicated they were intended to be used by "kids."