Inequalities in Facebook use

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ABSTRACT

While research has examined digital inequalities in general Internet use, little research has examined inequalities in social networking website use. This study extends previous research by examining how Facebook use is related to student background characteristics. Analyses were conducted to assess differences in time spent and activities performed on Facebook using a large sample ($N = 2359$) of college students. Results showed that women were more likely to use Facebook for communication, African Americans were less likely to use Facebook to check up on their friends, and students from lower socioeconomic levels were less likely to use Facebook for communication and sharing. Implications for education, communication, and student outcomes are presented.

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1. Introduction

Since its introduction in 2004, Facebook has become almost ubiquitous on college campuses with research showing that anywhere between 85% and 99% of students use the site (Hargittai, 2008; Jones & Fox, 2009; Matney & Borland, 2009). The Pew Internet and American Life Project found that between 67% and 75% of college-aged young adults (who may not necessarily be enrolled in college) use social networking websites (Jones & Fox, 2009; Lenhart, 2009; Lenhart, Purcell, Smith, & Zickuhr, 2010). Data collected by the EDUCAUSE Center for Applied Research (ECAR) found that 90% of college students used Facebook with 58% using it several times a day (Dahlstrom, de Boor, Grunwald, & Vockley, 2011). Recent data using a large sample of college students show that 92% of students used Facebook and they reported spending an average of over one hour and forty minutes a day on the site (Junco, 2012a); however, data using computer monitoring software showed that students actually spent only 26 min per day on the site (Junco, 2013).

While the percentage of students who use Facebook is high, it is important to acknowledge that there are persistent differences along gender, racial, and socioeconomic lines in technology adoption and use, often referred to as *digital inequalities* (Cooper & Weaver, 2003; DiMaggio, Hargittai, Celeste, & Shafer, 2004; Hargittai, 2008; Junco, Merson, & Salter, 2010; Kaiser Family Foundation., 2004). Although access rates may be equivalent for some groups, there is still variation in what they do when they are online (DiMaggio et al., 2004; Hargittai, 2008). While most studies have examined digital inequalities related to Internet and

communication technologies in general, few studies have examined digital inequalities in social networking website use. This is especially important in light of recent research that has found relationships between Facebook use and academic outcomes, the building and maintenance of social capital, and psychological outcomes (Ellison, Steinfield, & Lampe, 2011; Ellison, Steinfield, & Lampe, 2007; Junco, 2012a,b).

1.1. Digital inequalities

Even though research shows that there is a high adoption rate of social technologies among college students, digital inequalities still persist. Technological ownership, adoption and use within the overall population and within the population of college students vary according to gender, race, and socioeconomic status (Cooper & Weaver, 2003; DiMaggio et al., 2004; Hargittai, 2008; Junco et al., 2010; Kaiser Family Foundation, 2004; Rideout, Foehr, & Roberts, 2010). Junco et al. (2010) found that female and white college students were over twice as likely to own a cell phone as male and African American students and that more affluent students were over three times as likely to own a cell phone. African American students were more likely to send text messages than Whites and they sent more text messages and spent more time talking on cell phones than those from other racial/ethnic backgrounds (Junco et al., 2010). Furthermore, women typically send more text messages than men (Junco et al., 2010; Rideout et al., 2010). Hargittai (2010) found that women, students from lower socioeconomic backgrounds, and African American and Latino students reported knowing less about the Internet even when controlling for online experience.

In one of the few published studies on the topic, Hargittai (2008) found that Latino students were less likely to use Facebook

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than Caucasians and Asian Americans and were more likely to use Myspace. Women were also more likely to use Myspace than men and Asian American students were more likely to use Facebook but less likely to use Myspace (Hargittai, 2008). Furthermore, Hargittai (2008) found that students whose parents had a college degree were more likely to use Facebook than students whose parents did not have a college degree. A more recent study by Muscanell and Guadagno (2011) found that men were more likely to report using social networking websites to make new friends while women were more likely to report using them to maintain current relationships. Furthermore, they found that men were more likely to play games on social networking websites while women were more likely to post public messages, send private messages, send friend requests, and post photographs (Muscanell & Guadagno, 2011). In a more recent study, Hargittai and Litt (2011) found that African Americans students and those with greater Internet skills were more likely to use Twitter while students with parents who had less than a high school degree were less likely to be Twitter users.

1.2. Impact of digital inequalities in education

Many educators have embraced the opportunities presented by using technology in education. Studies have found academic benefits of using educational technology with elementary and/or high school students (Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010; Suhr, Hernandez, Grimes, & Warschauer, 2010; Tienken & Wilson, 2007). On the other hand, some studies have found a negative relationship between technology use and academic outcomes in these settings (Aypay, Erdogan, & Sozer, 2007; Waight & Abd-El-Khalick, 2007). Research on technology use in university settings helps to reconcile these contradictory findings: Bliuc, Ellis, Goodyear, and Piggott (2010) discovered that students who reported using discussion boards as tools to find answers—rather than to improve their understanding of a topic—were utilizing them in ways that encouraged reproduction and task completion rather than deep learning; those students also had lower final course grades. Rizzuto, LeDoux, and Hatala (2009) found that using a course management system for required actions (like posting comments) was positively related to course test scores. Sapp and Simon (2005) found that more students in online courses failed to complete the course and had lower grades than students in matched face-to-face courses. In related research, Weatherly, Grabe, and Arthur (2003) found that students in a section of a psychology course who were provided lecture slides via a course management system had lower exam scores than a control section, presumably because of decreased attendance. In other words, it is not whether technologies were used as part of the educational process, but *how* those technologies were used that made a difference in outcomes.

Research on college students has largely focused on institutionally-supported technologies like course management systems; however, more recent studies have been conducted that have found substantial benefits in incorporating new technologies like social media (Junco, 2012a,b; Junco, Elavsky, & Heiberger, 2013; Junco, Heiberger, & Loken, 2011). For instance, Junco (2012a) found that specific uses of Facebook were positively related to overall grade point averages (GPA). Specifically, checking to see what friends were up to and sharing links were positively predictive of overall GPA (Junco, 2012a). In a related study, Junco (2012b) found that certain Facebook activities predicted more of the variance in student engagement than time spent on the site; creating or RSVPing to events, commenting, and viewing photos were positively predictive of engagement while playing games, posting photos, using Facebook chat, and checking up on friends were negatively predictive. More recently, Junco et al. (2013) and Junco et al. (2011) conducted controlled experiments and found that using

Twitter in certain ways both increased student engagement and improved overall student GPAs.

Unfortunately, research on digital inequalities in education suggests that the benefits obtained by using educational technology may vary according to gender, race, or socioeconomic status. However, almost all of this research has examined high school students. Brown, Higgins, and Hartley (2001), Milone and Salpeter (1996), Pisapia (1994), and Warschauer, Knobel, and Stone (2004) found that students in public schools in lower socioeconomic areas were more likely to use computers for academic practice and quizzing, while students in higher socioeconomic areas were more than three times as likely to be learning how to program computers. In their review, Warschauer and Matuchniak (2010) found that students from minority ethnic and racial backgrounds as well as those from lower socioeconomic levels were at a disadvantage because they were less likely to own a computer and because of how they used technology in school. These disadvantages translated into negative impacts on academic achievement (Warschauer & Matuchniak, 2010).

In summary, digital inequalities work in two ways: they may begin at an early age and be perpetuated throughout a student's schooling so as to put some students at an educational, and by extension, a socioeconomic disadvantage or socioeconomically and educationally disadvantaged youth may be more likely to suffer from these inequalities. For if students are able to effectively use computers and other ICTs, their chances of being successful in today's workforce increases. This is especially true for social media as they are increasingly used as platforms to find employment and for career development (see Junco & Timm, 2008). In the case of Facebook, research has shown that use of the platform is related to the building and maintenance of social capital, student engagement in academic and co-curricular activities, and possibilities for peer-to-peer learning all of which are related to future employment potential (Ellison et al., 2011; Ellison et al., 2007; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Junco, 2012b). Therefore, inequalities in Facebook usage may put students at an "engagement disadvantage" which would affect their social integration, and by extension their persistence towards graduation (Tinto, 1993).

1.3. Purpose of the current study and research questions

Very little research has been conducted on digital inequalities at the university level possibly because of assumptions that students from the "Net Generation" are highly wired and have no difficulty adopting and using new technologies (see Prensky, 2001) and because of the assumption that college students have better access to ICTs thanks to computer labs and other campus resources. However as previously discussed, this is not the case—there is great variability in technology ownership, use, and Internet skills (Cooper & Weaver, 2003; DiMaggio et al., 2004; Hargittai, 2008, 2010; Junco et al., 2010; Kaiser Family Foundation, 2004; Rideout et al., 2010). Even fewer studies have examined digital inequalities in the use of Facebook, the most popular social media site for college students, the notable exceptions being the studies by Hargittai (2008) and Muscanell and Guadagno (2011). Hargittai (2008) found differences by ethnicity and parental educational level in whether or not students used Facebook. Muscanell and Guadagno (2011) examined gender in a small sample and found differences in reasons for using Facebook and differences in Facebook activities.

The current study extends previous research by using a large sample of college students to examine whether gender, race/ethnicity, and/or parental education level (a proxy for socioeconomic status) are related to time spent on Facebook as well as Facebook activities. Furthermore, unlike previous studies the current study uses a continuous measure of time spent on Facebook as well as

an expanded list of Facebook activities. The research questions examined were:

Question 1: When taking into account both time spent and activities performed on the site, is there a relationship between gender, race/ethnicity, or parental education level and time spent on Facebook?

Question 2: When taking into account both time spent and activities performed on the site, is there a relationship between gender, race/ethnicity, or parental education level and frequency of engaging in Facebook activities?

Given previous research on digital inequalities showing that women are more likely to use SNS, it is hypothesized that there will be differences in time spent on Facebook by gender (Hargittai, 2008; Rideout et al., 2010). Furthermore, based on previous research it is hypothesized that there will be differences in Facebook activities by gender, race/ethnicity, and parental education level (DiMaggio et al., 2004; Hargittai, 2008; Hargittai & Litt, 2011; Muscanell & Guadagno, 2011).

2. Methods

2.1. Participants

All students ($N = 5414$) at a medium, 4-year, public, primarily residential institution in the Northeast were surveyed. Students were contacted through their on-campus email accounts and sent a link to a survey hosted on SurveyMonkey.com a commercial survey-hosting website. Two additional reminders were sent, each one week apart. Participants were offered a chance to enter a drawing to win one of 90 $10 Amazon.com gift cards as an incentive. A total of 2368 surveys were completed for an overall response rate of 44%.

2.2. Instrument and measures

To evaluate average time spent daily, students were asked: "On average, about how much time per day do you spend on the following activities?" with a prompt for Facebook. Students used a pull-down menu to select the hours and minutes spent using Facebook. The hours and minutes spent using Facebook were converted to minutes for these analyses. Students were also asked to estimate the frequency with which they conducted various activities on Facebook. As the possible types of Facebook activities change over time because of addition or deletion of features, the list of Facebook activities was developed just before the current study by soliciting input from the author's Facebook network. A public status update was posted stating: "I need your help for my next research project. What are the things that you do on Facebook?" The items submitted by 39 members of the network were then collated and compiled into a non-overlapping list of 14 items that encapsulated the major categories of Facebook activities. The 14 items were shared with two separate groups of undergraduate students for input, revised, and then posted on Facebook for further comments. While all of the items from the original list were kept, many were edited for clarity and relevance. The final list of 14 items was: playing games (FarmVille, MafiaWars, etc.); posting status updates; sharing links; sending private messages; commenting (on statuses, wall posts, pictures, etc.); chatting on Facebook chat; checking in to see what someone is up to; creating or RSVPing to events; posting photos; tagging photos; viewing photos; posting videos; tagging videos; viewing videos. Students were asked: "How frequently do you perform the following activities when you are on Facebook? Facebook activity items were coded using a five-point, positively anchored Likert scale ranging from

"Never" to "Very Frequently (close to 100% of the time)." For these analyses, "Never" was coded as 1; "Rarely (25%)" as 2; "Sometimes (50%)" as 3; "Somewhat frequently (75%)" as 4; and "Very frequently (close to 100% of the time)" as 5.

Lastly, students were asked to select their gender (male/female) and their race/ethnicity (African American, Asian American, Hispanic/Latino, Native American, White/Caucasian, or Other). Because there were only four in the sample, Native Americans were included in "Other" category for these analyses. Consistent with the work of others, parental education was used as a proxy for socioeconomic status (SES; Donaldson, Lichtenstein, & Sheppard, 2008; Hargittai, 2008; Lien, Friestad, & Klepp, 2001). Asking about parental income has limited utility in college student populations because many students do not know and therefore, these questions typically have a high non-response rate (Donaldson et al., 2008). Furthermore, it is difficult to make inferences based on family income without having additional information (such as family size and asset information). Therefore, parental education level was obtained by asking students "What is the highest level of formal education obtained by your parents?" with prompts for "Parent/Guardian 1" and "Parent/Guardian 2." Parental education items were coded using the continuous scale recommended by Donaldson et al. (2008). For this study, "Less than high school degree" was coded as .14; "High school degree" was coded as .29; "Some college" was coded as .43; "College graduate (for example: B.A., B.S., B.S.E)" was coded as .71; and "Advanced graduate (for example: master's, professional, J.D., M.B.A, Ph.D., M.D., Ed.D.)" was coded as 1.0. The higher of the two parental education levels was used for these analyses.

2.3. Data analyses

A canonical correlation analysis was conducted using gender, race/ethnicity, and highest parental education level as predictors of the Facebook use variables (time spent on Facebook and frequency of engaging in certain Facebook activities) in order to evaluate the multivariate shared relationship between the two variable sets (see Fig. 1). Canonical correlation is used to examine the relationship between two sets of variables by first creating and then correlating two latent (canonical) variables. These two latent variables represent a linear combination of the set of predictor variables as well as a linear combination of the set of dependent variables. Therefore, the linear combination of time spent on Facebook and frequency of activities performed on the site was used to calculate the dependent latent variable and as such, this latent variable takes into account time spent and activities together. The linear combination of gender, race/ethnicity, and SES made up the predictor latent variable. Categorical variables were dummy-coded for purposes of the canonical correlation analyses. The reference categories for these variables were: female and White students.

The canonical correlation coefficient (R_c) is the Pearson r relationship between the two latent variables in a given canonical function. There will be as many canonical functions as there are variables in the smaller variable set; for these analyses, there will be six canonical functions with related latent variables being uncorrelated across functions. Therefore, the first function will be created to maximize the canonical correlation between the two latent variables. Then, using the remaining variance, the next function will be created to maximize the second canonical correlation between two other latent variables under the condition that these new latent variables are perfectly uncorrelated with all others preceding them. The process will iterate until all six functions are completed. It is then up to the researcher to interpret which functions are important in the analyses through the significance testing in the dimension reduction analysis and by examining the propor-
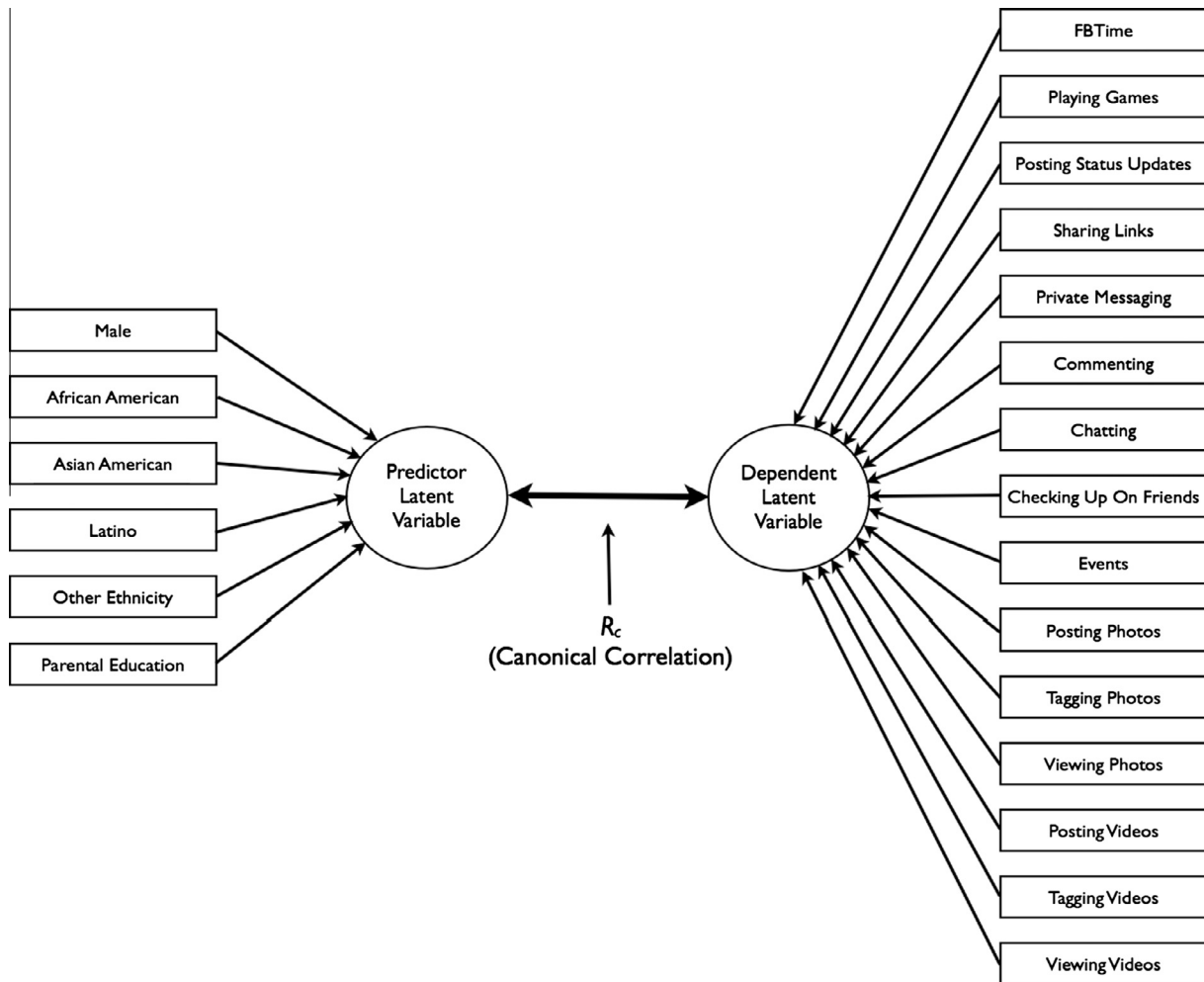
Fig. 1. Illustration of canonical function in canonical correlation analysis showing predictor variables, dependent variables, and their related latent variables. The latent variables are linearly combined from the observed predictor and dependent variables. The canonical correlation is the simple Pearson *r* correlation between the two latent variables.

tion of variance explained by each function (Sherry & Henson, 2005).

Sherry and Henson (2005) explain how the canonical analyses yield the following variables:

(1) The *canonical correlation coefficient* (R_c), which is the correlation between the two latent variables. The canonical correlation coefficient is calculated for each of the six functions. Because of scaling created by the standardized weights in the equations calculating the latent variables, the value of this coefficient can only range between 0 and 1 and therefore is analogous to the *R* statistic in a regression analysis. Consequently, the *squared canonical correlation* (R_c^2) like R^2 in regression represents the proportion of the variance shared between the two latent variables. Because the latent variables represent the observed predictor and dependent variables, R_c^2 represents the amount of shared variance between the variable sets.

(2) *Standardized canonical function coefficients* (*Coef*) are the standardized coefficients used in the linear equations to create the latent predictor and dependent variables from the observed variables. These weights are applied to the observed scores to yield the latent scores that are correlated to yield the canonical correlation. These weights are analogous to beta (β) weights in regression.

(3) A *structure coefficient* (r_s) is the Pearson *r* correlation between an observed variable and a latent variable. They define the structure of the latent variable by showing which observed variables contribute to it. *Structure coefficients* are analogous to the structure coefficients found in factor analysis structure matrix. The *squared structure coefficient* (r_s^2) is just like any other r^2-type effect size and shows the proportion of the variance that an observed variable shares with its related latent variable.

(4) The *canonical communality coefficient* (h^2) is the proportion of variance explained by each observed variable that is explained by the complete canonical solution—it is calculated by summing the r_s^2 across all canonical functions being interpreted. The *canonical communality coefficient* shows how useful each observed variable was for the entire analyses.

All analyses were performed using SPSS Statistics Version 19. Preliminary analyses were conducted to test whether the data met the assumptions of canonical correlation. In order to test for collinearity and important outliers, a regression with collinearity diagnostics was performed. The curve estimation procedure of SPSS was used to examine the linearity of the relationships in the data. Curve estimation was used to plot both linear and quadratic functions to examine linearity. The curve estimation,

collinearity, and outlier analyses showed that the assumptions for canonical correlation were met. However, the analyses also high-lighted nine outliers that were removed from further analyses thereby reducing the sample size to 2359 students.

3. Results

3.1. Descriptive statistics

Sixty-four percent of those who took the survey were female. The mean age of the sample was 22 with a standard deviation of 6. The age of participants ranged from 17 to 61, although over 78% were between 18 and 22 years old. Thirty one percent of students in the sample were in their first year, 22% were sophomores, 20% were juniors, and 27% were seniors. Highest educational level attained by either parent was as follows: 2% had less than a high school degree, 27% had a high school degree, 24% completed some college, 34% were college graduates, and 14% had a graduate de-gree. In terms of race and ethnicity, the sample was overwhelm-ingly Caucasian with 89% of students listing that as their race. Additionally, 5% of the sample was African American, 2% were Latino, 1% was Asian American, and 3% identified as "other." The gender, race, and ethnic composition of the sample was similar to that of the overall university population, with the exception of a slight overrepresentation of women in this sample. Students re-ported spending an average of 101 min per day on Facebook ($SD = 99$). Frequency of engaging in the 14 Facebook activities is re-ported in Table 1.

3.2. Canonical correlation

The full model across all six functions was statistically signifi-cant using the Wilks's $\lambda = .779$ criterion, $F(90, 13081.51) = 6.581$, $p < .001$. Because Wilks's λ represents the variance unexplained by the model, $1-\lambda$ yields the full model effect size. Thus, for the set of six canonical functions the effect size was .221, which indi-cates that the full model explained a little over 22% of the variance shared between the variable sets. While the canonical analysis yielded six functions, only three functions were considered note-worthy and will be interpreted because of the results of the dimen-sion reduction analysis and because of the squared canonical correlations (r_s^2) of the three functions.

The dimension reduction analysis allows the researcher to test the hierarchal arrangement of functions for statistical significance. As noted, the full model (Functions 1–6) was statistically signifi-cant. Functions 2–6 and 3–6 were also statistically significant, $F(70, 11078.06) = 2.353$, $p < .001$, and $F(52, 9014.54) = 1.568$,

$p < .01$, respectively. The remaining Functions (4–6, 5–6, and 6–6) were not significant with F values being less than 1.1 and p values being >.36. The squared canonical correlations (r_s^2) for each of the 6 successive functions were: .164, .035, .018, .008, .006, and .002. Therefore, the first canonical function found that the combination of the predictor variables predicted 16.4% of the variance in the dependent variables. The second canonical function found that the combination of the predictor variables predicted 3.5% of the variance in the dependent variables that was left over after the first function. Lastly, the third canonical function found that the combi-nation of the predictor variables predicted 1.8% of the variance in the dependent variables that was left over after the first and sec-ond functions. The remaining functions predicted less than 1% of the remaining variance between the variable sets.

Table 2 presents the standardized canonical function coeffi-cients (*Coef*) and structure coefficients (r_s) for Functions 1–3. The squared structure coefficients (r_s^2) are also given as well as the communalities (h^2) across the three functions for each variable. Examining the Function 1 coefficients shows that the relevant dependent variables were primarily posting photos and tagging photos, with viewing photos, commenting on content, and posting status updates making secondary contributions to the latent dependent variable. This conclusion was supported by the squared structure coefficients (r_s^2), which denotes the proportion of vari-ance predicted. All of these variables' structure coefficients had the same sign, indicating that they were all positively related. Examining the predictor variable set for Function 1 shows that the only relevant predictor variable was gender, which predicted 99.2% of the variance. Because the structure coefficient for male was negative, being male was negatively related to all of the Facebook activities contributing to the latent dependent variable. Because of the strong influence of gender, Function 1 was labeled "gender effects."

Moving to Function 2, the squared structure coefficients in Ta-ble 2 shows that the relevant dependent variable was tagging pho-tos with checking up on friends making secondary contributions. Both of the dependent variables were positively related on this function. In this function, being African American was the primary contributor to the predictor latent variable while parental educa-tion level made secondary contributions. Therefore, being African American was negatively related to checking up on friends and tag-ging photos while having a parent with higher levels of education was positively related. Because of the primary and strong influence of being African American, Function 2 was labeled "race effects."

Sending private messages and viewing videos were the primary contributors to the latent dependent variable with posting videos, tagging videos, chatting, tagging photos, and creating/RSVPing to

Table 1
Frequency of engaging in Facebook activities ($N = 2359$).

Activity	Frequency (% reporting)				
	Never	Rarely (25%)	Sometimes (50%)	Somewhat frequently (75%)	Very frequently (100% of the time)
Playing games	72	13	7	6	3
Status updates	18	39	27	13	3
Sharing links	48	34	13	5	1
Private messages	25	46	21	7	1
Commenting	13	22	32	27	7
Chatting	23	29	26	17	6
Checking up	15	21	27	25	12
Events	52	35	11	3	1
Posting photos	25	42	23	9	2
Tagging photos	32	42	17	7	1
Viewing photos	12	20	32	28	9
Posting videos	63	28	7	2	1
Tagging videos	69	25	5	1	1
Viewing videos	38	39	17	5	1

Table 2
Canonical solution for gender, ethnicity, and parental education level predicting Facebook frequency of use and activities (*N* = 2346).

Variable	Function 1 Gender effects			Function 2 Race effects			Function 3 Parental education effects			h^2
	Coef	r_s	r_s^2	Coef	r_s	r_s^2	Coef	r_s	r_s^2	
FB time	0.144	0.242	0.059	−0.239	−0.229	0.052	0.303	0.115	0.013	0.124
Playing games	0.022	0.069	0.005	−0.149	−0.212	0.045	0.339	0.316	0.100	0.150
Posting status updates	0.083	0.419	0.176	−0.52	−0.299	0.089	0.462	0.049	0.002	0.267
Sharing links	−0.414	−0.09	0.006	0.225	−0.035	0.001	−0.031	−0.283	0.080	0.087
Private messaging	0.156	0.3	0.090	−0.407	−0.248	0.062	−0.63	−0.666	0.444	0.595
Commenting	0.288	0.508	0.258	0.01	−0.021	0.000	−0.008	−0.262	0.069	0.327
Chatting	−0.335	0.077	0.006	−0.065	−0.11	0.012	−0.343	−0.396	0.157	0.175
Checking up on friends	0.099	0.413	0.171	0.721	0.349	0.122	0.145	−0.166	0.028	0.320
Events	−0.156	0.106	0.011	0.482	0.329	0.108	−0.089	−0.339	0.115	0.234
Posting photos	0.655	0.767	0.588	−0.042	−0.02	0.001	0.188	−0.279	0.078	0.667
Tagging photos	0.225	0.642	0.412	0.164	0.52	0.270	−0.34	−0.389	0.151	0.834
Viewing photos	0.119	0.515	0.265	0.055	0.124	0.015	−0.071	−0.286	0.082	0.362
Posting videos	−0.02	0.065	0.004	−0.77	−0.288	0.083	−0.219	−0.423	0.179	0.266
Tagging videos	−0.119	0.054	0.003	0.566	−0.067	0.001	0.019	−0.4	0.160	0.164
Viewing videos	−0.254	0.006	0.001	−0.271	−0.179	0.032	−0.174	−0.447	0.200	0.233
R_c^2			0.164			0.035			0.018	
Male	−0.99	−0.996	0.992	0.024	0.002	0.001	0.144	0.078	0.006	0.999
African American	−0.036	−0.079	0.006	−0.744	−0.739	0.546	−0.341	−0.289	0.084	0.636
Asian American	−0.033	−0.03	0.001	−0.031	0.002	0.001	−0.068	−0.063	0.004	0.006
Latino	−0.032	−0.062	0.004	−0.154	−0.134	0.018	−0.047	0.003	0.000	0.022
Other ethnicity	−0.026	−0.045	0.002	−0.368	−0.329	0.108	−0.548	−0.538	0.289	0.400
Parental education	−0.066	−0.113	0.013	0.545	0.567	0.321	0.774	−0.763	0.582	0.916

Note. Coef = the standardized canonical function coefficient; r_s = structure coefficient; r_s^2 = squared structure coefficient; R_c^2 = squared canonical correlation; h^2 = communality coefficient; squared structure coefficients making primary and secondary contributions are underlined as are their related communality coefficients.

events making secondary contributions. As for the predictor variables, the primary contributor was parental education with reporting "other" as ethnicity making a secondary contribution. Parental education was positively related to tagging photos, posting photos, sending private messages, viewing photos, commenting, checking up on friends, posting videos, creating/RSVPing to events, viewing videos, and chatting. Parental education was negatively related to posting status updates. Reporting "other" as ethnicity was also positively related to sending private messages, viewing videos, posting videos, chatting, and tagging photos, and tagging videos. Because of the primary and strong influence of parental education level, Function 3 was labeled "parental education effects."

4. Discussion

4.1 Question 1: When taking into account both time spent and activities performed on the site, is there a relationship between gender, race/ethnicity, or parental education level and time spent on Facebook?

When taking into account both time spent and activities performed on the site, there was no relationship between gender, race/ethnicity, or parental education level and time spent on Facebook. Hargittai (2008) found that Latino students were less likely to use Facebook, Asian American students more likely to use Facebook, and students whose parents had a college degree were more likely to use Facebook. While results from the current study were incongruent with Hargittai's (2008) findings, she examined whether a student used Facebook while the current study examined time spent on the site. In that regard, the results from the current study are congruent with others that have found that inequalities in time spent online have narrowed or been eliminated (DiMaggio et al., 2004; Hargittai, 2008).

4.2 Question 2: When taking into account both time spent and activities performed on the site, is there a relationship between gender, race/ethnicity, or parental education level and frequency of engaging in Facebook activities?

While there were no differences in time spent on the site, there were clear differences by gender, race/ethnicity, and parental educational level. Specifically, gender explained the most variance in Facebook activities with women being more likely to post photos, tag photos, view photos, comment on content, and post status updates than men. Race/ethnicity explained the next highest proportion of the variance with African Americans being less likely to check up on friends and tag photos. Lastly, socioeconomic status explained the next highest proportion of the variance with parental education being positively related to tagging photos, posting photos, sending private messages, viewing photos, commenting, checking up on friends, posting videos, creating/RSVPing to events, viewing videos, and chatting and negatively related to posting status updates. Although some of the variance in the race effects model was also predicted by education level, it only predicted 59% as much variance as race. Furthermore, while race/ethnicity predicted some of the variance in the parental education effects model, that variable also only predicted about half as much variance as the parental education variable.

Even though the list of activities examined were different, the gender results in the current study are generally congruent with the finding by Muscanell and Guadagno (2011) that women were more likely to post public messages, send private messages, send friend requests, and post photographs. Therefore, women are more likely to engage in Facebook activities centered on communication and relationship building. At first blush, checking up on friends and posting, tagging, and viewing photos may not seem like communication activities; however, checking up on friends and viewing photos are important social information seeking activities that

may be associated with increased perceptions of social capital and are related to positive academic outcomes (Ellison et al., 2011; Ellison et al. 2007; Junco, 2012a,b). Interestingly, while checking up on friends is positively related to GPA, it is also negatively related to student engagement (Junco, 2012a,b). On the other hand, posting and tagging photos may be an information sharing activity involved in maintaining bonds shared through real-world activities (Ellison et al., 2011). The gender results in the current study are congruent with the literature on gender differences in general Internet use in that women tend to use the Internet for communication activities and these activities are related to more positive psychosocial outcomes (Cotten, 2008).

An examination of the race results from the current study show that while there were no differences in the amount of time members of minority ethnic/racial backgrounds spent on Facebook, African Americans used Facebook differently than others. Specifically, African Americans were less likely to check up on friends and tag photos. As mentioned previously, checking up on friends is an important social information seeking activity that may be related to friendship maintenance and is related to academic outcomes (Ellison et al., 2011; Ellison et al. 2007; Junco, 2012a, b). Specifically, social information seeking helps students become more socially integrated which is directly related to their decisions to persist (Tinto, 1993). The race/ethnicity findings are not generally congruent with the only published study of ethnicity differences in social networking website use by Hargittai (2008) and that is more than likely due to the fact that the outcomes being examined are different and because of the time when the studies were conducted – Hargittai (2008) measured whether students used Facebook while the current study examined multiple variables related to how Facebook was used and made no comparisons against other social networking websites. Furthermore, the results of the current study are from data collected at a time when Facebook boasts an increasingly high adoption rate among college students.

The effect of parental education was about as strong as the effect of race and showed that students whose parents had lower levels of education were less likely to engage in a wide variety of Facebook activities including sending private messages, viewing videos, posting videos, tagging videos, chatting, tagging photos, and creating/RSVPing to events. This was congruent with Hargittai's (2008) finding that students whose parents had a college degree were more likely to use Facebook. As a whole, these activities can be regarded as sharing, connecting, and communicating with others. Of particular interest was that students with parents that had lower education levels were less likely to send private messages, an activity that predicted a substantial proportion of the variance. Therefore, it can be concluded that those from lower SES are less likely to use Facebook for exactly the types of activities for which Facebook was created—communicating, connecting, and sharing with others. As with the gender and race effects, these results call into question how these differential uses by students from lower SES levels puts them at a disadvantage both psychosocially and academically. While not examined in the current study, it will be important for future research to examine how these differential patterns of communication may influence using Facebook in ways detrimental to student academic and psychosocial outcomes.

4.1. Limitations

A major limitation of this study is that it is cross-sectional and correlational in nature. The relationships discussed in this paper are just that—relationships and causality in the links between demographic characteristics and Facebook use cannot be inferred. While the data show that being from lower SES levels is negatively

related to communication activities on Facebook, it could be that there is an unmeasured variable that explains this relationship (an example could be written expression skills). Another major limitation of the study is that the percentage of African American students at the university where the study was conducted, and therefore in this sample, is low. Only 5% of the students in the sample identified as African American and therefore, the results about African Americans must be viewed within this context. In other words, it is possible that the results about African Americans apply to only a small percentage of the overall African American student population in US universities. Further research will want to examine this issue in more detail *vis a vis* other research finding differences in African American use of technology and Internet knowledge (Hargittai, 2010; Hargittai & Litt, 2011; Junco et al., 2010).

While this sample was representative of the overall university population on which it is based, it may not be representative of all institutions. Relatedly, there were a large percentage of Caucasian students in this sample, possibly skewing the results for race/ethnicity. Future research will want to engage more diverse samples across race, ethnicity, income and academic institutions. Additionally, future research should collect longitudinal data to evaluate how differences in Facebook use change over time for diverse segments of the population. Relying on an online questionnaire when studying uses of Facebook could create a bias toward students who spend more time online and who may also be more inclined toward using Facebook more and in different ways from those who spend less time online (Hargittai, 2008). An associated limitation was related to estimating the frequency with which students use Facebook. Specifically, all of the variables were assessed via self-report. Recent research has shown that there are substantial differences between self-reported and actual use of Facebook (Junco, 2013). Therefore, further research should evaluate non-users of Facebook preferably through using traditional survey methodology as well as by combining multiple measures of Facebook use. Ideally, further research will also attempt to make assessments of actual time spent on Facebook either through observations or other logging methods.

5. Conclusion

While some studies have found a negative relationship between time spent on Facebook and academic performance, others have found positive relationships between what students do on Facebook and academic performance (Junco, 2012a). This is especially important in the context of digital inequalities, as inequalities are no longer represented in differences in time spent on the Internet or social sites, but on how those sites are used and what they afford the users. The results from this study suggest that while men, African Americans, and those from lower SES use Facebook with the same frequency, there are differences in how they use the site that could disadvantage them psychosocially and academically. Men are less likely to use Facebook for communicative activities that are linked to positive psychosocial and academic outcomes (Cotten, 2008; Junco, 2012a, b). Using Facebook for communication and connection with fellow students helps strengthen social bonds which leads to a greater sense of commitment to the institution and to increased motivation to perform better academically (Tinto, 1993). Furthermore, African American students were less likely to use Facebook to check up on their friends, an activity positively related to building social ties and to GPA although negatively related to student engagement (Ellison et al., 2011; Ellison et al. 2007; Junco, 2012a,b). Therefore when using Facebook, men and African Americans will be at a disadvantage as they perform activities that

are related to poorer real-world outcomes. Of particular interest were the ways students from low SES used, or more accurately, *didn't use* Facebook—they were less likely to use Facebook for the activities on which Facebook is based—communication and connection.

The ways in which men, African Americans, and those from lower SES use Facebook could put them at a disadvantage academically. Take for example, those students who are from lower SES and how they use Facebook—they are less likely to use it for communication and connection. Since Facebook is one of the primary communication sources for most college students, these students are at a disadvantage when attempting to build a social support system to help them integrate in their college environment (Smith & Caruso, 2010; Tinto, 1993). This result in particular suggests that some students, especially those from lower SES backgrounds, are either unaware or not complicit with the ways that Facebook is used by their majority peers; those from higher SES are more likely to use Facebook for the connecting and sharing activities for which it was designed, unlike those from low SES. Failure to connect in these ways could deprive students of the benefits of participation on such sites, such as increased social capital, improved social integration, opportunities for peer-to-peer learning, and improving the technological and communication skills valued in today's workplace (Ellison et al., 2007; Ellison et al., 2011; Jenkins et al., 2006; Tinto, 1993).

In addition to the skills enhanced by Facebook use, some students may be at an educational disadvantage as faculty are becoming more interested in integrating social technologies like Facebook into their courses (Junco, 2012a). One can imagine a discussion using a Facebook group on a class topic where students from low SES are less likely to participate, in part because they are not as used to communicating and sharing publicly online, as are their higher SES peers. This signals to faculty who will use social media in the courses that they must be prepared to instruct all students on how they will be using those technologies and to be prepared to educate some students on online cultural expectations.

These differential patterns in Facebook use suggest that when educators become more likely to use Facebook in their courses, for instance as a replacement for a traditional discussion board, that students from minority backgrounds will be at a disadvantage. One of the most important predictors of Internet skill is experience with technology and with less experience, comes a misunderstanding of the culture of what is expected on social sites (Hargittai, 2010). Educators are encouraged to ensure that when implementing interventions using newer technologies such as Facebook, that they both teach students how to use the technology as well as teach social and cultural expectations. For instance, an educator might start a course that will use Facebook as a replacement for a discussion board by showing all students how to create a profile and providing instruction on basic site features as well as engaging all students in conversations about what the social mores are for Facebook use among their peers and what online behaviors will be expected of them for the course.

The disparity in how those from disadvantaged backgrounds use Facebook may be related to differences in communication patterns, Internet skills, or both with those from minority cultures (both ethnic and SES) having weaker communication skills in general and technology skills in particular (Zhao, 2008). The current study serves as a starting point for other researchers to examine these discrepancies in more detail but also for faculty who use social media in their courses to implement educational interventions that are inclusive of those who are not as familiar with the dominant modes of their use.

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