

# What Role Does Grit Play in the Academic Success of Black Male Collegians at Predominantly White Institutions?

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**Abstract** This study tests the importance of a noncognitive trait, grit, to predicting grades for a sample of Black males attending a predominantly White institution. Using multivariate statistics and hierarchical regression techniques, results suggest that grit is positively related to college grades for Black males and that background traits, academic factors, and grit explain 24 % of the variance in Black male's college grades. Grit, alone, added incremental predictive validity over and beyond traditional measures of academic success such as high school grade point average and American College Test scores. Implications for policy and practice are highlighted.

**Keywords** Non-cognitive · Grit · Black male · Postsecondary · Achievement

College enrollment rates have increased dramatically over the last 30 years. Today, more than 19 million students are enrolled across 4,200 colleges and universities in the USA, making this the largest system of higher education in the world (U.S. Department of Education 2011). Enrollment rates vary by race/ethnicity. African-Americans, specifically, represent 12 % of college students nationally, and Black women outnumber their same-race male counterparts by more than 2 to 1 (Cuyjet 2006). Even when they do enroll, Black men are more likely than their peers to begin their postsecondary careers at 2-year community colleges (e.g., Flowers 2006; Hagedorn et al. 2007), earn lower grades (Bonner and Bailey 2006), devote less time to campus activities and studying (Flowers 2007; Harper et al. 2004), take longer to complete their degrees, or drop out altogether (National Urban League 2007). Indeed, two thirds of all Black men who enter higher education leave before completing their degree—the highest attrition rate among all races and both sexes.

The research literature is replete with references to factors that influence Black male attrition from college, most of which can be organized into three major

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categories: environmental, social, and psychological. Environmental factors include aspects of the campus ecology or prevailing ethos that either affirm Black male collegians' sense of belonging, facilitate their involvement in the academic and social life of campus, or marginalize them in ways that deny access to supportive networks that are critical for their success (e.g., Flowers 2002, 2003; Strayhorn 2012). Environmental cues also may be internalized by individuals and interrupt cognitive behaviors such as engagement, optimism, and information recall or transmission (Berger and Heath 2005; Zhao et al. 2012). For example, researchers have argued since Fleming's (1984) ground-breaking study that some Black men may struggle academically in campus environments that are racially hostile, unfriendly, and unwelcoming to students of color, or lacking a "critical mass" upon whom Black men can rely for support and advice.

A second line of inquiry focuses on social factors that inspire or inhibit Black males' success in college and suggests important conclusions. For instance, Black males' academic success, or lack thereof, is a function of meaningful interactions with diverse peers, supportive relationships with university faculty and staff, as well as frequent and educationally purposeful engagement in campus activities and student organizations (Flowers 2003; Harper 2006; Strayhorn 2008a, b). Strayhorn analyzed data from 531 Black and White men who responded to the *College Student Experiences Questionnaire* and found that cross-racial interactions with peers significantly predicted sense of belonging for Black men at predominantly White institutions (PWIs).

A third, and smaller, set of studies attempts to identify psychological determinants of student success in college. Here scholars have argued that any outcome (e.g., retention, grades) is a function of both cognitive (i.e., what students think) and behavioral (i.e., what students do) traits. The weight of empirical evidence, to date, suggests that what students do matters most (Astin 2003; Pascarella and Terenzini 2005) and the bulk of recent research in developmental psychology supports this conclusion (e.g., Nock et al. 2010; Vaughn et al. 2008). Still this line of research is somewhat under-developed, as we need to know more about plausible traits that influence college student success and whether certain psychological traits are correlated with academic success for specific subpopulations such as Black male collegians.

More recent scholars have posited the importance of grit to outcomes such as educational achievement. Grit research has focused in three areas: (a) initial development of a grit scale, (b) theoretical mining of the concept to clarify its meaning and distinction from other personality traits, as well as (c) tests of its predictive validity for specific samples (Duckworth et al. 2007). For instance, Duckworth and Quinn (2009) analyzed data from 1,248 cadets at West Point, the US Military Academy, and found that grit predicted completion of the academy's rigorous summer training program better than the Whole Candidate Index, comprised of one's weighted high school rank, SAT score, involvement, and physical exercise evaluation, which is used for admission. They concluded, "grittier West Point cadets were less likely to drop out during their first summer of training" (p. 173). Similar conclusions have been drawn for National Spelling Bee participants (Duckworth et al. 2011) and public school students in grades 4 through 8 (Rojas et al. 2012).

Despite these advancements, there are limits to the existing research on grit. To date, only a few studies examine the role of grit in predicting academic success among students (e.g., Duckworth and Quinn 2009; Rojas et al. 2012), and no studies

test the ability of grit to add incremental validity to predicting academic success for Black male collegians at PWIs who, according to most reports, may be the least likely to succeed at such campuses. The present study extends existing lines of research by addressing this gap in the literature.

## **Purpose**

The purpose of this study was to test the role that grit plays in explaining the academic success of Black male collegians' at 4-year PWIs. Specifically, I sought to examine whether grit added incremental predictive validity to a traditional model of academic success for a sample of Black male undergraduate students attending 4-year predominantly White colleges and universities. Two research questions guided the study: (a) What is the relationship between grit, as measured by the Grit-S questionnaire of Duckworth et al. (2007), and Black male collegians' grades? (b) Does grit add incremental predictive validity for explaining college grades over and beyond traditional measures, controlling for age and a battery of potentially confounding variables?

## **Methods**

The present study employed an ex post facto survey design. The survey was conducted as part of a larger, ongoing research project on the experiences of Black male collegians in the USA. The larger study includes data from Black men at 2-year, historically Black, predominantly White, and a few online institutions. In light of the purposes of this investigation, the discussion of methods focuses on only those elements that pertain to Black male collegians' at 4-year, degree-granting PWIs.

### **Sample**

The sample was comprised of 140 Black male students who were enrolled full time at a large, predominantly White, public research university located in the southeastern region of the country. The majority of participants were first-generation ( $n=85$ ; 61 %) who grew up in urban neighborhoods (35 %). One third of the sample consisted of science, technology, engineering, and math majors, while others had declared majors in business, education, and social sciences, to name a few. Eighty-six percent lived in a residence hall on-campus. This closely reflects the demographic and physical composition of the Black male student population at the university where the study was conducted, according to information provided by the institution's Office of Institutional Research.

### **Data Collection**

Data for this study were collected in the spring 2008 semester using the Black Male Student Success Questionnaire (BMSSQ), which was designed for the present study by the author. A web-based approach was employed because response rates are

frequently low to mailed surveys (Crawford et al. 2001), and evidence, to date, suggests that questionnaires completed online demonstrate psychometric properties that are very similar, if not superior, to those of paper-and-pencil surveys (Gosling et al. 2004). Specifically, individuals were invited to participate in the study via email. The electronic invitation included a hyperlink to the URL of the website on which the survey was located. The university's registrar forwarded the invitation to potential participants using a randomly selected list of eligible students. Several strategies were employed to encourage student participation. For instance, reminder messages were sent to non-respondents at 2-week intervals over a period of 2 months. Also, ten \$10 prizes were raffled for completing the survey; only those who had completed the survey in its entirety were eligible for the raffle. These strategies yielded an overall response rate of 51 %, after accounting for undeliverable electronic invitations and "bounce backs." A response rate of 30 to 40 % is considered "good" for web-based survey data collection techniques (Crawford et al. 2001).

The BMSSQ consists of 50 items designed to measure aspects of students' experiences in college. This measure includes four major sections: (a) demographic information, (b) student engagement, (c) student transition and adjustment, and (d) non-cognitive traits. Measures for the present study were drawn from the demographic, student engagement, and non-cognitive sections. For more information about the validity and reliability of the BMSSQ, see Strayhorn (2012).

## Measures

The dependent variable (*grades*) in this analysis reflects students' self-reported grades at their current institution. Grades were measured on a four-point scale, ranging from 1 (*mostly D's or lower*) to 4 (*mostly A's*).

The independent variable of principal interest in this study measured students' self-reported grit level, using the Short Grit Scale (Grit-S) originally developed by Duckworth et al. (2007) and later revised by Duckworth and Quinn (2009), which has established construct and predictive validity. The eight-item scale was designed to tap consistency in one's interests over time (i.e., passion) and his/her/hir ability to sustain effort in the face of adversity (i.e., perseverance). Sample items included: "I have overcome setbacks," or "I finish whatever I begin." Items were placed on a five-point response scale ranging from 1 (*not at all like me*) to 5 (*very much like me*). Scores were averaged to form an index of students' grit level.

The scale has well-documented reliability and validity. The predictive validity of Grit-S was assessed by its association with higher levels of lifetime schooling among individuals aged 25 years or older (Duckworth and Quinn 2009) and its positive association with happiness and life satisfaction (Singh and Jha 2008). For instance, the Grit Scale demonstrated high internal consistency ( $\alpha=0.85$ ) for the overall scale and for each factor (Consistency of Interests,  $\alpha=0.84$ ; Perseverance of Effort,  $\alpha=0.78$ ), in previous studies (Duckworth et al. 2007; Duckworth and Quinn 2009). Positive relations between grit and outcomes (e.g., conscientiousness, attainment) provide additional evidence of criterion validity. In the present study, the Grit Scale has an internal consistency coefficient of 0.87.

Because considerable research suggests that either college students' grades or self-reported grit are related to a variety of background traits and/or prior academic

performance (Duckworth et al. 2007; Pascarella and Terenzini 2005), this study controlled for differences in age, year in school, international status (0, no; 1, yes), athlete status (0, no; 1, yes), transfer status (0, no-started here; 1, yes-transferred here), fraternity membership (0, no; 1, yes), educational aspirations, American College Test (ACT) score (ranges from 0 to 36), and self-reported high school grade point average (GPA), which was scored on a 4.0 scale.

## Data Analysis

Data analysis proceeded in three stages. First, descriptive statistics were used to calculate mean values and standard deviations for all independent and dependent variables included in this analysis. Second, exploratory correlation analyses were conducted to explore the magnitude and direction of interrelationships. Last, hierarchical regression techniques were employed to estimate the influence of grit on Black male collegians' grades, controlling for differences in background traits, college experiences, and prior academic achievement. Hierarchical regression analysis is "a method of regression analysis in which independent variables are entered into the regression equation in a sequence specified by the researcher in advance" (Vogt 1999, p. 129); this approach yields more conservative estimates of statistical relationships, thereby reducing the chances of making type 1 errors.

## Results

Before analyzing data in light of the central research questions, descriptive statistics for the sample were calculated. The mean of Black male collegians' grit level was 4.08 (SD=0.88). Students in the sample performed fairly well academically in terms of grades ( $M=2.83$ ,  $SD=0.62$ ). Table 1 presents descriptive statistics and frequencies for the main independent and dependent variables.

### What is the Relationship between Grit and Black Male Collegians' Grades?

Bivariate correlations were conducted to measure the magnitude and direction of the statistical relationship between Grit-S scores and Black male collegians' grades. Participants grades were moderately related to Grit-S scores in a positive direction,  $r=0.38$ ,  $p<0.01$ . Interestingly, Grit-S scores also were positively related with Black male collegians' high school grades and ACT scores,  $r=0.35$  and  $r=0.23$  (both  $p<0.01$ ), respectively. Grittier Black males earned higher grades in college than their less gritty same-race male peers; grittier Black males also tended to have higher grades in high school and higher scores on the ACT.

### Does Grit Add Incremental Predictive Validity for Explaining College Grades?

Hierarchical regression analysis was conducted to examine the degree to which Black male collegians' grades could be explained by Grit-S scores, after controlling for demographic factors, potentially confounding academic variables, and prior academic

**Table 1** Descriptive statistics for independent and dependent variables

Variable	<i>M</i> / <i>SD</i>	Percent
Age	21.14/3.22	
HS GPA	3.51/0.38	
College GPA	2.83/0.62	
Grit	4.08/0.88	
ACT	23.33/3.77	
International student?		
Yes		0
No		100
Transfer student?		
Yes		14
No		86
Student athlete?		
Yes		9
No		91
Member of fraternity?		
Yes		25
No		75
Year in college		
First-year		12
Sophomore		14
Junior		23
Senior		38
5 or more years		13

Note. *HS GPA* high school grade point average, *ACT* American College Test composite score

achievement. The last and final model including all statistical controls, predictors, and Grit-S scores was significant,  $F(9, 129)=4.42, p<0.01$ . The sample multiple correlation coefficient ( $R$ ) was 0.49, indicating that approximately 24 % (adjusted  $R^2=0.18$ ) of the variance in Black males' grades can be explained by factors in the model. Grit ( $B=0.04$ ) was a positive predictor of Black males' grades in college, affecting grades almost as equally as high school GPA ( $\beta=0.31$ ) and ACT score ( $\beta=0.28$ ). Grit was moderately correlated with Black males' grades in college (partial  $r=0.25, p<0.01$ ), partialling out the effects of all other variables. Grittier Black males earned higher grades in college than their less gritty same-race male peers, even after controlling for differences in age, year in school, transfer status, engagement activities, degree aspirations, and prior achievement. Table 2 presents a summary of the regression results.

## Discussion

Recall that the purpose of this study was to test the role that grit plays in explaining the academic success of Black male collegians' at 4-year PWIs. Specifically, statistical techniques were employed to assess whether grit added incremental predictive

**Table 2** Hierarchical linear regression results predicting Black male collegians' grades

Variable	<i>B</i>	SE	$\beta$
Constant	0.33	0.83	
Age	0.02*	0.02	0.12
CLASS	-0.06*	0.05	-0.12
Transfer	-0.07	0.17	-0.03
GREEK	-0.19	0.12	-0.13
Athlete	-0.11	0.18	-0.05
Aspirations	-0.01	0.07	-0.01
HS GPA	0.51**	0.14	0.31
ACT	0.05*	0.01	0.28
Grit	0.04**	0.01	0.24
<i>R</i>	0.49		
<i>R</i> <sup>2</sup>	0.24		
Adj. <i>R</i> <sup>2</sup>	0.18		

*CLASS* year in college, *GREEK* member of fraternity, *HS GPA* high school grade point average, *ACT* American College Test composite score\* $p < 0.05$ ; \*\* $p < 0.01$

validity to a traditional model of academic success for the sample. In short, yes, grit level was positively related to Black males' grades in college. And Black males' level of grit added incrementally to a model predicting college grades from more traditional measures of academic ability. Grit was positively correlated with Black male collegians' grades even in the presence of an extensive array of statistical controls. Results suggest several important conclusions.

First, grit is positively associated with academic outcomes such as grades in college for Black males at PWIs. Whereas previous scholars have shown that grit predicts happiness and life satisfaction (Singh and Jha 2008), retention at West Point (Duckworth and Quinn 2009), and self-efficacy for elementary- and middle school students (Rojas et al. 2012), this study provides compelling evidence that grit also influences grades in college for Black men at PWIs. This represents an important extension of grit research since previous studies have been based almost exclusively on predominantly White, mostly female, and adult or adolescent samples; indeed, more grit research is needed for college student samples.

Second, results from this study affirm the assertion of Duckworth et al. (2009) that grit positively predicts achievement in challenging domains over and beyond mere talent. That grit—the tendency to pursue long-term challenging goals with perseverance and passion—was correlated with Black male collegians' grades, holding all other factors constant, underscores the significance of this trait to achievement. We have known for some time that students who perform well in high school also do well academically in college (Strayhorn 2008b). In this study, grittier Black males earned higher grades in college even when compared to peers with similar high school GPAs, ACT scores, and educational aspirations. Thus, grit may prove to be an effective lever for raising Black male academic success.

Results have important implications for educational policy and practice. For instance, I found that grit was positively associated with Black male collegians' grades at PWIs. Academic advisors and parents might consider these results when working with such students. Encouraging Black males to apply themselves, exert



more effort, and persevere with passion despite setbacks seems to be just as important as emphasizing previous grades and test scores. Admission counselors might do well to consider formulating policies that incorporate non-cognitive assessments, such as Grit-S, in addition to traditional admission criteria (e.g., GPA, ACT), especially if such policies are designed to recruit racially diverse students who will earn good grades in college.

Another consistent finding indicates that personality traits and variables like grit are responsive to policy or programmatic intervention (Bandura 1997; Rojas et al. 2012). Applied to the study's results, this is good news for those who want to assist Black male collegians. If grit is positively associated with Black males' college grades above and beyond traditional academic measures and grit is a malleable trait, then the question is how can one facilitate or nurture grit in college students? Parents and mentors of Black boys should talk with their sons about the importance of hard work and perseverance, dispelling any myths that assume "natural talent" or "sheer genius" over sustained effort. Malleable traits like self-efficacy—and by extension grit—can be powerfully influenced through verbal persuasion (Bandura). Teachers and college student educators also might consider how grit can be enhanced through structured opportunities for Black men to engage in vicarious experiences (i.e., watching others persevere despite distractions); working in groups, listening to guest speakers, or learning from a mentor might be promising practices for nurturing Black male collegians' grit, which, in turn, could lead to higher grades in college. Indeed, future research might test the efficacy of such interventions on raising grit among racially diverse students.

There are several implications for practice. For instance, results of the present study provide evidence that sticking with long-range goals over time makes it possible for Black males to earn good grades in college, holding high school GPA and ACT score constant. This may point to the compensatory role that grit can play in terms of one's academic success in college—that is, hard work and perseverance over time despite setbacks seems to pay off in terms of Black males' college grades. Despite where they begin in terms of college readiness, Black males who exert more grit than their peers earn better grades in college. Program advisors might consider these results when designing activities for Black males; teaching them how to regulate effort over longer periods of time, to manage time well, and to set short- and long-term goals is critically important to their academic success in college. These skills could be taught through Black student programming, fraternity gatherings, Black Male Initiative meetings, and even student organizations such as Student African American Brotherhood.

The present study supports the idea that achievement is the product of talent and effort. In other words, it is not just the amount of energy Black males invest in a particular task at a given point in time, but rather the consistency of their effort toward long-term goals and the stamina with which they pursue those goals over time that matters most, especially for college outcomes that can take years to achieve. Translated to practice, advisors might sponsor workshops for Black men that stress the importance of sustaining effort toward a particular goal (e.g., earning good grades) over time. Isolated or one-time attempts to work hard or study long hours will likely have little to no influence on Black males' college grades. Sustained effort and hard work over time, despite setback or failure, is, in part, the formula for Black males' academic success in college.



Results also have implications for future research. In this study, I used survey data to test the predictive validity of grit in explaining Black males' college grades at PWIs. A similar approach could be used to assess the influence of grit on grades for Black women, Latinos, first-generation college students, or even Black men at historically Black colleges and universities. Though preliminary, there's growing evidence that grit affects much more than college grades. Future studies might explore the relation between grit and college entrance exams, retention, engagement, and other social psych measures such as happiness, satisfaction, and self-concept, to name a few.

## Conclusion

This study represents a worthy foray into grit's role for Black male college students at PWIs. Results have a number of important implications for our work with students. Armed with information from this study, college student educators can do more to meet the needs of Black male students and help them earn better grades in college. By earning good grades, they are more likely to earn credits necessary for graduation, meet university requirements to maintain academic standing, and persist toward degree completion.

**Acknowledgments** Research presented in this study was supported, in part, by grant funds from the National Science Foundation (NSF), Division of Research on Learning, EHR #0747304. Opinions reflect those of the author and not necessarily those of the granting agency.

## References

- Astin, A. W. (2003). Studying how college affects students: A personal history of the CIRP. *About Campus*, 8(3), 21–28.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Berger, J. A., & Heath, C. (2005). Idea habitats: How the prevalence of environmental cues influences the success of ideas. *Cognitive Science: A Multidisciplinary Journal*, 29(2), 195–221.
- Bonner, F. A., II, & Bailey, K. W. (2006). Enhancing the academic climate for African American men. In M. J. Cuyjet & Associates (Eds.), *African American men in college* (pp. 24–46). San Francisco: Jossey-Bass.
- Crawford, S. D., Couper, M. P., & Lamia, M. J. (2001). Web surveys: perceptions of burden. *Social Science Computer Review*, 19, 146–162.
- Cuyjet, M. J. (2006). African American college men: twenty-first century issues and concerns. In M. J. Cuyjet & Associates (Eds.), *African American men in college* (pp. 3–23). San Francisco: Jossey-Bass.
- Duckworth, A. L., Kirby, T. A., Tsukayama, E., Berstein, H., & Ericsson, K. A. (2011). Deliberate practice spells success: why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science*, 2(2), 174–181.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101.
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166–174.
- Fleming, J. (1984). *Blacks in college: a comparative study of student's success in Black and White institutions*. San Francisco: Jossey-Bass.
- Flowers, L. A. (2002). The impact of college racial composition on African American students' academic and social gains: additional evidence. *Journal of College Student Development*, 43, 403–410.

- Flowers, L. A. (2003). Effects of college racial composition on African American students' interactions with faculty. *College Student Affairs Journal*, 23, 54–63.
- Flowers, L. A. (2006). Effects of attending a 2-year institution on African American males' academic and social integration in the first year of college. *Teachers College Record*, 108(2), 267–286.
- Flowers, L. A. (2007). Descriptive analysis of African American students' involvement in college: implications for higher education and student affairs professionals. In J. F. L. Jackson (Ed.), *Strengthening the African American educational pipeline: informing research, policy, and practice* (pp. 73–96). Albany: State University of New York Press.
- Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist*, 59, 93–104.
- Hagedorn, L. S., Maxwell, W., & Hampton, P. (2007). Correlates of retention for African American males in community colleges. In A. Seidman (Ed.), *Minority student retention: the best of the Journal of College Student Retention: Research, Theory, & Practice* (pp. 7–27). Amityville: Baywood.
- Harper, S. R. (2006). Enhancing African American male student outcomes through leadership and active involvement. In M. J. Cuyjet & Associates (Eds.), *African American men in college* (pp. 68–94). San Francisco: Jossey-Bass.
- Harper, S. R., Carini, R. M., Bridges, B. K., & Hayek, J. C. (2004). Gender differences in student engagement among African American undergraduates at historically Black colleges and universities. *Journal of College Student Development*, 45(3), 271–284.
- League, N. U. (2007). *The State of Black America 2007: portrait of the Black male*. New York: Beckham Publications Group, Inc.
- Nock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: implicit cognition predicts suicidal behavior. *Psychological Science*, 21(4), 511–517.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: a third decade of research* (Vol. 2). San Francisco: Jossey-Bass.
- Rojas, J. P., Reser, J. A., Usher, E. L., & Toland, M. D. (2012). *Psychometric properties of the academic grit scale*. Lexington: University of Kentucky.
- Singh, K., & Jha, S. D. (2008). Positive and negative affect, and grit as predictors of happiness and life satisfaction. *Journal of the Indian Academy of Applied Psychology*, 34, 40–45.
- Strayhorn, T. L. (2008a). Fittin' in: do diverse interactions with peers affect sense of belonging for Black men at predominantly White institutions? *NASPA Journal*, 45(4), 501–527.
- Strayhorn, T. L. (2008b). The role of supportive relationships in facilitating African American males' success in college. *NASPA Journal*, 45(1), 26–48.
- Strayhorn, T. L. (2012). *College students' sense of belonging: a key to educational success*. New York: Routledge.
- U.S. Department of Education, National Center for Education Statistics. (2011). *The condition of education 2011* (NCES report no. 2010-081). Washington, DC: U.S. Government Printing Office.
- Vaughn, B. E., Bost, K. K., & van Ijzendoorn, M. H. (2008). Attachment and temperament: additive and interactive influences on behavior, affect, and cognition during infancy and childhood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: theory, research, and clinical applications* (2nd ed., pp. 192–216). New York: Guilford.
- Vogt, W. P. (1999). *Dictionary of statistics and methodology: a non-technical guide for the social sciences*. Thousand Oaks: Sage.
- Zhao, M., Lee, L., & Soman, D. (2012). Crossing the virtual boundary: the effect of task-irrelevant environmental cues on task implementation. *Psychological Science*, 23(10), 1200–1207.