# Interaction Analysis of Sports And Fitness Video Comments On Bilibili Video Website Based On Social Presence Theory

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***Abstract:*** Under the background of the Healthy China strategy and the particular period of the epidemic, online sports and fitness has developed rapidly. This paper analyzes the interaction between users in the social network. We select the sports and fitness videos of the Bilibili website as the research object. We use the network text analysis method to collect, organize and analyze the comment data of the selected users of the Bilibili video website on the sports and fitness videos. The three measurement dimensions of Bilibili analyze the review text data and conclude that the interaction behavior affects the social presence of Bilibili video website users.

***Keywords:*** Sports and Fitness, Social Presence, Interaction

## 1. INTRODUCTION

In 2017, China proposed the Healthy China Strategy. Since then, the National Fitness for All National Strategy has been implemented in-depth, setting off a wave of people's exercise and fitness. During the epidemic, living at home has promoted the trend of online sports and fitness. According to data, since the COVID-19 outbreak in 2020, the cumulative number of fitness and sports videos on the Bilibili video website has reached 660 million, an increase of nearly three times compared with the same period last year, and the number of new fans of fitness sports bloggers has increased by about 2.5 times. In this context, this paper starts with the sports and fitness bloggers on the Bilibili video website and their user interaction behaviors, combines social presence and interaction theory, and uses text analysis to analyze video comment samples. The data is analyzed by comment sentiment analysis, interaction analysis, and cohesion analysis of each measurement dimension. We conclude that interaction affects the social presence of Bilibili video website users.

## 2. LITERATURE REVIEW

### 2.1 Social Presence

Short et al. (1976) first proposed the concept of social presence, arguing that social presence refers to how the user communicates in the media with little difference from the real one and the feeling of communicating with others.

Fulk et al. (1987) proposed that social presence is the feeling of being with others. Gunawardena (1995) believes that social presence can be a psychological feeling generated in interaction between people and media with the development of communication media. Ijsselsteijn et al. (2000) divided presence into physical and social, representing the degree to which users feel in the physical space and the degree to which they perceive the presence of others. Garrison et al. (2000) regarded users as a social presence when they believed that they were communicating with real people in the media. As online learning grew, Rogers et al. (2005) suggest that the immersive experience of online learners in the learning process is social presence.

Many different scholars have provided reference dimensions for measurement regarding the measurement of social presence. Rourke et al. (2001) suggest that social presence can be divided into interactive, emotional, and cohesive. Biocca et al. (2001) proposed that social presence has three dimensions: co-existence, engagement, and behavioral consistency. When measuring the social presence, Tu (2002) finds that social presence factors include communication situation, information dissemination, interactive behavior, machine secrecy, and sense of secrecy. Xu (2006) notes that the user's interactive behavior, the user's perception of reality, the user's closeness to others, and the user's cooperation with others are the influencing factors of social presence. Karel Kreijns et al. (2011) find that communication behavior and ability between people are essential influencing factors. The three dimensions of social presence proposed by Rourke et al. (2001) were mainly applied in this study.

### 2.2 Interaction and Social Presence

Although scholars have not reached a consensus on the definition and measurement dimensions of social presence, many scholars have mentioned the important influence of interaction on social presence. Some scholars have confirmed the relationship between the two. Palmer (1995) believes that the user's psychological input leads to social interaction and behavioral interaction. Social presence is the consistency of behavior and the behavioral interaction of multiple channels connected. Skadberg and Kimmel (2004) found that the greater the degree of network interaction, the greater the user's virtual experience. Hassanein et al. (2009) argue that enhancing the user-machine interaction can enhance social presence. Mollen et al. (2010) found that users have interactive behaviors, a sense of presence, and user engagement are three types of users' degrees of connection with online platforms. Zhao et al. (2014) believed that the higher the level of consumers' interaction, the greater the sense of social presence. Li (2017) found that most dimensions that measure interaction perception have a significant positive impact on users' social presence.

### 3. RESEARCH DESIGN

### 3.1 Research objects

Bilibili video website is a video website with a large audience. It is now a cultural community and video platform with a high concentration of the young Chinese generation. This paper selects the relevant videos released by sports and fitness bloggers on the Bilibili video website as the research object for comprehensive and in-depth research and analysis.

### 3.2 Research samples

The author divides the top 30 sports and fitness bloggers on the Bilibili video website into six categories and then selects the blogger with the highest influence index from the six categories as the research sample source for this article.

The top two videos of the following six sports and fitness bloggers were selected as research samples.

**Table 1.** Research Blogger Profile

| Type | Name | Number of Fans | Total Likes | Total Video Views |
|---|---|---|---|---|
| Increase Strength | Uncle Zhuo Gain Weight | 1.325 M | 2,522 K | 54.544 M |
| Female Bodybuilding | Liuye Zhou Zoey | 9,039 K | 12.294 M | 530 M |
| Fitness Theory | Shuaiqi Yan | 1,740 K | 5.91 M | 96.754 M |
| Fitness Comprehensive | Handsome Soserious | 2.44 M | 5.566 M | 110 M |
| Comprehensive Posture | Body Master APP | 1,371 K | 584 K | 37.195 M |
| Fitness Entertainment | Soul Fitness Teacher Yang | 978 K | 4,482 K | 55.217 M |

### 3.3 Research methods

This study used literature analysis, case study, and text content analysis. This research takes 12 videos released by six sports and fitness bloggers on the Bilibili video website as a case study. The case study reveals the specific and common interaction between sports and fitness bloggers and their users on the Bilibili video website. The author studied the relevant literature on social presence theory to provide a theoretical basis for this research. This paper selects the comment text content of 12 videos of six sports and fitness bloggers on the Bilibili video website for crawler collection for further research and analysis.

### 3.4 Data collection

Among the selected six bloggers, this research selects two videos from the videos published by each blogger for data collection and conducts a web comment text crawler. 82,165 video comments are collected, and the data in the following table is obtained.

**Table 2.** Video Comment Data Statistics

| Number | Type | Blogger Name | Video Content | Video Views | Comments Collected |
|---|---|---|---|---|---|
| A1 | Increase Strength | Uncle Zhuo Gains Weight | Improve Physical Fitness | 4,465 K | 1,241 |
| A2 | Increase Strength | Uncle Zhuo Gains Weight | Fitness Muscle Building | 2.613 M | 3,613 |
| B1 | Female Bodybuilding | Liuye Zhou Zoey | Waist Slimming Exercise | 39.37M | 21,480 |
| B2 | Female Bodybuilding | Liuye Zhou Zoey | Improve Body Posture | 36.854 M | 25,373 |
| C1 | Fitness Theory | Shuaiqi Yan | Strengthen Pectoral Muscles | 5,443 K | 4,215 |
| C2 | Fitness Theory | Shuaiqi Yan | Lose Belly At Home | 5.438 M | 4,081 |
| D1 | Fitness Comprehensive | Handsome Soserious | Correct Flat Feet | 8.339 M | 2,673 |
| D2 | Fitness Comprehensive | Handsome Soserious | Improve Sleeping Position | 6,930 K | 3,098 |
| E1 | Comprehensive Posture | Body Master APP | Improve Physical Posture | 8.594 M | 7,310 |
| E2 | Comprehensive Posture | Body Master APP | Improve Outer Side Of Calf | 5.113 M | 3,270 |
| F1 | Fitness Entertainment | Soul Fitness Teacher Yang | Girl Fitness Knowledge | 1,982 K | 3,239 |

| F2 | Fitness Entertainment | Soul Fitness Teacher Yang | Fitness Movement | 1,951 K | 2,572 |

## 4. DATA ANALYSIS

The data analysis mainly used ROST CM6 software. This research uses ROST CM6 software to analyze the sentiment and high-frequency words of the collected Bilibili video website comments and analyze the data. The following results are obtained:

### 4.1 Emotion Analysis

**Table 3.** Sentiment Analysis Results

| Number | Positive Emotion | Neutral Emotion | Negative Emotion |
|--------|------------------|-----------------|------------------|
| A1 | 40.13% | 39.08% | 20.79% |
| A2 | 46.53% | 37.97% | 15.50% |
| B1 | 16.65% | 51.45% | 31.90% |
| B2 | 19.24% | 49.04% | 31.72% |
| C1 | 35.33% | 41.02% | 23.65% |
| C2 | 32.03% | 39.84% | 28.13% |
| D1 | 39.09% | 37.60% | 23.31% |
| D2 | 37.80% | 38.41% | 23.79% |
| E1 | 26.63% | 41.01% | 32.35% |
| E2 | 15.17% | 56.64% | 28.20% |
| F1 | 35.69% | 45.48% | 18.83% |
| F2 | 38.23% | 48.46% | 13.31% |

The software is used to perform emotion recognition analysis on the comments of each video and divide them into three different emotional results: positive, neutral, and negative, and the data in the table above is obtained. According to the table, among the twelve videos of six bloggers, eight video comments show that the proportion of positive emotions is significantly higher than that of negative emotions. The negative emotions of the other four videos are more elevated than positive emotions but lower than neutral emotions, of which 12 the impartial sentiment comments on the videos are all between 35%-57%. Social presence is a continuous process from absence to a low level of psychological engagement to a high level of behavioral performance. The emotion of video commentary is a critical influencing factor. The emotions displayed by the online comments of users watching videos are an essential factor affecting the sense of social presence. Positive emotional comments show personal approval of the blogger's video, individuals actively follow sports and fitness bloggers for learning, etc., and drive other users to communicate and interact in the comment area. Strong emotions will make users more likely to have a sense of social presence, and it will be easier to promote social interaction and mutual communication.

### 4.2 Interaction Analysis

**Table 4.** Interaction Data

| Number | Views | Likes | Coins | Collections | Retweets | Barrages | Comments |
|--------|-------|-------|-------|-------------|----------|----------|----------|
| A1 | 4,465 K | 176 K | 112 K | 154 K | 28 K | 5,093 | 1,241 |
| A2 | 2.613 M | 188 K | 131 K | 65 K | 34 K | 2,000 | 3,613 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B1 | 39.37 M | 489 K | 233 K | 2,319 K | 567 K | 1,986 | 21,480 |
| B2 | 36.854 M | 596 K | 302 K | 2,275 K | 632 K | 6,000 | 25,373 |
| C1 | 5,443 K | 308 K | 271 K | 530 K | 37 K | 2,005 | 4,215 |
| C2 | 5.438 M | 232 K | 222 K | 452 K | 46 K | 2,980 | 4,081 |
| D1 | 8.339 M | 172 K | 67 K | 150 K | 38 K | 3,133 | 2,673 |
| D2 | 6,930 K | 202 K | 94 K | 246 K | 43 K | 3,024 | 3,098 |
| E1 | 8.594 M | 170 K | 76 K | 862 K | 115 K | 5,975 | 7,307 |
| E2 | 5.113 M | 57 K | 23 K | 434 K | 29 K | 2,110 | 3,270 |
| F1 | 1,982 K | 136 K | 127 K | 54 K | 25 K | 1,070 | 3,239 |
| F2 | 1,951 K | 109 K | 290 K | 16 K | 7,311 | 1,989 | 2,572 |

This research mainly selects the number of views, likes, coins, collections, retweets, barrages, and comments as essential data for user interaction. The number of views shows the popularity of the video, and the number of likes shows the user's love and recognition of the video. The number of coins invested indicates that the user is willing to give money to the blogger who posted the video to express a more profound identification with the blogger or the video. The number of collections reflects the user's belief that the video can help them exercise and fitness and has a certain guiding significance. The number of retweets indicates the willingness of users to share excellent sports and fitness videos with others. The number of barrages and comments reflects the behavior of text exchanges and ideological collisions between users and bloggers or with other users. According to the data in the above table, it can be known that the amount of interaction data for users watching these twelve videos is relatively large. In watching, liking, coining, collecting, forwarding, sending barrage, and commenting, users are in an active, interactive environment. They can feel a higher level of social presence, especially when the interaction is personalized. Social presence is further enhanced when features are apparent, such as using internet lingo or unique emoji in comments.

### *4.3 Cohesion Analysis*

**Table 5.** High-Frequency Words Theme And Representative Words

| Number | Theme | Representative Word |
|---|---|---|
| A1&A2 | Teaching Content | Fitness, Exercise, Running, Staying Up Late, Knowledge, Protein |
| A1&A2 | Blogger Interaction | Uncle Zhuo, Favorites, Suggestions, Hand In Homework, Three Strikes |
| A1&A2 | User Interaction | Friend, Brother, Effect, Attention, Improvement |
| A1&A2 | Emotional Interaction | What To Do, Thanks, Usefulness, Psychological Desire |
| A1&A2 | Sports Punch-In | Plan, Goal, Refuel, Persevere, Do What I Say |
| B1&B2 | Teaching Content | Trapezius, Movement, Shoulders, Back, Straight, Stomach |
| B1&B2 | Blogger Interaction | Follow The Teacher, Collect, Open Your Body |
| B1&B2 | User Interaction | What Is The Problem, Sister, Why Is It Wrong, Obvious Improvement |
| B1&B2 | Emotional Interaction | What To Do, Thanks, Crying, Effective, Exhausted |
| B1&B2 | Sports Punch-In | Persistence, Come On, Day 1、2、3 etc., Change, Success |
| C1&C2 | Teaching Content | Lunges, Moves, Jumps, Muscles, Push-Ups, Arms |
| C1&C2 | Blogger Interaction | Shuaiqi Yan, Favorite,Three Strikes, Suggestion, Novice |
| C1&C2 | User Interaction | Brother, Ask, How, Why, How Long |
| C1&C2 | Emotional Interaction | Afraid, Troubled, Embarrassed, Effective, Outrageous |
| C1&C2 | Sports Punch-In | The First Time, Persist, Never, Every Day, Come On |
| D1&D2 | Teaching Content | Flat Feet, Cervical Spine, Sleeping Position, Insoles, Toes, Spine |

| D1&D2 | Blogger Interaction | Handsome Boy, Collection, Suggestion, Three Strikes, Correction |
|---|---|---|
| D1&D2 | User Interaction | When I Was Young, Often, Every Time, Congenital, Why |
| D1&D2 | Emotional Interaction | Uncomfortable, Terrible, Useful, Bad, What To Do |
| D1&D2 | Sports Punch-In | Daily, Control, Persistence, Balance, Fitness |
| E1&E2 | Teaching Content | Movement, Shoulder Blades, Knees, Thighs, Stretches, Ankles |
| E1&E2 | Blogger Interaction | Posture Masters, Collections, Standards, Exercises, Principles |
| E1&E2 | User Interaction | Right Or Wrong, Sister, What's Going On, Change, Why |
| E1&E2 | Emotional Interaction | Powerful, Crying, Useful, Comfortable, Uncomfortable |
| E1&E2 | Sports Punch-In | Day 1、2、3 etc., Tomorrow, Persistence, Renew, Exercise |
| F1&F2 | Teaching Content | Fitness, Muscle, Full, Figure, Action |
| F1&F2 | Blogger Interaction | Teacher Yang, Homepage, Live Streaming,Collection, Welfare |
| F1&F2 | User Interaction | Hello, Come In, Go Up, Talent, Congratulations, Please |
| F1&F2 | Emotional Interaction | Happy, Nice, Funny, Cute, Treasure, Perfect |
| F1&F2 | Sports Punch-In | Exercise, Study, Every Day, Persistence |

Cohesion here means that users of Bilibili Video website bloggers perceive their engagement and intimacy with bloggers, other users, and user groups, including the perception of communication. The above data is the author in the selected six bloggers in a total of twelve videos, according to the word frequency results, combined with the actual needs of the research to identify topics, extract five teaching content, blogger interaction, user interaction, emotional interaction, sports punch-in topic and list some representative words. For example, blogger videos A1 and A2 have high-frequency words related to teaching content, such as "Fitness, Running, Staying Up Late, Protein." And the representative words such as "Blogger's Nickname, Collection, Three Strikes, Live Broadcast, Welfare" reflect the interaction between users and bloggers, showing the closeness between bloggers and users, and users' appreciation and recognition of the video, bloggers give back to users, etc. The representative words "Often, Ask, Brothers And Sisters, Please, Congratulations" reflect the user's passing of his own experience to other users, asking questions, expressing help and congratulations, etc., also reflect the interaction between users. "What To Do, Uncomfortable, Happy, Effective, Funny" and other comments expressing users' worries, distress, happiness, and other emotions are important carriers for users to interact with emotions. Representative words such as "Every Day, Refuel, Persistence, Day 1、2、3 Etc. and" reflect the exercise and fitness check-in performed by users themselves. The high-frequency words in the comments of these five themes show the user's attention to the video content, the strong content and emotional interaction between the user and the blogger or with other users, the user's exercise and fitness practice exchange, and jointly promote the user and blogger, The formation of cohesion and trust among user groups. These high-frequency words are mainly reflected in users' shared perception of communication objects, forming an atmosphere composed of social relations, group cohesion, trust, and belonging.

**5.CONCLUSIONS AND DISCUSSION**

*5.1 Conclusions*

Today, China's new media and social platforms are booming, the Healthy China strategy continues to be implemented, and online exercise and fitness have become a new craze during the COVID-19 pandemic. This paper selects the Bilibili video website that mainly publishes videos by self-media bloggers for research and conducts an in-depth analysis of the video comments released by six sports and fitness bloggers with a large number of fans and influence. According to Social Presence and Interaction Theory, the main conclusions are as follows.

### 5.1.1 The development of online sports and fitness is booming

Affected by the epidemic in many places in China, many residents could not respond to the call from home, the videos and live broadcasts of online exercise and fitness have skyrocketed, and the number of related user groups has skyrocketed. According to the data, the number of sports and fitness videos on the TikTok platform will increase by nearly 1.5 times year on year in 2021. Since the new crown epidemic, the cumulative number of sports and fitness videos on the Bilibili video website has also reached 660 million times. Through network data, it can be found that the number of fans and comments of the top 30 sports and fitness bloggers on the Bilibili video website is relatively large, and it is constantly increasing over time. The six bloggers selected in this article also have more than 900,000 fans, and the cumulative video playback volume has reached more than 30 million. However, this article only selects the Bilibili video website for research, so it is evident from these data that the current development of online sports and fitness is relatively hot.

### 5.1.2 Interactive behavior has a positive impact on the social presence of BiliBili video website users

This study mainly applied the three dimensions of emotion, interaction, and cohesive response to measure social presence. By conducting sentiment analysis, interaction analysis, and cohesion analysis on six different types of typical sports and fitness blogger video comments, the following results were obtained: Research Most of the selected video comments have a larger proportion of positive emotions than negative emotions, and neutral emotions are maintained at a relatively stable level; users who participate in dynamic, interactive behaviors for sports fitness videos have a relatively large base; commented on high-frequency word topics and representatives Words show the strong interaction between bloggers and users, as well as the cohesion and trust between bloggers and user groups and users. These results indicate that users have a strong sense of social presence in the three aspects of emotion, interaction, and cohesion in participating in the interaction, which has a positive impact.

### 5.2 Discussion

The content of the comment text in this study adopts the technical means of web crawlers to ensure the accuracy and integrity of the content. However, when the ROST text data analysis software is used for sentiment analysis, the analyzed text contains hot words, emoticons, emoticons, etc. It is difficult for the software to accurately analyze the new uncertain emotional expressions such as emoji characters, and there are specific errors. At the same time, we only selected twelve videos of six different types of sports and fitness bloggers for analysis, and the selected samples were small. This paper only chooses the sports and fitness videos of the Bilibili video website to study the relationship between the user's interactive behavior and the user's sense of social presence. It does not consider the relevant situation of other video sites and does not determine the specific case of social presence. The factors affected by the interaction activities need further research.

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