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Christian Spirituality and Smartphone Addiction in Adolescents: A Comparison of High-Risk, Potential-Risk, and Normal Control Groups

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Abstract

The goal of this study was to compare aspects of Christian spirituality such as God's image and sense of spiritual well-being among three groups: the high-risk, potential-risk and normal control groups for smartphone addiction. Participants were: 11 adolescents in the high-risk group for smartphone addiction; 20 adolescents who were potentially at risk of smartphone addiction, and 254 adolescents who were in the normal control group. The results showed that the high-risk group for smartphone addiction adolescent group showed low levels of spiritual well-being and positive image of God comparing to those in the potential-risk and control groups. Each group had specific and distinctive features. Consideration of potential clinical interventions, limitations of the current study, and suggestions for future research are discussed.

Keywords Christian spirituality · Smartphone addiction · God's image · Spiritual well-being · Adolescents

Introduction

Currently, the rate of smartphone addiction is rapidly increasing in both Korea (Ministry Science and ICT & National Information Society Agency 2018) and the USA (Smith 2015). The unique characteristics of smartphones may trigger adolescents to overuse their smartphones from both hardware and software perspectives. First, from a hardware perspective, adolescents easily use their smartphones without the need for delicate or complicated user skills due to the development of smartphone

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technology such as touch screens. In addition to this, adolescents can access smartphones anywhere and anytime because smartphones have many using contact points compared to other media such as PC, tablets due to being easily portable.

With the development of software in smartphones, adolescents have their own virtual spaces which meet their developmental needs such as independence, communication, and self-confirmation (Erikson 1993; Loder 1998; Mehdizadeh 2010). Adolescents are provided with a unique and customized virtual space through various Apps and the OS platform (Ahn et al. 2014; Seo and Lim 2016) in smartphones. For example, they have communicative space, self-presenting space, and entertaining space in the smartphone (Seo and Lim 2016). Adolescents have a tendency to stay in the virtual space provided by their smartphones and facilitate smartphone overuse due to adolescents' desire to have their own independent spaces according to their developmental stage (Loder 1998). Moreover, the needs of self-presentation by communicating with peers in SNS (Social Network Services) also facilitate overuse of smartphones (Mehdizadeh 2010). Adolescents may be sensitive to people's evaluations and pursue intimacy with their peers via their smartphones because they seek self-confirmation as part of their identity formation during adolescence (Erikson 1993).

Importantly, smartphone addiction inhibits adolescents' cognitive, emotional, social, and spiritual development (Crews et al. 2007; Ji et al. 2017; Salovey and Mayer 1990; Shim 2017). Smartphone overuse may inhibit brain development including cognitive development. Addiction research has shown that addictions are fatal to the brain development of adolescents. Crews et al. (2007) have explained that alcohol abuse inhibits adolescents' cognitive development, including components such as rational thinking, goal setting and accomplishment, impulsivity regulation, and ability to set priorities.

Smartphone addiction also negatively influences emotional development, such as the development of emotional intelligence. Emotional intelligence consists of recognizing and expressing emotion properly as well as empathizing and regulating emotion (Salovey and Mayer 1990). Smartphone addiction inhibits adolescents' ability to recognize, regulate, and express their emotions (Ji et al. 2017). A smartphone addiction risk group has been found to experience more unstable emotional states than a non-risk group in research measuring the brainwaves of the frontal, parietal, and temporal lobes (Kim and Kang 2018). The emotional intelligence level of Internet-addicted adolescents is significantly lower than that of the non-addicted adolescents (Lee 2009).

Social development is also inhibited by smartphone addiction. Kim (2013a) reported that adolescents who have a disturbance of adaptive functions as a symptom of smartphone addiction lose their self-confidence in relating with others. Preferring the virtual world is one of the main characteristics of smartphone addiction (Kim et al. 2014). Smartphone overuse also facilitates adolescents in preferring the virtual world, reducing their sense and abilities of realistic relationships and communication (Eum and Ha 2014). Smartphones also inhibit the ability to make close personal relationships (Choi et al. 2012).

Spiritual development is also inhibited by smartphone addiction. Addiction destructs one's relationship with God and facilitates a distorted image of God.

Addicts generally have negative images of God and their own self which triggers a vicious cycle of addiction (Richards et al. 2007).

Although smartphone addiction significantly inhibits adolescents' holistic development, the protecting and recovering elements in the high-risk group, potential-risk group and normal control group of Smartphone addiction have not yet been studied. In particular, spiritual elements should be considered as strong protecting resources. Spirituality has been proven to provide strong protectors for various addictive behaviors (Cook 2003). For example, the 12-step program as one of the spiritual intervention programs has been protective and therapeutic effects on those afflicted by addiction to alcohol, drugs, and gambling (Bristow-Braitman 1995; Chi et al. 2009; Gamble and O'lawrence 2016; Kelly et al. 2008; Kim and Park 2015b).

Moreover, Christian spirituality also has been a strong protector and holds therapeutic elements not only for addiction but for mental disorders (Kim and Jeon 2014; Jung and Shin 2008; Timmons 2012). Christian spirituality is based on Christ-centered worldview and lifestyle empowered by the Holy Spirit (Demarest 1999) compared to general spirituality. Christian spirituality is an experience based on the knowledge of biblical God and executed by biblical beliefs (McGrath 2013).

Although Christian spirituality may be a critical protector in non-addicted groups compared to addicted groups, research has not yet made this comparison. First, previous research in exploring spiritual characteristics in smartphone addiction is very limited. Indeed, previous research has only focused on the pathological characters such as depression, anxiety, psychasthenia, hysteria, paranoid, schizophrenia, ADHD (attention deficit hyperactivity disorder) of a smartphone-addicted group (Hwang et al. 2012; Jeong 2016; Kim and Park 2015a).

Second, there is no study which has explored Christian spirituality as a distinctive protector among risk-addicted, potentially addicted, and non-addicted groups. Some previous research participants (Shin et al. 2011; Park et al. 2014) have been adolescents in non-religious schools, and thus the impact of Christian spirituality could not be captured. At the same time, although knowledge about God is a core element of Christian spirituality (Calvin 2008), previous research has only focused on the relationship between spiritual well-being and addiction. An individual's God's image and relational experience with God need to be studied to explore the dynamics of Christian spirituality among the normal control and addicted groups.

Given methodological limits, group differences between smartphone-addicted groups have not yet been studied. Group difference research is required because the metaphor of addiction to be protected by spirituality is different among groups, as well as the metaphor to be overused by smartphone according to the degree of addiction. The uniqueness of groups is captured by exploring group differences because this reveals the similarities and differences between groups based on their characteristics of being influenced by spiritual protectors. However, previous research exploring the spiritual differences between smartphone addiction groups is limited because it has focused on correlational and causal relationships between spirituality and smartphone addiction (Shim 2017). Therefore, this study explored the dynamic contents of spirituality among different groups according to smartphone addiction.

This study explored components of specific Christian spirituality based on adolescents' God's image and the spiritual well-being among different groups according to extent of smartphone addiction.

Literature Review

Smartphone Addiction

The main characteristics of smartphone addiction include withdrawal, tolerance, disturbance of adaptive functions, and virtual life orientation (Kim et al. 2014). Smartphone addiction is generally defined as when individuals compulsively use their smartphone despite being able to predict risks and negative consequences of their behaviors (Wu et al. 2013; Kim et al. 2014). These diagnostic characteristics are similar to those in other behavioral addictions such as pathological gaming disorder (American Psychiatric Association 2013).

Spiritual Well-being and God's Image as Christian Spirituality

Christian spirituality is based on having a relational experience with the biblical God. It is distinguished from general spirituality because Christian spirituality is revealed as a daily life based on the knowledge of the biblical God and biblical beliefs (McGrath 2013). This means that Christian spirituality is not just subjective experience but a daily experience based on a biblical worldview and beliefs. Ultimately, the experience of the Gospel in Jesus Christ is the core axis of Christian spirituality (Demarest 1999; Keller and Alsdorf 2014). Christian spirituality differentiates from other protectors because the meaning of life and relationship with God can connect to the ultimate desires of people and a fundamental motivation to change (Lane and Tripp 2006).

Christian spirituality involves God's image as collects of one's knowledge of God. It also involves having relational satisfaction with God because relational experience with God requires knowledge about God (Shim 2016). This study focused on spiritual well-being and God's image as components of Christian spirituality.

Spiritual well-being, a representative concept of spirituality, includes: (1) religious well-being that measures the relational experience with God and (2) existential well-being measuring life meaning and goals (Paloutzian and Ellison 1982). Religious well-being items such as "I believe that God loves me and cares about me" and "My relation with God contributes to my sense of well-being" (Paloutzian and Ellison, 1982, p. 232) allow the examination of person's satisfaction with their relationship with God. Existential well-being items are: "I believe there is some real purpose for my life" and "I feel very fulfilled and satisfied with life" (Paloutzian and Ellison 1982, p. 232) and these reflect one's understanding of one's own life's meaning and goals.

Christian spirituality consists of having a relational experience with God, the world, others, and oneself. One dimension of Christian spirituality is the vertical

experience with God as revealed through the piety of saints. Calvin (2008) focused on piety as a fruit of the life of a relationship with God. Calvin explained that saints experiencing awe and fear of God as a creation could live in a self-controlled manner in a lifestyle of piety.

The other dimension of Christian spirituality is the horizontal experience with the world, others, and self. Saints execute God's calling as a steward of his rule (Keller and Alsdorf 2014). This study also includes Christian spirituality as consisting of "Religious well-being" as relational satisfaction with the God of Christian adolescents and "Existential well-being" as life's meaning and purpose based on a steward's calling toward the world and others.

God's Image

Image generally is taken to mean "a mental picture or impression of something" (Merriam Webster 2018). God's image is a kind of mental representation consisting of images, episodes with God, and emotion toward God (Lee et al. 2009). Moreover, from an objective relational perspective, God's image is formed by relationships with significant others such as one's father (Freud 2003) and mother (Rizzuto 1979). Rizzuto (1979) also explored case studies of some patients' image of God and their psychodynamics in a hospital in Boston. She found close relational dynamics between a patient's image of God and various psychopathologies.

The biblical images of God that people perceive have been formed not only through their relationships with significant others but also their relationship with God (Calvin 2008; Packer 2011; Shim 2016). The image of the biblical God, one type of knowledge of God is made by the Holy Spirit's work and by understanding the Bible. In the Old and New Testaments, Christian adolescents may have images of God based on God's creative and redemptive works (Packer 2011; Shim 2016). In particular, the biblical image of God is confirmed by Jesus Christ (Packer 2011). The biblical God listens to and answers people's prayers (Jer. 33:2–3; Psa. 34:4). He leads saints' ways as a shepherd (Ps. 23:1–2; Joh 10:11–15) and takes care of them (Exo. 3:23–25). God accepts his people through Jesus Christ (Hoekema 1994).

Relationship between Spiritual Well-being, God's Image, and Smartphone Addiction

Various researches have shown that spiritual well-being closely relates to smartphone addiction, Internet addiction, and alcohol abuse (Kim 2013b; Park et al. 2014; Shin et al. 2011; Tsuang et al. 2002). Park et al. (2014) found that existential well-being protected against smartphone, Internet gaming, and cyber sex addiction. In that study, existential well-being and religious well-being were discriminant variables in the addictive group distinct from the normal control group. Existential well-being was a significant discriminant variable of smartphone addiction and cyber sex addiction; religious and existential well-being were significant discriminant variables of gaming addiction. Shin et al. (2011) also showed that existential well-being was a protective factor against Internet addiction mediated by depression. However,

these studies have limitations in measuring the protective effect of Christian reli-gious well-being on smartphone addiction, because most research participants were not religious. Previous research has inadequately measured the relational satisfaction with God, a unique characteristic of Christian spirituality. Moreover, these studies have limits in understanding the unique characteristics of spirituality in an addiction group.

God's image also relates to addiction. "Controlling" God's image has positively influenced work addiction. Participants' low "loving" God image induced work addiction by mediating self-esteem (Kézdy et al. 2013). While a negative God's image was a cause of addiction, a positive image of God has been found to be a strong recovery factor for drug abuse (Timmons 2012). Nguyen et al. (2015) found that a positive image of God relates to resilience that triggers recovery as a capacity to endure suffering.

However, these studies have focused on correlational and regression analysis and it is difficult to explore the spiritual differences between high-risk, potential-risk, and the normal groups in addiction. Understanding the differences among these groups helps to elaborate upon the critical characteristics of the spirituality of the groups, as well as to inform therapeutic strategies for addiction in each group in clinical settings. Although understanding the unique characteristics among groups from a research and clinical viewpoint is valuable, these approaches are rare and are limited in terms of participants. Park et al. (2014) found that existential well-being and religious well-being were discriminant variables of an addictive group, but this study has limits in exploring Christian spirituality because the general population with various religious backgrounds was surveyed. Moreover, although the biblical God's image is a critical component to building and sustaining Christian spirituality, God's image has not been used in a group comparison in addiction research.

Therefore, the goal of this study was to compare Christian spirituality and God's image in three groups including smartphone-addicted, potential-risk, and normal control groups of Christian adolescents.

Methods

Participants and Methods

The participants in this study were 11 adolescents at a high risk of smartphone addiction, 20 adolescents at potential-risk group of smartphone addiction, and 254 adolescents who were control participants. Smartphone addiction was measured by the Korean Smartphone Addiction Proneness Scale for Youth and Adults (Kim et al. 2014). All participants were Christians recruited online and offline from churches in Seoul and Gyonggi-do. For this study, under the ministers' permission of the churches, purposive sampling to target Christian adolescents was executed. The data were gathered using online survey and offline paper-and-pencil surveys. The online survey could be completed from smartphones. A total of 300 online and offline sur-vey questionnaires were distributed, and 285 samples were obtained as valid data because 15 samples from the offline survey were incomplete.

Measures

Korean Smartphone Addiction Proneness Scale for Youth

Kim et al. (2014) developed the Korean Smartphone Addiction Proneness Scale for Youth consisting of 15 items. Sub-components of the scale were disturbance of adaptive functions (five items), virtual life orientation (two items), withdrawal (four items), and tolerance (four items). Items 8, 10, and 13 were reverse-scored.

The high-risk group of smartphone addiction was defined as participants with a score greater than 45. A score greater than 42 and less than 44 score defined the potential-risk group of smartphone addiction. Scores lower than 42 were the control group. The Cronbach's α of the scale in the original research (Kim et al. 2014) was .88. The Cronbach's α in this research was .89.

Spiritual Well-being Scale

The Spiritual well-being scale developed by Paloutzian and Ellison (1982) assesses the vertical and horizontal dimensions of one's spirituality. The vertical dimension of spirituality refers to one's relational experience with God, and the horizontal dimension describes one's perception about his own meaning and purpose in life. The scale is comprised of two factors consisting of 20 items with a 6-point Likert scale ranging from 1(strongly disagree) to 6(strongly agree). Higher scores reflect higher spiritual well-being. This study used the Spiritual well-being scale which Park (2003) translates English version into Korean version. The Cronbach's α in Park's study was .91 (total), .90 (religious well-being), and .87(existential well-being). In the current study, Cronbach's α was .94 (total), .92 (religious well-being), and .89(existential well-being).

Korean Brief Version of God's Image Scale

Korean Brief God's Image Scale consists of 17 items including five dimensions: answering, accepting, benevolent, presenting, and nurturing God's image. Shim (2017) developed this scale based on Lawrence's God's Image Scale that includes 72 items. She developed a brief 17-item, five-factor scale by exploratory and confirmatory factor loading analyses with rigorous statistical standards. This scale has a 6-point Likert scale ranging from 1(not at all) to 4(to a great extent). Higher scores reflect a more positive perception of God's image, such as an answering, accepting, benevolent, presenting, and nurturing God. The Cronbach's α in Shim's research (2017) was .86 (total), 78 (answering God), .72 (accepting God), .66 (benevolent God), .81 (presenting), and .86 (nurturing). The Cronbach's α in this study was .86 (total), 75 (answering God), .60 (accepting God), .55 (benevolent God), .79 (presenting God), and .75 (nurturing God).

Statistical Analysis

All statistical analyses were conducted with SPSS 21.0. Data were compared using multivariate analysis of variance (MANOVA) with Scheffe's post-hoc analysis. Statistical significance was set at the level of 0.05, which was two tailed.

Results

Demographics

Table 1 shows the demographics of the research participants. There were 138 male adolescents (48.4%) and 147 female adolescents (51.6%). There were 193 high school students (66.7%) and 92 middle school students (32.3%). Overall, the age of the high school students ranged from 12 to 19 years old.

Group Comparison

Comparisons of God's image and spiritual well-being among the high-risk group, potential-risk group, and normal control group of smartphone addiction were conducted. Dependent variables were the five images of God (answering, accepting, benevolent, presenting, and nurturing) and two kinds of spiritual well-being (religious and existential well-being). Equality of variance–covariance matrices ($p > .05$) and homogeneity of variance ($p > .05$) were all confirmed, and dependent variables all had medium level of correlations.

The significant difference among the high-risk group, potential-risk group, and normal control group of smartphone addiction in terms of God's image and spiritual well-being was confirmed [$F (14, 552) = 3.14$, $p < 0.0005$, Wilks' lambda $= .86$, partial $\eta^2 = .07$]. Additional ANOVA testing demonstrated that the difference among the high-risk, potential-risk, and normal control group was significant except for having a benevolent image of God ($p < 0.05$). Religious and existential well-being and images of answering, accepting, presenting, nurturing God differenced significantly among three groups (Table 2).

Table 1 Demographics

Variables	Sex		Grade					
			Middle school			High school		
	Male	Female	First grade	Second grade	Third grade	First grade	Second grade	Third grade
Number	138	147	21	26	45	64	75	54
Percent (%)	48.4	51.6	7.4	9.1	15.8	22.5	26.3	18.9

Table 2 Comparison of God's image and spirituality among groups divided by the degree of smartphone addiction

	High risk Group (A)		Potential risk Group (B)		Normal Group (C)		F	Post-hoc
	Mean	SD	Mean	SD	Mean	SD		
God's image								
Answering God	11	2.45	8.95	1.88	10.69	2.26	5.77**	C > B
Accepting God	6.55	2.02	7.3	1.75	8.46	1.78	9.49***	C > A, C > B
Benevolent God	9.64	1.29	9.3	1.38	9.70	1.66	.55	
Presenting God	12.64	2.54	11.9	2.22	13.25	2.10	4.03*	C > B
Nurturing God	10.64	1.50	9.05	1.54	9.96	1.59	4.24*	C > B, A > B
Spiritual well-being scale								
Religious well-being	42.18	9.21	39.5	6.19	45.25	8.74	4.63*	C > B
Existential well-being	37.36	8.90	37.25	7.40	43.88	8.18	9.01***	C > A, C > B

SD standard deviation

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

Post-hoc analysis was then conducted. This revealed that the normal control group held higher scores for four biblical positive images of God and two kinds of spiritual well-being than the potential-risk group ($p < 0.05$). The accepting God and existential well-being scores of the normal control group were higher than the high-risk group ($p < 0.05$).

The answering, accepting, presenting, and nurturing God's image scores of the potential-risk group were significantly lower than that of the normal control group. Moreover, the accepting God's image score of the high-risk group was significantly lower than that of the normal control group. However, the nurturing God image score of the high-risk group was higher than the potential-risk group.

The religious well-being and existential well-being scores of the potential-risk group were significantly lower that of the normal control group. The high-risk group's existential well-being score was significantly lower than that of the normal control group.

Discussion

Significant differences were observed among the three groups with regard to scores for the biblical images of God and two kinds of spiritual well-being (except for the image of God as benevolent). The scores of the potential-risk group on the score of Christian spirituality and understanding the biblical image of God were lower than that of the normal control group.

It was found that the high-risk group had unique characteristics of spirituality according to God's image and spiritual well-being. The high-risk adolescent group of smartphone addiction had lower scores for "accepting God's image" and existential well-being than the normal group. This means that the high-risk group might

hardly recognize and experience accepting God because they do readily believe that God accepts them. Moreover, they reported not being satisfied with life's meaning and goal compared to the normal control group. The normal group's "accepting God's image" may have a crucial role in discriminating between the normal group and high-risk, potential-risk groups.

The potential-risk group had overall lower scores for answering, accepting, presenting, and nurturing God's image, and religious and existential well-being than the normal control group except for the benevolent God's image. The potential group had lower recognition of the biblical God's image and low satisfaction from having a relationship with God and life's meaning and goal.

Previous research also has shown that positive and biblical God's images and spiritual well-being closely relate to preventing addiction (Park et al. 2014; Timmons 2012). God's image and spiritual well-being were found in this study to be distinctive differences among groups according to the severity of the smartphone addiction.

There is no significant difference between the groups regarding scores for having a benevolent image of God's image which might be caused by the content of the benevolent images of God. Other images of God focus on the relationship between God and saints. The benevolent image of God explains God's characteristic of promoting one to love other people with other religions, including atheists. The items of the benevolent God's image included "I think God even loves atheists," "God's mercy is for everyone," and show God's generosity toward all people. Therefore, Christian adolescents might not experience or empathize with a "benevolent God" as might a Christian who already was accepted by God.

The high-risk group score for a nurturing God's image was higher than the potential-risk group. Further research may usefully explore in depth how the high-risk group and the potential-risk group perceive the meaning of God's nurturing.

From a research perspective, this study revealed the importance of spirituality according to the level of smartphone addiction by exploring the unique characteristics of God's image and spiritual well-being among addicted groups. Importantly, this study found that the normal control group's spiritual resources such as God's image and spiritual well-being compared to the high-risk and potential-risk groups. At the same time, the spiritual weakness of the high-risk and potential-risk groups about God's image and spiritual well-being was revealed.

This study focused on the specific contents of Christian spirituality including five biblical images of God and two dimensions of spiritual well-being. Although previous research focused on the spiritual well-being of addicts, this study explored not only spiritual well-being but also God's image in smartphone addicts. This helps us to understand the diverse dimensions of spirituality among groups as well as differences in the degree of spirituality. A negative God's image closely relates to addiction as reported in previous research (Kézdy et al. 2013; Nguyen et al. 2015; Timmons 2012).

The methodologies in previous studies have focused on the relationships between addiction and spirituality but have limits in exploring the distinct characteristics of addicted groups. Although Park et al. (2014) studied distinctive spiritual characteristics such as spiritual well-being between an addicted group and a

normal control group, it has sampling limitations regarding Christian spirituality. In contrast, this study examines the characteristics of Christian spirituality among high-risk, potential-risk and normal control groups and all the participants were Christians.

Suggestions for Clinical Intervention

Efficient spiritual intervention is possible in smartphone addiction therapies. Two elements of spiritual well-being and God's image could be the main axis to from which to counsel the use of spiritual resources. Clinicians may design therapeutic strategies focusing on "Accepting God's image" through Jesus Christ and developing life's meaning and goal for existential well-being for high-risk and potential-risk adolescents for smartphone addictions. Moreover, clinicians may also intervene in potential-risk groups to change their God's image into an "answering, accepting, presenting, nurturing God's image" and provide relational satisfaction with God as well as life's meaning.

This also could apply for smartphone prevention programs by developing a positive image of God and spiritual well-being. God's image and spiritual well-being could be changed by understanding the Bible and biblical doctrine, participating in individual and community worship, prayer, and praise. In addition to this, clinicians could provide therapeutic resources for smartphone-addicted adolescents, based on evaluating God's image through various questions through verbal and visual expression systemically (Ahn 2013; Shim 2016). Spiritual well-being could be developed by helping adolescents to explore core spiritual resources. Importantly, exploring spiritual well-being and God's image may help prevent the development from a healthy adolescent to potential or risk-addicted adolescent.

Current Study Limitations and Suggestions for Future Research

Further study is needed to explore the correlational and causal relationships between addiction and the protective spiritual elements in groups according to smartphone addiction. In this study, only spiritual resources among groups were measured according to smartphone addiction. Furthermore, qualitative research may be a good methodology to explore the relationship between addiction and spiritual well-being and God's image among groups. This study focused on measuring the statistical differences between spirituality among groups. In further research, the unique and detailed dynamics of addiction and spirituality in each group should be explored using in-depth interviews and qualitative analysis. This may provide further ideas about how holding a positive biblical image of God and spiritual well-being dynamically protects against the smartphone addiction of adolescents. A final limitation of this study is that it recruited only Christian adolescents in Korea. Therefore, future work sampling a range of different ages and ethnicities would be beneficial.

Compliance with Ethical Standards

Conflict of interest The author declares that there is no conflict of interest.

Informed Consent All participants agree with the informed content to involve this study.

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