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Korean Children's YouTube Use and Social Skills: A Linkage Analysis with Negative Interactions in Favorite YouTube Content

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ABSTRACT

Given the popularity of YouTube viewing among young children, we studied the relations between young children's YouTube viewing time and exposure to negative interactions within reported favorite YouTube content on their self-regulation, anxiety, and social skills. Through analysis of data collected from 341 South Korean parents (child ages 4–6), we found that child YouTube viewing time was associated with poorer child self-regulation. We also found that the number of negative interactions within children's favorite YouTube content and YouTube viewing time had significant and positive relations with children's anxiety. Children's anxiety was negatively correlated with social skills, but there was a positive correlation between self-regulation and social skills. Additionally, children's YouTube viewing time was not directly associated with social skills, but negative interactions on YouTube was negatively correlated with social skills. Children's YouTube viewing time was related to social skills through self-regulation and anxiety, and exposure to negative interactions on YouTube was associated with social skills through anxiety. This study is significant because it examines how social skills, which are essential for children's development, relate with children's YouTube use and the nature of YouTube content.

KEYWORDS

Children; YouTube; self-regulation; anxiety; social skills

Unlike previous generations, which have experienced cyberculture and incorporated it into their lives after undergoing processes of socialization, young children are being significantly influenced by the Internet during the very process of socialization. According to recent marketing research, YouTube has emerged as the most recognizable brand in the lives of children in the United States. The majority of children aged 6 to 12 (96%) report being aware of YouTube, with over 80% of these children using YouTube on a daily basis. Furthermore, more than 90% of parents expressed a strong liking for

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YouTube. This data highlights the significant presence of YouTube in the lives of young children (Auxier, 2020).

A similar trend is observed in South Korea. For example, YouTube has emerged as the most popular media platform and is used by 94.8% of children ages 3–9 in South Korea (Korea Press Foundation, S. J. Kim et al., 2020). According to the 2020 Korean YouTube Annual Growth Report, the number of Korean YouTube subscribers grew by 80.19% in 2018, 68.43% in 2019, and 67.92% in 2020. As such, YouTube has become the most widely used video platform in Korean society. Given the popularity of YouTube around the world, it is not surprising that many researchers have considered the correlates of its use among children and adolescents.

Compared to other forms of screen media such as television, however, there still is a relative lack of research on YouTube (Khan, 2017). In particular, there is a lack of studies on the relationship between YouTube viewing and children's social skills, especially regarding whether just more time watching YouTube leads to less time for social skill development, or whether children see negative interactions in the content and model those behaviors, thus potentially leading to less developed social skills. Indeed, many studies on YouTube in particular question whether it is time (Elias & Sulkin, 2017; Klobas et al., 2019) or whether it is exposure to certain content (Buzzi, 2011; Neumann & Herodotou, 2020; Saleem, 2022) that might associate with certain negative outcomes among child audiences. As children spend more time on YouTube, it is important to understand which factors relate to social skills, an essential part of a children's development. To fill this gap, our study aims to explore the relations between children's YouTube viewing time and exposure to negative interactions in children's favorite content on social skills through the indirect variables of self-regulation and anxiety.

Specifically, we asked parents to report on the amount of time children spent viewing YouTube, and also to report on children's favorite YouTube content. We then coded this content for positive and negative interactions. We coded all genres of videos, assuming that even videos with only one person or character can mimic an interaction, through the person or character asking questions or speaking directly to camera. Indeed, many YouTube videos, such as unboxing and game reviews, often feature a single character talking to the camera or viewer. In this case, the media allows viewers to form emotional bonds by experiencing real-life friendships with the characters, termed parasocial interactions (Gleich, 1997). Also, from an emotional perspective, influencers are seen as personable (de Veirman et al., 2017). As such, they use a variety of methods to build and develop social relationships with their audiences in order to create a sense of intimacy (Baym, 2015). In the process, people can make real and emotional connections with the characters in the video, share social identities, and develop various forms of interactions. Therefore, we coded and analyzed the videos for positive and negative

interactions, except when the videos were simply close-ups of non-human objects without any talking. This will allow for an understanding of which aspect is more important for children's social skill development: YouTube viewing time or content exposure. Furthermore, our findings can provide parents with guidelines on how to moderate the time and content of their children's viewing YouTube.

Children's YouTube Use

One of the reasons why children's YouTube use is receiving so much research attention is children's active presence as media actors on the platform. Furthermore, while traditional media often lack content that children prefer, YouTube offers a wide range of genres of children's content that is able to cross national boundaries. In particular, content featuring simple, easily imitated non-verbal elements and characters offers the advantages of cultural inclusion and accessibility without language barriers (J. S. Lee & Jeon, 2020). Another key factor is that traditional media is heavily regulated by governments to protect children and young people. On the other hand, online platforms like YouTube are relatively free from content regulation (Park et al., 2018).

However, the increasing level of inappropriateness and violence in content targeted at children on YouTube has also been criticized. In fact, while there is a lot of age-appropriate content on YouTube for children, there is also a great deal of inappropriate content as well (Maheshwari, 2017; Subedar & Yates, 2017). An example of this is the "Elsa Gate" controversy, in which users uploaded videos featuring popular cartoon characters such as Spider-Man, Elsa and Anna from Disney's *Frozen*, and Mickey Mouse, along with inappropriate content containing elements such as violence or sex (Brandom, 2017). Other videos promote immoral or dangerous behavior, mislead children, misappropriate intellectual property, or display other unusual characteristics that are potentially harmful to the development of children (Burroughs, 2017). In addition, in September 2019, the U.S. Federal Trade Commission (FTC) fined YouTube $170 million for violating the Children's Online Privacy Protection Act (COPPA) by illegally collecting children's personal information without their parents' permission and providing adult or dangerous content to children (New York Times, 2017).

Although Alphabet (the parent company of Google and YouTube) started YouTube Kids to combat these issues of inappropriate content, research has suggested that YouTube Kids remains less popular among children relative to YouTube (Taylor & Cingel, 2023). Other research shows that many children tend to access regular YouTube channels through their parents' accounts (Kang, 2019). Only recently has YouTube enforced restrictions on content targeted at children, requiring creators to indicate whether their videos are

intended for children. However, the guidelines provided by YouTube for determining whether a video is intended for children are vague and therefore can be open to different interpretations.

Therefore, there are ongoing concerns about the appropriateness of YouTube content for children. In particular, excessive consumption of video content has been shown to be associated with internalizing problems such as depression and anxiety and externalizing problems such as aggression and attention disorders (Swing et al., 2010). Research examining the relationship between screen time and social skills in preschoolers has found that more screen time is associated with worse social skill formation (Hinkley et al., 2018).

Further, young children's media use is also closely related to self-regulation, which can negatively impact social skill development (E. K. Kim et al., 2007). In addition, a lack of self-regulation can relate to negative social consequences, such as engaging in a variety of problematic behaviors such as crime and risky behavior in pursuit of short-term pleasure (A. K. Kim, 2003). Thus, self-regulation in early childhood is an important predictor of social skill formation (Bronson, 1999). It has also been reported that children who consume more screen media are more likely to be negatively affected emotionally (Radesky et al., 2015). More specifically, anxiety can act as a barrier to social skill formation (Coie & Koeppl, 1990). Based on these previous studies, our paper examines how children's YouTube viewing relates to their social skills via two factors: self-regulation and anxiety.

YouTube and Self-Regulation

Self-regulation refers to the ability to control one's cognitions, emotions, and behaviors as desired, and involves an individual's conscious effort and commitment to effectively manage thoughts, feelings, impulses, and behaviors that are not easily accepted or required by society (Baumeister et al., 1994). Early childhood is a critical time when children begin to develop self-regulatory skills (Kopp, 1982). Self-regulation in early childhood is an essential aspect to develop because it plays an important role in enabling children to engage in activities that are socially and educationally desirable. It also serves as a predictor of future social, emotional, and cognitive competence (Bronson, 1999; Kopp, 1982). Use of media has been shown to be negatively associated with children's self-regulation, particularly mobile media use, which has been shown to have a stronger negative relation than television use (Choe et al., 2023). Platforms such as YouTube, in particular, utilize algorithmic recommendations to drive more viewing through recommended content (Zhou et al., 2010) thereby perhaps increasing the likelihood of a negative association with self-regulation. Excessive media use among children increases the risk of

problem behaviors such as hyperactivity and addiction (H. W. Lee et al., 2015; Oh et al., 2014), and increased exposure to media content is associated with decreased sociability, externalizing problems such as impulsivity, and increased internalizing problems such as depression and anxiety (Seol, 2021). Therefore,

H1: Time spent using YouTube will be negatively related to children's self-regulation.

Self-regulation is not an immediate or one-time accomplishment; it emerges gradually through childhood development, and parents and the environment play an important role in the process (Posner & Rothbart, 2000). Moreover, young children often rely on situational cues to regulate themselves because they have difficulty determining what is expected of them (Liew et al., 2010). Children and adolescents are exposed to consistent values in mediated content and therefore may therefore take on those values or behaviors modeled in the content (de Lenne et al., 2020). Furthermore, children can imitate behaviors in the videos, which can influence their socialization (Bussey & Bandura, 1999). In fact, children who frequently watched videos with high levels of prosocial behavior were found to show more altruistic behavior (Rosenkoetter, 1999). Thus, it is important to consider the YouTube environment beyond time spent on the platform.

Numerous studies have shown that children's lack of self-regulation is associated with age-inappropriate media use (Barr et al., 2010; Lillard & Peterson, 2011). From the perspective of Bandura's social cognitive theory, children can learn through observation, in which they imitate behaviors exhibited by adults and peers (Bandura et al., 1961). Thus, when an observer (receiver) monitors a behavior that is considered socially acceptable, and the behavior is judged to be rewarding, the observer (receiver) is more likely to imitate the behavior. Further studies examining the effects of media on children have confirmed Bandura's findings. Repeated exposure to violent and aggressive video content has been shown to have a greater negative relation on children's behavior, cognition, and emotions compared to infrequent exposure (Bushman & Huesmann, 2006) The violence-induced script hypothesis argues that violence (as a form of a negative interaction) is characterized by impulsive behavior (the opposite of self-regulation), and exposure to these violent acts may activate behavioral scripts that result in poor self-regulation (Anderson & Bushman, 2001; Hummer et al., 2010). Next, the violence-induced arousal habituation hypothesis suggests that violent media content affects children's arousal systems (Bushman & Huesmann, 2006; Fleming & Rickwood, 2001). This means that repeated exposure to negative media content can lead to children becoming desensitized to it (Ballard et al., 2006). Indeed, moderate amounts of media use and child-produced or

educational content have been found to be good for children (Mares & Pan, 2013), but otherwise have been shown to negatively impact self-regulation (Nathanson et al., 2014). Thus,

H2: Exposure to negative interactions in children's favorite YouTube content will be negatively related to self-regulation.

YouTube and Anxiety

Anxiety is the most common mental health disorder among children and adolescents, with a prevalence rate of 30% by age 18 (Merikangas et al., 2010). A recent meta-analysis found that 13.4% of children and adolescents in high-income countries experience a mental disorder, with anxiety and depressive disorders accounting for 6.5% and 2.6%, respectively (Polanczyk et al., 2015).

Early childhood is a critical developmental period for emotional interaction, communication, and impulse control. A survey of students in grades 3–8 found that children who spent more time watching television had higher rates of psychological distress, such as anxiety disorders (Singer et al., 1998). A study by Mistry et al. (2007) examining the differential effects of television exposure time on young children found that watching more than two hours of television at 30–33 months was associated with increased depression, anxiety, aggression, and attention problems. The study of Damar et al. (2011) of 126 children also found that increased television viewing predicted significant factors such as aggression, anxiety, hyperactivity-impulsivity, and antisocial behavior. Overall, there is a significant association between screen time and increased mental health problems among young children (Hoare et al., 2016). In other words, children may be negatively affected emotionally by increased media use (Radesky et al., 2016), including YouTube. Therefore, based on these studies, we can hypothesize the following:

H3: Time spent using YouTube will be positively related to anxiety.

The argument that media content triggers negative emotions in children is not a new idea. Cultivation theory is an explanation for the powerful and long-term effects of television on heavy viewers. This theory hypothesizes that individuals who spend a lot of time watching media are more likely to perceive the real world based on repeated messages that are consistently embedded in media content. Studies by Gerbner et al. (1980) found that those who watched more violent television programs reported that they were more likely to be involved in violence themselves and had more fear of walking alone at night

and more distrust of others. This negative state of reality perception among heavy viewers was termed "mean world syndrome" by Gerbner and colleagues.

Relatedly, Blumer and Hauser (1933) published research showing that movies cause fear, terror, and mental distress in children and adolescents. Children who are not restricted in what they watch at home have been shown to be less able to distinguish between reality and fantasy and to experience more confusion and anxiety as a result than children in homes where parents mediate (Desmond et al., 1985). The reason for this is that during early childhood, the boundaries between reality and unreality are blurred, making it difficult to distinguish fact from fiction; therefore, young children, who tend to perceive visual representations as real, may interpret scenes that adults consider harmless as serious threats (Cantor, 1988).

Indeed, an analysis of data from children aged 0–36 months found that exposure to violent and nonviolent TV content before age 3 was associated with increased emotional problems at age 4–5 (Zimmerman et al., 2007). In addition, it was found that increasing media use for educational purposes decreased depression, anxiety, and aggression in children, while increasing media use for play purposes increased attention problems and aggression in children (M. K. Kim et al., 2016). This highlights the importance of examining content rather than focusing only on the total amount of screen time, considering the diversity of the media landscape. Given our interest in negative interactions in YouTube content, it is likely that exposure to such content would relate to children's anxiety, as an indicator of children's affect. This leads to our fourth hypothesis:

H4: Exposure to negative interactions in children's favorite YouTube content will be positively related to anxiety.

Social Skill Formation

Broadly, social skills are defined as social abilities that enable healthy interpersonal relationships and social communication with others (Katz & McClellan, 2000/2001). Such skills include a wide range of behaviors and include children's ability to play with, listen to other children, and engage in prosocial behavior. Acquiring those social skills that can result in successful interactions with peers, and peer acceptance is a primary developmental task for preschool children (Johnson et al., 1987). Failure to establish positive peer relationships during early development puts children at a heightened risk of persistent social incompetence and maladaptive behaviors, including potential academic struggles (Parker & Asher, 1987), emotional challenges (Cowen et al., 1973), and rejection from peers (Coie et al., 1990).

Elliott and Gresham (1993) identified five primary factors that hinder the development of social skills: a lack of knowledge, insufficient feedback practice, limited cues or opportunities to learn and display prosocial behaviors, inadequate reinforcement for socially skilled behaviors, and the presence of interfering problem behaviors that impede the acquisition or execution of prosocial behaviors. Each of these could be influenced by the amount of time a child spends viewing YouTube content, or the nature of the content itself. Existing research has been mixed with respect to the nature of the relationship between young children's media use and social skills.

For instance, a study conducted in the United States (Mistry et al., 2007) found that prolonged TV viewing of 2 or more hours per day at both 2.5 and 5.5 years of age was linked to attention problems and social skill difficulties at the age of 5.5 years. Further, children who spend more time with media than they do with family, neighbors, and peers have fewer opportunities to interact with their surroundings, leading to decreased self-regulation and a lack of development of social skills such as social adjustment, relationship building, and empathy (Cho et al., 2018; M. K. Kim et al., 2016).

In contrast, however, a study conducted in Thailand yielded different results (Intusoma et al., 2013). Children who watched television for 30 to 120 minutes per day demonstrated increased overall social skill scores compared to those who did not watch television at all. Specifically, viewing educational programs was more strongly associated with improvements in social skill scores than non-educational programs. However, the positive effects of television diminished when children watched TV for more than 2 hours per day. These findings suggest that a brief period of screen media viewing may benefit the social skill development of preschool children, particularly when educational programs are involved. Given these somewhat conflicting past findings, we ask the following research questions:

RQ1: What is the relationship between time spent on YouTube and children's social skills?

RQ2: What is the relationship between exposure to negative interactions in children's favorite YouTube content and children's social skills?

Indirect Relationships

Numerous studies have considered self-control or self-regulation as a component of social skills. For example, a study demonstrated that a social skills construct related to learning encompasses self-control, cooperation, assertion, and mastery behaviors such as planning and organizing (McClelland et al., 2000). Consequently, the ability to exercise self-control

would be positively correlated with social skills. E. K. Kim et al. (2007) proposed that children's self-regulation is positively correlated with prosocial skills, one of which is social competence. Shin (2008) also found that when children effectively regulate and express their emotions, positive prosocial behaviors will increase and negative behaviors will decrease. Therefore,

H5: Children's self-regulation will be positively related to social skills.

Additionally, anxiety has been recognized as a hindering factor in the development of social skills. From an affective perspective, it is suggested that high levels of arousal associated with anxiety or anger can impede the use of appropriate social skills (Spence, 2003). Lochman and Dodge (1994) demonstrated that aggressive children tend to make faulty interpretations of social events and others' behaviors, increasing the likelihood of responding aggressively. Likewise, the pessimistic cognitive style exhibited by depressed children is also associated with poor social competence (Garber et al., 1993). Therefore, we predict and ask the following:

H6: Children's anxiety will be negatively related to social skills.

RQ3: Is there an indirect relationship between YouTube viewing time and children's social skills via (a) self-regulation or (b) anxiety?

RQ4: Is there an indirect relationship between exposure to negative interactions in children's favorite YouTube content and children's social skills via (a) self-regulation or (b) anxiety?

Method

Participants and Procedure

This analysis is based on data from a survey of South Korean parents of children aged 4–6 who watch YouTube. A South Korean research company conducted an online survey of 341 parents with children who watch YouTube for approximately one week starting May 1, 2022. This sample size is consistent with other linkage studies on children's YouTube use (e.g., Taylor & Cingel, 2023). Parents were asked to fill in the names of the YouTube content that their children usually watch on weekdays and weekends, and we received a total of 1700 responses. We then separated these by YouTube channel, which resulted in a total of 241 channels, and we selected the two most recently uploaded videos from each channel for coding (total N = 482 videos). The definition of

Table 1. Mean values of key variables for children's YouTube viewing.

	M	SD
Parent age	36.87	3.81
Residence (South Korea) 1) Seoul, 2) Gyeonggi, Gangwon, 3) Chungcheong, 4) Honam, 5) Gyeongbuk, 6) Gyeongnam	2.10 (43.25% Gyeonggi or Gangwon)	1.67
Education (Parent's) 1) Elementary school or under, 2) Middle school, Middle school graduate, 3) High school, High school graduate, 4) College, College graduate (including breaks), 5) Graduate school or more (including breaks)	4.00 (60.35% College Graduates)	1.11
Monthly Income (South Korea, KRW) 1) Less than 1.5 million won, 2) Less than 1.5–2.5 million won, 3) Less than 2.5–3.5 million won, 4) Less than 3.5–4.5 million won, 5) Less than 4.5–5.5 million won, 6) More than 5.5 million won	5.72 (41.22% more than 5.5 Million Won)	1.29
Child's gender 1) Female, 2) Male	1.77 (59.92% Male)	.55
Children watch YouTube with...? 1) Parents, 2) Alone	1.71 (68.52% Alone)	.63
Age when child started watching YouTube 1) Under 12 months old, 2) 12–23 months old, 3) 24–35 months old, 4) 36–47 months old, 5) 48–59 months old, 6) 60–71 months old	2.90 (39.18% between 24–35 months)	1.13
Average number of minutes per week that children watch YouTube	315.12	140.66

children's content in this study is based on YouTube's criteria. YouTube describes children's content as "when the subject matter of the video is intended for children, such as children's characters, themes, toys, or games" and includes animation, characters, child influencers, and celebrities that appeal to children (YouTube, 2020). Due to the purpose of this study, which is to analyze interactions between people or characters, we excluded videos that showed close-ups of objects with no people and no sound and analyzed a total of 442 videos. Thus, 40 videos were excluded due to having no interaction or at least a mimicked interaction (such as a person or character speaking directly to camera). The coders watched the entire video and counted the total number of interactions in the video.

The average age of parents who participated in the survey was just under 37 years ($M = 36.87$, $SD = 3.81$), with the majority in their 30s ($n = 210$, 61.58%) and 40s ($n = 76$, 22.29%). The gender split for parents was 91.2% female ($n = 311$) and 8.7% male ($n = 30$). The average age of the children reported on was 5-years-old, with significant proportions of 4- ($n = 71$, 20.82%), 5- ($n = 205$, 60.12%), and 6-year-olds ($n = 65$, 19.06%), and the gender split for children was male ($n = 204$, 59.82%) and female ($n = 137$, 40.18%). Both parents and children were Korean. Please see descriptive statistics section below for full demographic information about the sample, as well as Table 1.

Measures

YouTube viewing time

We asked parents to report the amount of time their child watches YouTube. The most reliable way to measure viewing time is to ask a person directly. However, because the main targets in this study were 4–6-year-old children, we considered that their developmental stage made it difficult for them to directly monitor their behavior and report on it. Thus, for this study, we asked parents to record their child's YouTube viewing time for the most recent week. To avoid parents' subjectivity and get more accurate results, we calculated the actual viewing time by dividing it into weekends and weekdays.

Specifically, we used the questions "Please tell us how long your child watches YouTube on average per day during the week (Monday through Friday)" and "Please tell us how long your child watches YouTube on average per day on the weekend (Saturday through Sunday)." The recorded numbers were converted to minutes. We then multiplied the weekday number by 5 and the weekend number by 2 and added them together then divided by 7 to calculate the average time. Parents reported that their children spent about 5.25 hours consuming YouTube content per week ($M_{mins} = 315.12$, $SD = 140.66$).

Negative interactions in YouTube content

To create our coding scheme, we used the Penn Interactive Peer Play Scale (PIPPS) by Fantuzzo et al. (1998) and adapted the scale by Choi (2010) by selecting items from the PIPPS that correspond to peer interaction. This scale consists of 22 items, including negative interactions that hinder peer interaction (13 items) and positive interactions that help peer interaction (9 items). We used a measure of peer interaction to inform our coding scheme because our dependent variable is children's social skills.

Specifically, in Choi's (2010) study, which modified the scale by factor analysis of the full PIPPS for Korean children, negative interactions were defined as follows: Taking away a friend's things, refusing to share things with a friend, verbally criticizing a friend, destroying a friend's things, not taking turns, interrupting, showing physical aggression in interactions with friends, rejecting ideas suggested by friends, starting fights or arguments, disagreeing or not following friends, refusing to play when invited to play, crying, whining, or getting angry in interactions with friends, and snitching. The factor analysis scores for snitching in the original study were low, so we removed it and collapsed the remaining 12 items into five for the purposes of coding (described below).

Next, in Choi's study, positive interactions were specifically defined as: politely directing a friend's behavior; making up stories and talking while playing with a friend; adding creative ideas to play with a friend; helping

a friend; asking a friend to play with you; helping with conflicts between friends; expressing positive emotions in play with a friend; comforting a friend who is hurt or sad; and being smooth and flexible in play. In our study, these items were grouped into six categories.

Together, this paper used five negative interactions and six positive interactions for our coding scheme. Negative interactions are verbal and nonverbal behaviors that interfere with interacting with others and consist of five categories: (1) refusal (refusing to help someone when they are in need or asking for help), (2) physical attacks (physical harm to someone's body, including direct physical harm such as hitting someone, and also includes small physical attacks such as gestures), (3) verbal attacks (using aggressive language such as cursing, blaming, yelling, etc.), (4) interruptions (taking things away from others or getting in their way), and (5) threats (making others feel threatened or afraid). Positive interactions are behaviors that are conducive to initiating or sustaining interactions and consist of (1) giving and receiving help (helping or received help from others), (2) conversation (sharing stories with others), (3) smiling or laughing (to show closeness), (4) suggesting an opinion (expressing one's opinion or thoughts during an activity), (5) affiliative physical contact (friendly behaviors such as hugging others), and (6) favorable behaviors (behaviors such as nodding or waving).

We used this scheme to code positive and negative interactions, but rather than simply coding for the presence or absence of behavior, we also considered the context in which the behavior occurs, as certain behaviors may have different effects depending on the nature of the context. In particular, we considered two factors: whether the behavior is rewarded (or not) and the motivation for the behavior. These factors were based on child development research that suggests motivation and the perception of connections between actions and outcomes can be important variables in children's understanding of narrative structures in media at certain ages (Bryant & Anderson, 1983). In detail, 1) the reward of an action refers to whether the performer of an action receives a benefit or gain from it, and 2) the motivation of an action refers to whether the performer of an action is doing it to gain/avoid social or material rewards or because of an order from an authoritative character. In our coding, we distinguished positive interactions based on whether a laugh, for example, is voluntary (positive interaction) or forced by another person (negative interaction). For negative interactions, we also considered the context. For example, in the case of a refusal, we considered that it is different to refuse on your own compared to being forced to do so by someone else. In particular, for items such as giving and receiving help, conversation, and smiling and laughing, we did not count it as a positive interaction if the behavior was not voluntary, but rather the result of someone's command, and for items such as suggesting an opinion and favorable behavior, we did not count positive

interactions if the purpose of the behavior was to solely benefit the individual giving the opinion or enacting the favorable behavior.

We then counted the total number of positive and negative interactions in the entire video. Inter-coder reliability was derived in four steps: first, whether the video had an interaction; second, if the interaction was positive and/or negative; and third, which of the six positive or five negative subcategories in the interaction fell into. Fourth, the categorization of interactions in each sub-dimension was reviewed again with context in mind (such as the motivations behind the action). Two PhD students in communication and media conducted the content analysis, and met twice to receive preliminary training on each variable. One hundred ten videos were randomly selected, about 25% of the total, and analyzed in the first and second steps: whether there is an interaction in the video and what kind of interaction it is (positive/negative). Both step 1 and step 2 had a reliability of 1.00 with 100% agreement, so we moved on to the next step. The results of the third step showed that Cohen's kappa was 0.85. The final step, adjusting to consider context, was also found to be reliable, with a Cohen's kappa of .80. which exceeded both Fleiss's (1981) minimum requirement (0.70) and Landis & Koch's (Landis & Koch, 1977) standards for reliability. The results for reliability for each item are as follows: giving and receiving help (.91), making conversation (.85), smiling or laughing (.90), suggesting an opinion (.79), affective physical contact (.89), favorable behavior (.83), refusals (.88), physical attacks (.92), verbal attacks (.80), interruptions (.72), and threats (.81).

The total number of positive and negative interactions per video averaged 173 ($M = 173.00$, $SD = 63.77$), including 91 ($M = 91.00$, $SD = 35.43$) positive interactions and 82 ($M = 82.00$, $SD = 28.34$) negative interactions. The most frequent positive interactions on YouTube were: making conversation ($M = 42.35$, $SD = 17.62$), suggesting an opinion ($M = 19.56$, $SD = 7.91$), smiling or laughing ($M = 16.43$, $SD = 6.30$), favorable behavior ($M = 7.37$, $SD = 2.10$), affective physical contact ($M = 3.02$, $SD = .83$), and giving and receiving help ($M = 2.27$, $SD = .71$). Negative interactions were most frequently observed on YouTube in the order of physical attacks ($M = 30.92$, $SD = 12.13$), refusals ($M = 23.02$, $SD = 8.75$), interruptions ($M = 14.04$, $SD = 4.03$), verbal attacks ($M = 9.05$, $SD = 2.23$), and threats ($M = 4.97$, $SD = 1.20$). In our analysis below, we use the total frequency of negative interactions, controlling for the number of positive interactions.

Self-regulation

Self-regulation was measured using Sung and Hong's (Sung & Hong, 2010) 10-item scale, which was developed from a survey of Korean preschoolers to examine self-regulation and interactions by gender. We

used an exploratory factor analysis with varimax rotation of the 10 items used in Sung and Hong's study. After removing the items with low reliability, a total of five items were derived from the factor analysis: "My child cannot stay still for a moment," "My child is more difficult to control than other children his or her age," "My child has trouble keeping to a regular routine, such as sleeping, eating, or playing," "My child is easily distracted during activities," and "My child stops crying or having outbursts of anger suddenly." All items were reverse-coded, such that higher scores indicate better self-regulation. Responses were on a 5-point scale from 1 = Strongly Disagree to 5 = Strongly Agree (M = 3.92, SD = .54; α = .91).

Anxiety

We used five items from the "Burks Infant Behavioral Composite Rating Scale" and the "Burks Infant Behavioral Composite Rating Scale-2" (BBRS-2: Burks & Gruber, 2013) for our analysis. The Burk's Infant Behavioral Composite Rating Scale is designed to measure a variety of behaviors, including anxiety, and has been used in studies of pre-school children (H. J. Kim, 2012). The Burks Behavior Rating Scale 2nd Edition is a revised version of the BBRS designed to measure adjustment-related behavioral traits in younger children (4–6 years old) to children and adolescents (6–18 years old). It consists of seven scales: conduct disorder (27 items), attention/impulsivity problems (16 items), emotional problems (17 items), social withdrawal (9 items), intellectual problems (6 items), physical problems (9 items), and lack of self-confidence (10 items). Among them, anxiety is included in emotional problems, and 5 items were derived based on BBRS and BBRS-2.

The items were "My child frequently changes moods," "My child takes a long time to feel comfortable in new places or situations," "My child has difficulty adjusting to new people," "My child has overreactions to small things," and "My child has difficulty adjusting to unfamiliar social events." Thus, higher scores indicate higher levels of anxiety. Responses were measured on a 5-point scale from 1 = Strongly Disagree to 5 = Strongly Agree (M = 3.74, SD = .52; α = .85).

Social skills

We measured children's social skills using 10 items from the Social Skills Rating Scale (SSRS) developed by Katz and McClellan (1997). Sample items include "My child takes the lead when playing or engaging in activities with other children," "My child listens well to other children," "My child is popular with other children," and "My child communicates effectively and positively with other children." Parents answered these items on a 5-point scale from 1 = Strongly Disagree to 5 = Strongly Agree (M = 4.14, SD = .57; α = .93).

Analysis Plan

Data analysis was conducted using Stata 16.0 and Mplus 8.0, combining content analysis with survey data. Structural equation modeling (SEM) was used to examine the relationships between key variables. Maximum likelihood estimation was used for estimating parameters, and bootstrapping was used to test the significance of indirect effects. We included child gender, parent education, who children watch YouTube with (as an indicator of parent involvement and mediation), and the frequency of positive interactions as coded from children's favorite YouTube content as control variables in our model because it is likely that these variables within the 4–6 age group may affect not only social skills, but also screen time, self-regulation, and anxiety. Each of these variables was categorized based on the parents"responses to the survey: specifically, for gender, we asked them to answer 'male' and 'female;' for parents" education, we asked them to answer about the education level of the primary caregiver of the child: "elementary school or under," "junior high school, junior high school graduate," "high school, high school graduate," "college, college graduate (with a break)," and "graduate school or more (with a break)." Finally, we asked who the child watches YouTube with most often. This is an important control variable because children who watch YouTube alone may have less parent involvement, resulting in longer viewing times and difficulties with self-regulation. In addition, we included the frequency of positive interactions as a control variable to isolate the relationships between exposure to negative interactions in YouTube content on our other variables of interest.

Results

Descriptive Statistics

The majority of participants lived in Gyeonggi and Gangwon do (43.25%), the closest metropolitan areas to the capital, and Seoul (17.1%), the capital of South Korea. In other words, the people who participated in this study were not limited to Seoul but included people living in other regions in South Korea. In terms of education, college and university graduates accounted for the highest percentage of participants (62.35%). There were more boys (59.92%) reported on in the sample relative to girls, and when asked who they watch YouTube with, the most frequent answer was alone (68.52%). Please see Table 1 for full descriptive information about the sample and Table 2 for descriptive information about the measures. Table 3 is a correlation analysis of the key variables.

Table 2. Mean values and reliability of metrics for children's YouTube viewing.

Variables		Concepts	Number of items	*M* *(SD)*	Cronbach's Alpha
Interactions on YouTube	Positive interactions on YouTube	Giving and receiving help	6	2.27 (.71)	.86
		Conversation		42.35 (17.62)	
		Smiling or laughing		16.43 (6.30)	
		Suggesting an opinion		19.56 (7.91)	
		Affective physical contact		3.02 (.83)	
		Favorable behavior		7.37 (2.10)	
	Negative interactions on YouTube	Refusals	5	23.02 (8.75)	.85
		Physical attacks		30.92 (12.13)	
		Verbal attacks		9.05 (2.23)	
		Interruptions		14.04 (4.03)	
		Threats		4.97 (1.20)	
Self-regulation		Self-regulation	5	3.92 (.54)	.90
Anxiety		Anxiety	5	3.74 (.52)	.85
Social Skills		Social Skills	10	4.14 (.57)	.93

Table 3. Correlations between key variables.

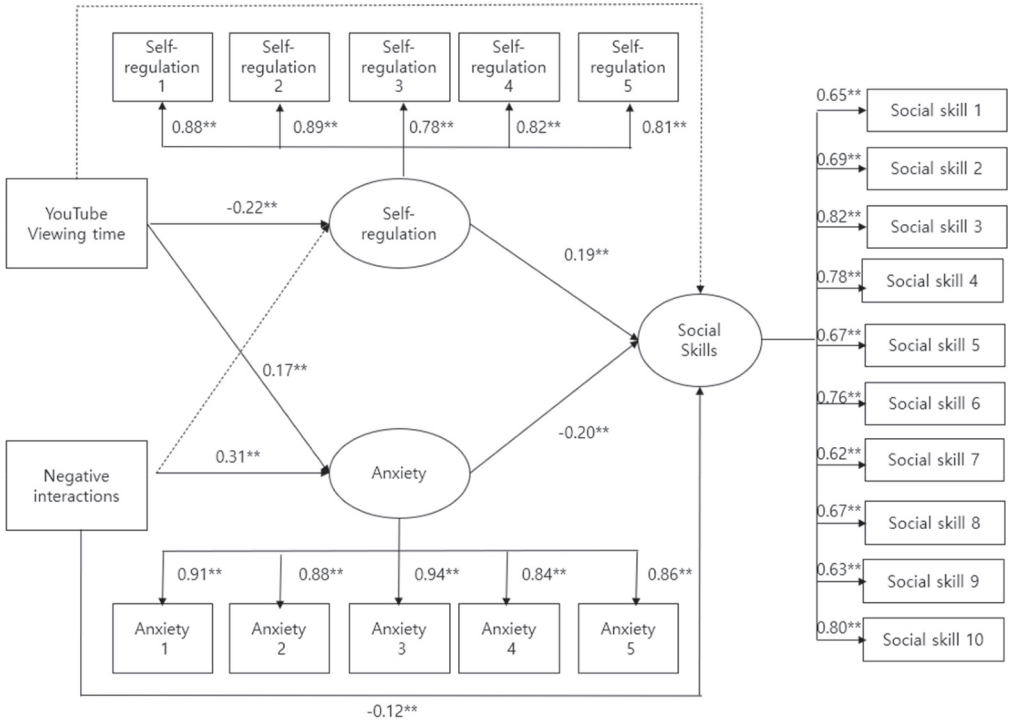
	Self-regulation	Anxiety	Social skills
YouTube viewing time	−.71**	.52**	−.71**
N	341	341	341
Self-regulation		−.47**	.75**
N		341	341
Anxiety			−.65**
N			341

Testing the Hypothesized Model

The hypothesized model showed a good fit with the data, $\chi^2 = 721.34$, $p = .001$, RMSEA = 0.06, CFI = 0.97, and TLI = 0.95, and included four covariates: child gender, parent education, who the child viewed YouTube with, and frequency of positive interactions. The results and significance of the relationships between the variables are presented in Figure 1. First, we found that children's YouTube viewing time was related to both self-regulation ($\beta = -.22$, $p = .001$) and anxiety ($\beta = .17$, $p = .001$). In other words, H1 and H3 were supported. However, exposure to negative interactions was related to anxiety ($\beta = .31$, $p = .003$), but not self-regulation. Thus, H4 was supported, but H2 did not receive support. H5 and H6 were also supported. Specifically, self-regulation was positively associated with social skills ($\beta = .19$, $p = .004$), and anxiety was negatively associated with social skills ($\beta = -.20$, $p = .003$).

Regarding RQ1, there was no significant, direct relationship between YouTube viewing time and children's social skills. However, in regard to RQ2, exposure to negative interactions on YouTube had a negative direct relation with social skills ($\beta = -.12$, $p = .001$)

Related to RQ3 and RQ4, the indirect effects of children's YouTube viewing time and negative interactions in YouTube on children's social skill formation



$$\chi^2 = 721.34, p = 0.001, \text{RMSEA} = 0.06, \text{CFI} = 0.97, \text{TLI} = 0.95$$

Figure 1. The relations between children's YouTube viewing time and exposure to negative interactions on social skill formation.

Table 4. Indirect effects of children's YouTube viewing time and negative interactions on children's social skill formation through self-regulation and anxiety.

Indirect paths	β	SE
YouTube viewing time → Self-regulation → Social skills	−.07**	.03
Negative interactions in YouTube → Self-regulation → Social skills	−.06	.02
YouTube viewing time → Anxiety → Social skills	−.07**	.03
Negative interactions in YouTube → Anxiety → Social skills	−.02**	.03

**$p < .001$.

via self-regulation and anxiety are shown in Table 4. First, the indirect effect of self-regulation was found to be significant in the relationship between YouTube viewing time and social skills (β = −.07, $p = .003$). Next, we analyzed the relationship between exposure to negative interactions on YouTube and social skills through self-regulation, but it was not significant. The relationship between YouTube viewing time and social skills through anxiety (β = −.07, $p = .003$), and exposure to negative interactions on YouTube and social skills through anxiety (β = −.02, $p = .002$) were found to be significant when analyzing the indirect effects. Therefore, there is an indirect relationship between children's YouTube viewing time and social skills via both self-regulation and anxiety, addressing RQ3. There is an indirect effect of the negative interaction on YouTube and social skills via anxiety, but not self-regulation, addressing RQ4.

Discussion

Summary of Results

Overall, this study examined how YouTube viewing time and exposure to negative interactions (controlling for exposure to positive interactions) viewed in children's favorite YouTube content are related to the social skills of young children. Specifically, there was a negative relationship between YouTube viewing time and children's self-regulation, and a positive relationship between YouTube viewing time and anxiety. The frequency of negative interactions on YouTube was associated with higher anxiety, but not self-regulation. Both self-regulation and anxiety were found to relate to children's social skills. Specifically, self-regulation was found to be positively associated with social skills and anxiety was found to be negatively associated with social skills. We also found that exposure to negative interactions on YouTube has a direct negative relation with children's social skills. However, children's YouTube viewing time does not directly relate with their social skills. We also found an indirect effect in the negative relationship between children's YouTube viewing time and social skills via decreased self-regulation. In addition, both YouTube viewing time and exposure to negative interactions within

YouTube content were found to negatively relate to children's social skills through increased anxiety. However, there was no significant indirect effect of the negative interactions on YouTube through self-regulation on social skills.

Theoretical Implications

The significance of this study is that it simultaneously analyzed the relationship between YouTube use and children's social skill formation, both in terms of viewing time and exposure to content. First, this study emphasizes the importance of screen viewing time (at least in terms of YouTube) in children's social development. This is important, because multiple authors have begun to argue that measuring media use in terms of time may not be the most fruitful operationalization. Indeed, for adolescents, who have more developed social skills and many other developmental capacities relative to younger children, time spent using social media, including YouTube, may not have a strong relationship on outcome variables related to development and mental health (Coyne et al., 2019). However, for young children who are less developed in many areas, viewing time may have a significant relationship with social skill development because it can displace time that could be spent building these important developmental capacities (e.g., Choe et al., 2023). Therefore, based on the results of this study and previous research, we argue that it will be important to consider media viewing time in future studies pertaining to correlates of development among younger children, while also considering the activities that such media use might displace. Further, it will be important to assess when exposure to certain content, rather than simply the amount of time spent viewing media, becomes a stronger predictor of developmental correlates, or if this is dependent on the type of development (e.g., emotion regulation compared to social skills).

In addition, we categorized negative interactions into five dimensions based on previous research. While it is possible that the negative relationships detected in this study may be assuaged with parental mediation, this does show that children's social development may be hindered by YouTube both in terms of the amount of time children spending consuming (thereby displacing time that could be spent practicing these developmental skills) and in terms of the content consumed. This study shows that the time spent on YouTube might displace opportunities for children to practice skills, while the content they watch can be related to their anxiety – all of which contribute negatively to social skills, which are vitally important for child development. This has implications for parental mediation of young children's media use, as well as regulations on children's media, as restrictions on both time and content may be necessary to support healthy child development.

The study also used SEM to examine not only the direct statistical effects of various factors on children's social skill formation, but also the indirect effects

of YouTube viewing time and negative in-video interactions on children's social skills via self-regulation and anxiety. The results showed that while negative interactions on YouTube were unrelated to self-regulation, they were positively related to anxiety. Further, the amount of YouTube viewing time related to both self-regulation and anxiety. These results indicate that both time and content are important considerations for children's development when they consume YouTube and that they relate to more distal outcomes, like social skills, via slightly different mechanisms. Our finding that negative content exposure does not relate to children's self-regulation, but viewing time does, is of particular interest. First, heavy media use has been found to negatively impact social and emotional development by reducing opportunities for interaction with peers and family (Plowman et al., 2010). In addition, media use has been found to increase indoor activity time (Lupu et al., 2013), which has been linked to decreased self-regulation and emotional well-being in young children (J. W. Lee & Jo, 2018). In particular, children's media time reduces their opportunities to interact with others, limiting their access to developmentally appropriate experiences and negatively affecting their emotional well-being (J. M. Kim et al., 2014). Likewise, a study of preschoolers in the Netherlands found that prolonged television exposure was consistently associated with externalizing problems, including attention problems and aggression (Verlinden et al., 2012). Therefore, sheer amount of time viewing may negatively relate to young children's self-regulation not because they are modeling negative behaviors, but rather, because it is displacing time that could be spent practicing self-regulation. Importantly, however, this may come in conjunction with consuming content featuring negative interactions, which relates negatively to social skills via increases in anxiety. Specifically, in this study, children's anxiety was found to be more related to the consumption of content with more negative interactions than viewing time itself, and anxiety was more strongly associated with social skills than self-regulation. These findings suggest that both YouTube viewing time and exposure to certain content could play an important role, together, in children's development.

Practical Implications

YouTube has become one of the most popular online applications used by children around the world (Marsh et al., 2019; Rideout & Hamel, 2006/2017). In addition, the concept of "digital parenting" (Rode, 2009), which involves guiding children to develop appropriately in a digital environment and teaching them how to self-regulate their digital devices, is important. The findings of this study suggest that parents should consider what content their children are consuming when they watch YouTube, beyond simply controlling the amount of time they spend, although we note that among this younger sample,

both variables are important correlates of children's social skills. In particular, YouTube viewing is mostly done on mobile devices, leading to more isolated viewing by children, which can make it difficult for parents to control both viewing time and content. Furthermore, even before YouTube, parents' mediation has been known to help children develop better viewing habits by influencing their socialization while watching videos and reducing viewing time (Nathanson, 2001; van den Bulck & van den Bergh, 2000). However, YouTube may be particularly difficult for parents to adequately mediate, given that children can easily consume content via more personal, mobile devices, but also because the site's algorithms can quickly move children to consume different content once an initial video (possibly selected by the parent) ends.

Strengths, Weaknesses, and Directions for Future Research

Despite the theoretical and practical implications of this study, there are several limitations to consider. First, when we measured negative interactions within YouTube content, coding was completed manually. Although experienced coders with media expertise performed preanalysis and reliability testing to arrive at our results, a limitation of manual measurement is that it does not capture deeper aspects such as intensity. Therefore, a more comprehensive study would be possible in the future by using methods such as deep learning to analyze the frequency, intensity, and the five negative interactions within the entire content.

Additionally, although we asked parents to be honest when they responded to the survey, the data might not be accurate because parents were responding based on their observations of their children and not recording their own experiences. The study also asked parents to report their child's YouTube viewing time, dividing it between weekdays and weekends. This approach would provide a more accurate picture of how children's self-regulation and anxiety are related to the amount of time they spend watching YouTube.

Finally, this is a cross-sectional study. For example, while the model in this study suggests that YouTube viewing time is associated with higher anxiety, it is also possible that the opposite case: children with higher anxiety spend more time on YouTube. Furthermore, there may certainly be other factors that are not included in this model, so we must be cautious in our interpretation of the findings, including their directionality. We also suggest that future studies could compare whether viewing time influences anxiety or anxiety influences viewing time, or whether these are reciprocal processes over time.

Considering the importance of early childhood social skills development, highlighted in previous studies by Katz and McClellan (2000/2001), who found that failure to achieve minimal social skills by age 6 can put children

at risk in social relationships throughout their lives, this study may provide guidance in understanding how children's social skill development, which plays a critical role in growth and is the foundation of character and basic attitudes, may be affected by YouTube consumption. This study is also meaningful in that it categorized the types of interactions in YouTube as positive and negative and linked this coding with parent survey data, indicating that both amount of time spent on YouTube and the content of videos are important for young children's development.

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