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Research on the Influence of Mass Communication on College Students' Environmental Behavior from the Perspective of Media Convergence

Fei Tong¹ and Chiajung Lin²

1 Jiangxi Nanchang ,Nanchang University, No.999 xuefu avenue, honggutan new district, nanchang ,jiangxi province, China

2 Krirk University, Thanon Ram Intra, Khwaeng Anusawari, Khet Bang Khen, Krung Thep Maha Nakhon 10220, Thailand

E-mail: lin.chiajung@staff.krirk.ac.th

Abstract. This article studies how mass communication affects the environmental protection on the behaviors of college students. With the intensification of global warming and the frequent occurrence of extreme weather, natural environmental issues have become one of the concerns of the entire human society. Mass media has infinite and vivid characteristics. Audiences obtain environmental information through various forms of mass communication activities, generate understanding, and then transform it into practical actions including pro-environmental behavior. Therefore, the purpose of this study will mainly explore whether mass communication in the age of media convergence will affect the environmental behavior of college students, and verify whether the level of education will affect the environmental behavior of college students. This study surveyed the environmental behavior of 614 college students. Independent sample t-tests were performed using SPSS statistical tools, and ANOVA was used for univariate analysis. The significance level is set to $\alpha = 0.05$. The results are analyzed as follows: 1. In mass communication, there are significant differences in the pro-environmental behavior of college students in interpersonal communication. 2. In mass communication, there is no significant difference in the environmental protection behavior of college students in traditional media communication. 3. In digital media communication, there is a significant difference in the private sphere of college students' pro-environment behavior, but there is no significant difference in the public sphere. The conclusion of this study indicates that mass communication and education have important effects on the environmental behavior of college students.

1. Introduction

The purpose of this study is to investigate the impact of mass media communication on college students' environmental behavior. The topics of this research are (1) exploring the path of mass communication under the trend of media integration; (2) understanding the environmental behavior of college students; (3) exploring the relationship between mass communication and environmental protection behavior of college students. Many studies have shown that mass media can influence environmental behaviors. Environmental behaviors are usually triggered by individual wishes,



depending on age, region, education, and whether citizens have a high sense of social responsibility and environmental protection.[1]

As college students of higher education, they have initially formed the concept of environmental protection. The role of mass media has always been an important transmission and main channel for receiving various environmental information. Especially in the era of media convergence, it is common to disseminate news facts and information issues, guide public opinion and attract public participation topics related to the environment.

With the continuous development of new media technologies, scholars in related fields in China focused their research on the background of media fusion, pointing out how traditional media and new media can play a role through content production and information dissemination. [2] Although domestic and foreign scholars have reached a consensus on the discovery that there is a positive correlation between mass communication and pro-environmental behaviour. [3-5] These research focuses have rarely explored the spread of pro-environmental behaviors by various mass media, such as different regions, age levels, and education levels. College students are not only the foundation for future environmental protection but also the seeds of citizens. This study intends to explore and analyze the influence factors and specific expressions of mass communication on the pro-environmental behavior of college students from the perspective of media integration, which has certain research value.

Synthesizing the above motivations and goals, the three issues that this study mainly explores are as follows:

1. What is the research of mass communication under the trend of media integration?
2. What is the current environmental behavior of college students?
3. What is the relationship between mass communication and college students' pro-environmental behaviors?

2. Literature

2.1 Mass Communication in the Age of Media Convergence

In the 1930s, Harold Lasswell (1932) proposed the "5W" model to explain the basic elements of mass communication. This theory also laid the foundation for the five main areas of mass communication research.[6] Then Jensen defined mass communication in the age of media convergence as communication activities across three different dimensions of media platforms, including interpersonal communication, mass media communication (represented by newspapers and radio), and Digital media communication.[7] The ultimate purpose of these communications is usually hidden and difficult to detect. Their value realization is "end communication", which means that the audience will externalize the cultural information and emotional experience obtained through mass communication activities into specific behaviors. [8] In terms of communication effects, after receiving information through communication, listeners will have corresponding impacts on three levels: cognition, psychological attitude, and social behavior.[9] Existing research shows that with the continuous deepening of media integration, the diversification of information sources and the content of mass communication have led to a trend of diversified audience values, which has also led to public awareness, attitudes, and social moral performance. There will also be significant individual differences in specific behaviors.[10] According to the above literature, this study finds that due to the multi-dimensional form and content of mass communication, as well as the rapid dissemination characteristics, the effects of media communication have become more diverse and narrow.

2.2 Pro-environmental behavior of college students

Many scholars approach pro-environment behavior from different perspectives. For example, Hines points out that pro-environmental behavior is a civic behavior driven by personal moral values and social responsibility, whose mission is to improve the quality of the environment or to address climate change.[11] Scholars have pointed out from the perspective of characteristics of different populations that the education level of citizens is positively related to their environmental behaviour. [12-16] Some

related research further divides the field of environmental protection behavior into public and private fields, such as turning off lights, saving food, separating waste, ecotourism, and recycling waste resources. These belong to private areas. Participation in environmental knowledge lectures, participation in various environmental organizations, acceptance, and dissemination of environmental concepts, and donations to environmental protection activities are all public environmental actions. [17] Through the above literature, we analyze the environmental protection behavior of college students in the public and private fields according to the characteristics of college students, and then serve as potential promoters of ecological development, protection, and sustainable development. Mass communication and pro-environmental behavior of college students

Some scholars have pointed out in the research that traditional media such as newspapers, radio, and television have a positive correlation with the audience's pro-environmental behaviour. [18] Some researchers believe that in the age of media convergence, computers, tablets, and mobile media have become public domains for social groups and individuals to obtain information, form cognition, and publish and exchange opinions. [19] Other survey data show that contemporary college students' awareness of low-carbon environmental protection issues mainly depends on Internet media, computers, and mobile phones, followed by traditional media such as television, radio, newspapers, and periodicals.[20] Therefore, this study concludes that, in the context of the age of media integration, in the process of disseminating environmental issues, mass media can implicitly embed the moral, ethical concepts, and social behavior norms that communicators want to convey university ideas. The influence path of mass communication on the pro-environmental behavior of college students needs to make them accept environmental awareness through three levels of cognition, psychology, and behavior, that is, through various mass media channels. Protect, establish correct environmental protection values, and actively take practical action on environmental advantages. At present, some studies have stated and explained that mass communication has a positive impact on the environmental behavior of college students. But what are the different approaches and methods that will affect the environmental behavior of college students, which are important issues that need to be addressed and explored in this research?

3. Research Methods

3.1 Study participant

In this study, convenient sampling was used to test college students' self-environmental behavior questionnaires through mass communication. The research object is a college student from Jiangxi University. 614 questionnaires were distributed, of which 236 were male (38.4%) and 378 were female (61.6%).

3.2 Research tools

Based on the literature, a questionnaire on the environmental behavior of college students was compiled. The questionnaire contains two dimensions and 25 questions, that is, public areas and private areas of college students' pro-environmental behavior. The answer option uses a Likert five-point scale. Cronbach's alpha was 0.945. In terms of validity, three experts and scholars on environmental issues were invited to check the consistency of the problem projects. The study used SPSS V.25 for independent sample t-test and ANOVA analysis. Significance value p -value = 0.05 was used as the sample test.

3.3 Research Procedure

3.3.1 independent sample (t- test)

The t-test used to analyze the differences between the three dimensions of mass communication: interpersonal communication, traditional media communication, and digital media communication.

3.3.2 One-way ANOVA

The single-factor analysis used to analyze whether there were significant differences in the dimensions

of college students' grades, majors, parental occupations, and parental education levels in the "University Pro-environment Behavior Scale". The number of statistics used in the analysis of the variance is the F test. When the F value reaches a statistically significant level ($p < .05$), the Scheffe method used for post hoc comparative analysis.

3.3.3 Pearson 's Correlation

As the "Pro-environmental Behavior Scale for College Students" in this study is continuous, the Pearson Product Difference Correlation Test used to explore the relevant aspects of the scale.

4. Results and discussion

4.1 Results analysis

4.1.1 Analysis of the social background of college students

The statistical results indicate that from the perspective of personal pro-environmental behavior, there are significant differences between male and female ($F(1,612) = 691, p = .009 < .01$) showing that female college students have a higher degree of environmental protection behavior in the private sector than male college students. In the environmental protection behavior of the public domain, there is no significant difference between college students of different genders ($F(1,612) = 691, p = .10 > .05$) (see Table 1).

Table 1 Analysis of univariate variation in pro-environmental behavior of college students of different genders (n = 614)

Level	SV	SS	df	MS	F	p
Private area	Between Group	3.03.72	1	3.03	6.91**	.009
	Within Group	268.72	612	0.43		
	Total Sum	271.75	613			
public area	Between Group	1.59	1	1.59	2.66	.103
	Within Group	366.83	612	0.59		
	Total Sum	368.43	613			

* $p < .05$ ** $p < .01$ *** $p < .001$

4.1.2 Analysis of the parental background of college students

It can be seen from Table 2 that the mother's occupation has reached significant levels in both aspects of college students 'pro-environmental behavior ($F(4,609) = 3.91, p < .01$; $F(4,609) = 3.90, p < .01$), which indicates that mothers' different occupations have significant differences in the private and public spheres of university students. Pro-environmental behavior. A post hoc comparison based on Scheffe's method found that mothers' professional occupations (including doctors, lawyers, teachers, and other professional and technical personnel) had a greater impact on college students' environmental behavior in private and public places. (see Table 2).

Table 2 Analysis of Single-factor Variation in Mothers' Pro-environmental Behavior in Different Occupations

	SV	SS	df	MS	F	p	Post hoc com-parison
Level							
Private area	Between Group	6.81	4	1.70	3.91**	.004	2>5
	Within Group	264.94	609	0.43			
	Total Sum	271.75	613				
public area	Between Group	9.21	4	2.30	3.90**	.004	2>5
	Within Group	359.22	609	0.59			
	Total Sum	368.43	613				

*p < .05 **p < .01 ***p < .001

It can be seen from Table 3 that the father's education level has reached a significant level in the private sphere of college students' pro-environmental behavior ($F(4,609) = 3.28, p = .01 < .05$), but it has not reached a significant level in the public sphere. It shows that different levels of father education have significant differences in the private environment of college students' pro-environmental behavior. Through the post-hoc comparison of Scheffe's method, it was found that fathers with a college education level had a greater impact on the environmental behavior of college students than their fathers' primary and junior high school levels (see Table 3).

Table 3 Single-factor variation analysis of fathers' different environmental education behaviors in college students (n = 614)

	SV	S	df	MS	F	p	Post hoc comparison
Level							
Private area	Between Group	5.73	4	1.43	3.28	.011*	4>1
	Within Group	266.02	609	0.43			
	Total Sum	271.75	613				
public area	Between Group	4.58	4	1.14	5.41	.10	n.s.
	Within Group	363.85	609	0.59			
	Total Sum	368.43	613				

*p < .05 **p < .01 ***p < .001

It can be seen from Table 7 that in the two aspects of college students' pro-environment behavior, the mother's education level has reached a significant level ($F(4,609) = 5.47, p = .000 < .001$; $F(4,609) = 4.07, p = (.003 < .001)$), indicating that different levels of mother education have significant differences in the pro-environmental behavior of college students in private and public places. A post hoc comparison of Scheffe's method found that the mother's education level is a master's degree and a doctoral degree for college students. The impact of environmental behavior is higher than the education level of other mothers (see Table 4).

Table4 Analysis of single-factor variation in mothers' pro-environmental behaviors at different educational levels of mothers (n = 614)

Level	SV	S	df	MS	F	p	Post hoc com-parison
		S					
Private area	Between Group	9.43	4	2.35	5.47**	.0001	5>2>1
	Within Group	262.33	609	0.43			
	Total Sum	271.75	613				
public area	Between Group	9.60	4	2.40	4.07**	.003	5>2>1
	Within Group	358.82	609	0.58			
	Total Sum	368.43	613				

*p<.05 **p<.01 ***p<.001

4.1.3 Differences among college students' pro-environmental behaviors in the three dimensions of mass communication

The statistical results show that the public domain has a significant impact on the environmental protection behavior of college students ($t = 1.36$, $p = 0.02 < 0.05$). Obtaining relevant information about environmental protection through digital communication, for college students in the public domain, their environmental protection behaviors are very different. Obtaining relevant information about environmental protection through digital communication has a significant impact on the environmental protection behavior of university students in the public domain. (See Table 5).

Table 5 The t-test of traditional media communication on college students' pro-environmental behavior (n = 614)

	Mean (standard deviation)		Degrees of freedom	t value	p
	(N=82)	(N=532)			
	Pro-environmental behavior of college students (Private area)	3.4114			
Pro-environmental behavior of college students (Public area)	2.8295	3.0541	612	2.29*	0.02

*p<.05 **p<.01 ***p<.001

This result is also consistent with the previous research conclusions of some scholars.

4.2 Analysis and discussion

4.2.1 Discussion on mass communication paths under the trend of media convergence

From the three dimensions of mass communication, obtaining relevant environmental protection knowledge through interpersonal communication can have a positive impact on the environmental protection behavior of college students, but has no significant impact on traditional media; also, college students can use the environmental protection obtained through digital media communication. Knowledge and pro-environmental behaviors are positively related to the private sphere.

On the one hand, this study uses independent sample t-tests, and the results verify that in the three dimensions of media integration of modern mass communication, compared with the other two dimensions, the impact of traditional media on the pro-environmental behavior of college students is generally weaker. On the other hand, from the other two dimensions of mass communication, this study found that the closer the horizontal social network including neighbors, colleagues, and classmates is, the more environmental issues are involved in social content, and the "social trust" dimension, the more effectively they can promote the members of these organizations to pursue their common interests. Such as study, work, and improvement of the living environment to participate in pro-environmental behavior. This result is also consistent with the previous research conclusions of some scholars.[21]

The result of this study indirectly reflects that college students' trust in interpersonal communication represented by school education is much better than that of other media. Also, this study believes that the result that traditional media is not significantly related to the pro-environmental behavior of college students is due to the decline in college students' exposure to the integration of modern and traditional media. Another explanation is the trend of democratization brought by the development of big data, artificial intelligence, cloud computing and other technologies to mass communication in the era of media convergence. The masses, especially younger audiences, who are accustomed to precise and personalized communication methods, can no longer adapt to the traditional one-way, passive communication methods of media. In the era of media convergence, the diversification of the main body of digital media, the depth of the communication, the quantification of the content of the communication, and the personalization of the means of reception also make the audience to a certain extent produce environmental issues and related policy interpretation some cognitive biases. [22] This deviation leads to the dissemination and acceptance of digital media's environmental content-related information content tends to be more practical, and its cognitive and behavioral focus on the audience is often more inclined to seek people and the environment in the short term. The improvement of the interactive relationship makes it easy to overlook the importance of actively constructing and analyzing the long-term relationship between the environment and the upper structure of society from a macro level, such result is also coincide with some opinions of previous scholars. [23]

4.2.2 Discussion on Pro-environmental Behavior of College Students

In the statistical results of demographic-related variables, this study found that, in the college education stage, gender has significant differences in the private environment of college students' pro-environmental behavior, but no significant difference in the public domain. No significant effect on behavior. In addition, the pro-environmental behavior of college students will be affected by the family background, especially the mother's occupation and education level, which is positively related and significant; the education level of the father is also positively related to the environmental protection behavior of college students in private areas. This study used a one-way analysis of variance to verify that female's environmental concerns, perceptions, and pro-environmental behaviors were usually higher than male's. This supports some scholars' conclusions. [24-25] In other words, as stated by some scholars in their research, female is more inclined to pay attention to the environment than male, and they are becoming more active in activities related to environmental behavior. [26-28]

In addition to another conclusion of this study, that is, the educational level of mothers in college students' pro-environmental behaviors is significantly higher than that of their fathers in the cultivation and influence of their children.

4.2.3 Discussion on the relationship between mass communication and environmental behaviors of college students.

The findings of this study mainly analyze the impact of the three dimensions of mass communication on the pro-environmental behavior of college students from the perspective of media integration in the

following aspects. First, the positive effects of interpersonal communication on the pro-environmental behavior of college students are verified, and the importance of the current school education, family education and community promotion to promote environmental protection behaviors in various fields is confirmed; Second, relevant empirical data shows that traditional media communication has no significant positive correlation with college students' pro-environmental behavior, and indirectly reflects the current young audience's environmental communication based on policy interpretation and governance results display for traditional media such as newspapers, radio, and television. Content, relatively low acceptance. Finally, while verifying that digital media communication has a significant positive effect on the environmental protection behavior of college students in the private area this study also found no significant correlation in the public sphere. Therefore, to further enhance the democracy of public environmental issues, the use of new media platforms to collect feedback, explore environmental protection appeals, etc., to select and produce communication methods and content that are more in line with the characteristics and needs of young audiences. An effective way to improve the enthusiasm of college student audiences in public environmental protection.

5. Research Limits and Suggestions

5.1 Research restrictions

This study uses a questionnaire to test the impact of mass communication on the pro-environmental behavior of college students. Although some of the hypotheses have been verified, this paper also has research limitations. The first is the limitation of research tools. As the existing scales of related topics are less selective, they can only refer to the existing literature as much as possible. Some items in the compilation scale are set to multiple choices or are more difficult to understand, which will affect the accuracy of some respondents' answers; secondly, the unity of the research sample. The subject of this study is the eco-environmental behavior of college students, but currently, only convenient sampling is used to test the undergraduates of a university in Jiangxi Province. The results may not be deduced to the eco-environmental behavior of other colleges and students at other education stages. Besides, this study only selects two ends of the influence path of mass communication on college students' pro-environmental behavior as the research variables, so it has limitations. The mass media communication must pass through the stages of environmental knowledge awareness and environmental risk perception to finally have a substantial impact on the environmental protection behavior of the audience.

5.2 Suggestions for future research

This study suggests that relevant research variables should be added, such as adding different regions, ages, education levels, and so on. Also, it is necessary to consider the media integration era through mass communication to comprehensively consider the multiple mediating effects including environmental cognition and perception produced by college students' pro-environmental behaviors. Besides, the questionnaire survey should be further expanded. The scope of the sample can be used to test the different education stages of different institutions of higher education, different colleges, and departments, and obtain Panel Data to more accurately make the causal relationship between mass communication and pro-environmental behavior. Validation and evaluation; Finally, in terms of research methods, based on existing self-made scales, qualitative research methods such as interviews or observations are added. And in subsequent related research, using more microscopic and more targeted survey data and research methods to further verify the findings of this research at this stage, the future researchers' three dimensions of mass communication and the differences between college students' pro-environment behavior Impact can be assessed more effectively.

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