

HONG KONG RECREATION REVIEW

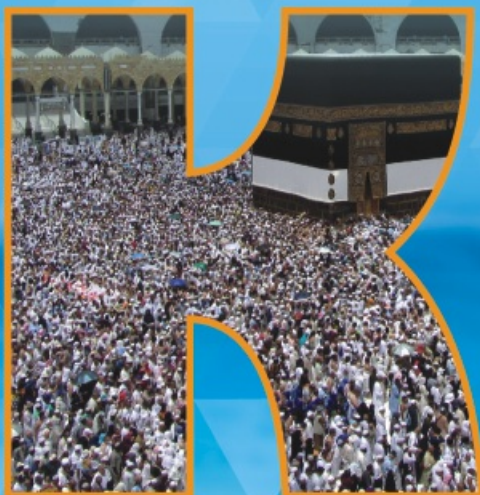
康樂動向

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Hong Kong Recreation Management Association

香港康樂管理協會



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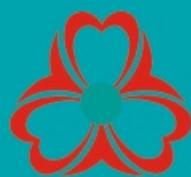
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A Celebration of Collaboration: Humor, Leisure, Play and Ritual

Carole N. Hansbrough
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Introduction

Maya Angelou, a renown American civil rights activist, poet and award-winning author, suggested that . . . “not only should people laugh often but laughing becomes one of the greatest gifts we can do for ourselves and our fellow human beings.” We all like sharing an enjoyable laugh or joke with friends, family, coworkers or even the occasional stranger. Valued by all cultures, humor is a quality that universal and serves to enhance and animate our everyday lives.

In my own ethnographic account, I awkwardly assimilated from one culture to another as a visiting student in Japan, Korea Taiwan, Thailand and Hong Kong in the early 1990's. I was fortunate to share many leisure encounters that included mutual laughter with Asian residents. It was the end of an exciting but exhausting summer in 1991, and I waited for a delayed evening flight at Naha airport in Okinawa, Japan to fly out of country to renew my visa. I had spent three weeks gathering the proper papers, and I grasped a 2-inch stack of crumpled supporting documents. My summer had consisted of long hours, working with children and youth. At the airport, my colleague and I found ourselves seated next to a group of jubilant Chinese tourists settled in a relaxed circle on their well-travelled, frayed, and worn-out suitcases. To our surprise, they were singing, familiar and welcoming English melodies that lingered from our childhood. The recognizable and heartwarming lyrics beckoned to us and we couldn't help ourselves but to join the Chinese chorus and singing a round of “You are my sunshine.”

After singing a variety of reminiscent tunes, we spent the better part of the second hour in various

amusements--sharing stories, joking, smiling, and laughing at our cross cultural incongruencies, and language mishaps. Although not yet an anthropologist, in the spirit of anthropological participant observation the experience was rich and memorable.

Even today, some 25 years later, these unforgettable and inviting conversations warm my heart, and bridge a smile across my face. This was one of my most sincere and spontaneous leisure experiences while visiting Asia. I will always share an affinity with my collaborating East Asian friends. Laughter, in these moments facilitated a connected kinship, and a humanistic bond between myself and my international hosts. Leisure encounters such as this created a space where we were able to engage and



interact in a playful manner and in perpetuity connect to one another that traversed a cultural divide. My first-hand encounters in Asia confirming the Chinese proverb, that the value of a wise conversation is worth of ten years' study of books. The purpose of this article is to provide insights into humor, leisure, play and ritual and explore the relationship among these terms.

Humor as Human Expression

Why is humor so important to the human condition? Dempsey et al. (2010) suggests that "humor is a necessary construct of humanity." Like my experiences in Asia, humor usually recognizes a kinship or bond and is a way people can interact in a playful manner (Martin, 2007). As a device, humor facilitates several social mechanisms such as reducing conflict, social control, dissipating aggression, facilitating problem solving. Through laughter we can cope with almost any challenge we may face as humans. Humor can provide a cognitive-affective shift so that situations are perceived less threatening (Yue, et al. 2017). Wit and humor help people cope with forces beyond their control and humor may help a person who is experiencing a painful life experience (Kottoff, 2006; Capps, 2006).

Additionally, humor can be used as a means of establishing intimacy, promoting group solidarity or trust, and provide a connection thereby reinforcing relationships. Creating a rapport between group members by reducing social distance, relationships are affirmed and confirmed through the use of humor (Leung, 2009). Research suggests people with a high sense of humor are less likely to worry (Kelly, 2002). Humor and laughter are known to reduce external threats, and create amusement (Francis, 1994).

Humor assists us in communicating who we are, our social identity, and can reveal our personal experiences and attitudes (Graham, et al., 1992). Also, humor helps us gather information about others and develop and present our personality and self-image to an audience (Norrick, 2003). Further, Graham et al. (1992) observes that humor helps people share "attitudes, perceptions, expectations and feelings, often in a non-threatening manner." McAdams (1988) identifies humor as a means to attain status, reinforce stereotypes and display forms of masculinity and femininity.

When we find ourselves in uncomfortable social gatherings, or communal situations, humor is an important shared dynamic between participants. Humor used in leisure settings, such as a celebration, festival or ritual can also be a palliative force enhancing or facilitating the experience through free and spontaneous play. Humor and leisure in conjunction can be ... "imaginative, transformative, creative, co-constructions that include related traits such as playfulness and the joy of laughing" (Dempsey, C., 2010).

Most importantly, humor can strengthen human bonds and build and reinforce friendships (Leung, 2009). Reflecting on my travels to Asia, humor served to help me cope with cultural inconsistencies, reduce social distance, relieve anxieties and develop and build intimate trust and co-construct friendships and enhanced my experiences of leisure and ritual.

Cultural Context of Humor

Our perceptions of humor, how it is used and its implications for psychological well-being are all influenced by culture (Martin, 2001; Chen and Martin,



2007; Martin and Ford, 2018). Ethnographic data suggest that both Western and non-western cultures have accounts of joking (Fry, 1994). However, people from different cultural backgrounds may see humor in different ways. Value systems and patterns of behavior can again affect the ways in which we experience humor. Laughter and humor are a cross cultural human phenomenon, with contextual construction that is culturally specific (Martin & Ford, 2018; Nevi, 2001).

Chinese people have been described as "people undeniably possessing a deep sense of humor" (Nevi, 2001). As a culture, the Chinese share both a contempt and love of humor; constructively a yin and yang interpretation (Decker, et al, 2011; Liao 1998; 2003; Yue, 2010). Humor is used to illustrate a concept, prove a point, save face and serve in an argument.

The appreciation of humor in China is derived from traditional social conditions and historical context, and is often based on tone and linguistics. The ancient description of humor was that it should be pleasant, good natured, tactful and educationally useful (Davis, et al, 2011). Humor, in Chinese culture was considered to have its place in society and in effect to be used only at the right time, manner and with the right person (Decker, 2001). Humor was to be private, moderate, good natured, tasteful and didactically useful. Chinese term for humor is "youmo" which is associated with a gentleman and was used as a means of persuasion by scholars to negotiate relationships between elites.

Part of Chinese appreciation of humor also comes from the Taoist tradition, along with force of "qi," the energy life force that runs through everything. Living harmoniously and peacefully within nature implies having good "qi," which includes a good sense of humor (Bond,

1996). Taoism values humor as a peaceful and harmonious interaction with [human] nature (Yue, 2011). The flow of "qi" through the body is influenced by happiness and laughter.

In collectivist societies, humor tends to be more affiliated. Affiliative humor is self-enhancing and can relieve anxiety, depression, and attachment avoidance; and increase subjective well-being, individuals' sense of identity and belongingness (Chen and Martin, 2007; Cann, et al., 2008; Frewen, et al., 2008). Humor in China has expanded in the 20th century with contact to the West, and the use of tonalities, double entendre, irony, analogies, rhymed sentences, and bon mots are more common in China today.

Additional studies show Asian cultures rely less on humor to cope with difficulties, while in the United States we use humor to deal with stress and illness. Typically humor in China demonstrates incongruity of clashing perceptions and illuminates human impermanence and foolishness. Practiced by humorists, Chinese regard humor as a special disposition with discordant aspects (Yue, et al., 2016).

Martin (2007) suggests in America, humor tends to be individualistic, and is valued as a natural expression that is positive for humans. Humor brings amusement, delight and play to people (Grant, 1924). Like Chinese humor, American humor reflects both its culture and nationalism (Zhong, 2012).

Humor in America includes the use of several humor devices such as jokes, teasing, wordplay, ridicule, insult, horseplay, banter, irony, or spontaneous conversational joking (Norrick, 2003). Americans and others alike seem to enjoy humor incongruity in joking with friends, and by



using certain “play signals” we break the rules of conventional conversation (Grice, 1975). Humor can also be related to an indifferent attitude toward something that might be considered serious, such as a ritual.

Americans use three main humor theories or devices. Morreall (1993;1997), suggests that the incongruity theory, not only includes incongruities, but the mutual acceptance of a distortion of reality, and/or as a discrepancy in two contrasting frames of reference. This device contrasts between what is “real and what is the unreal” or contextual reality (Norrick, 2003).

Freud (1928) regarded humor as a coping mechanism against stressful feelings. The second theory known as relief and arousal for humor describes laughter, as an outlet for nervous or psychic energy (Clasquin, 2001). The superiority theory, the third theory suggests that humor is used out of the need to express dominance over a person (Graham, et al. 1992). Humor has been strongly linked to power and dominance. Anyone who makes us laugh can redirect attention and has established ... “momentary control of the situation” (Kotthoff, 2006).

In India, both Buddhism and the British Empire had a huge impact on humor. It was not considered dignified for a Buddhist monk to laugh out loud according to the Buddhist Sanskrit scriptures, and only the unenlightened fool would laugh loudly and energetically. Buddha exclaimed, “how can there be mirth or laughter when the world is on fire” (Seigal, 1987). Prior to Buddha, humor in India . . . “could be erotic, bawdy, obscene and categorical” (Clasquin, 2001; Seigal, 1987), and only later under British rule ancient humor was constrained (Bajas, 2011).

Humor, Leisure and Play

Throughout history scholars have sought to define leisure and humor. All humans have the capacity of for humor, with the oldest play signals in early humans including smiling and laughing (Aldis 1975, 139; Panksepp 1993, 150). In the West, humor has been valued since the ancient Greeks and defined as self-expression brought by amusement and enjoyment (Grant 1924). Thomas Aquinas saw leisure as virtuous and as means “of being.” Humor, according to Aquinas not only offered value to the human existence but awarded it . . . “with an instinctive tendency to laugh and have this feeling in response to pains presented playfully” (Stanford Encyclopedia of Philosophy).

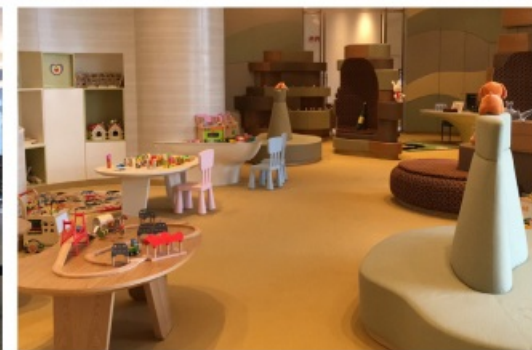
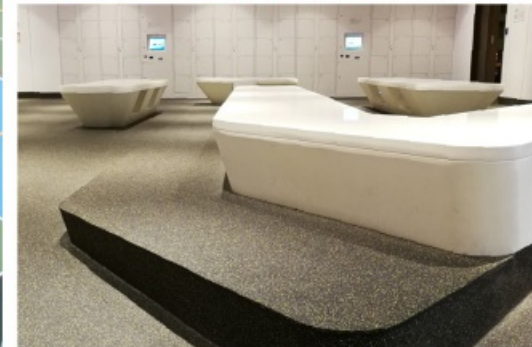
German philosopher Emmanuel Kant of the 18th Century, introduced the idea of the 'free play' and linked it

to humor and expression in social exchange. Leisure as defined by itself was something that could be intrinsically or extrinsically initiated, or as a spontaneous activity that could be joyful and allow people to develop their imagination, and in kind respond in humor. Today, humor is considered verbal and cognitive play.

Leisure, like humor is known to have both psychological and physical therapeutic benefits. According to Kleiber, et al. (2010), leisure can be transcendent as a coping skill for negative life events. Leisure can also help the participant(s) . . . “reinvent, renew and change or be transformed (Edginton, et al. 2014). During leisure celebrations or rituals the use of humor concomitantly can contribute to personal health and wellbeing. In a study by Mathieu (2008), happiness and humor were suggested to promote life satisfaction in older participants during seniors’ activities. Intellectually supported, leisure and leisure activities, can be a setting for humor-based exchange.



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Humor, Leisure, Play and Ritual

Huizinga (1998) suggests culture expresses elements of leisure and play as it interprets the world. It is through our social interaction humans understand and acquire many features of culture. Social communications include elements of both leisure, play, and humor. Humor, leisure and play in effect have the power to cut across, historical, ethnic, geographic, temporal and religious divides (Dempsey et al., 2010).

Rituals are practiced throughout cultures of the world. Often patterned, a ritual consists of repetitive behavior focused on the sacred or secular (Miller, 2017). A ritual fundamentally signals membership and commitment to a group (Lieberman, et al., 2017). Furthermore, a ritual can serve to strengthen group cohesion and membership, and reinforce shared values and beliefs. A ritual may be performed to illicit rain, ensure crops, cure an illness or may be associated with a religious icon. Although sometimes no seemingly causal relationship between the action and goal is evident, rituals are an important and necessary part of humanity (Lieberman, et al. 2017).

Like other cultures, in the West rituals have been an important part of history. Thousands of works of Greek art depict the central importance of ritual and celebration as leisure and play experiences (de Lisle, 2009). Early Greek philosophers suggested cultural festivals be identified as *anapaula*, a breathing time and a break from work (deLisle, 2009). Many holidays and festivals are the result of nature-based celebrations like winter solstice, and the arrival of spring and involved ritual. These celebrations were marked by free-spirited revelry along with dancing, singing and feasting (de Lisle, 2009). It is feasible to say these celebrations also included demonstrations of humor.



As positive leisure and play, ritual along with humor becomes a vehicle for declaring social values, regulating social pressure, and as a catalyst for social synergy and change. "All true ritual is sung, danced and played and play has a strong role and significance in ritual (Dempsey, et al., 2010). Like leisure and play, humor and ritual reflect the human existence, and are a diversion from the everyday demands of living (De Lisle, 2009).

Ritual creates meaning through symbols and social expression and in collaboration, humor found in leisure, play as reflected in ritual activity can generate spiritual experiences that adds value to our lives that transcends the mundane. Like a leisure or play experience, a ritual, and humor or laughter [within context] "can be the consequence of a shift of consciousness," as well as, a "legitimate spiritual expression and spiritual awakening" (Laude, 2005).

Rituals which include symbolic interpretations can also cross boundaries and be considered, transformative, playful and in effect . . . "playful work" (Driver, 1998). The Greek's distinguished festivals and ritual sport as a



"play sphere" or "play festival rite" (Huizinga 1998). Play in ritual through humor, may include "tension, joy and consciousness" that is something different that from the typical and ordinary (Huizinga, 1998).

Dempsey et al., (2010) suggests play is not only "intrinsic to ritual" but is best described as levity. As noted by the American Dictionary (1964) we understand levity as weightless, a "lightness of mind and character" (Dempsey, 2010). Levity lacks proper seriousness suggesting a spontaneous and playful nature. While rituals can be dialectic containing an element of seriousness and solemnity, they also can embrace and include many moments of joviality. Although a ritual can be serious in nature, it is important to distinguish that a ritual is not always "synonymous with seriousness" (Laude, 2005). This dynamic creates the paradox of a ritual, both serious and as sacred play or leisure (Huizinga 1998).

As playful work, ritual can reinforce and restore values of the group (Driver 1998). In the course of the ritualistic process three phases are identified: separation, liminality and reincorporation (Miller, 2017). In the liminal or transitional stage of a ritual, participants are suspended between an old and new status. During a ritual, levity, playfulness or humor can creatively empower the performers, move them to transcendence, and break social norms. During reincorporation, or the final stage of the community welcomes the initiate with their new status through another ritual, a joyful leisure or play experience, and/or celebration filled with humor and laughter. Humor, as a device during ritual can foster intimacy by temporarily alleviating the solemnity of significant and serious rites of passage, thus generating a measure of leisure and play. Humor and laughter can be considered an important variable in the ritual experience, much like a leisure experience by enhancing quality of life for its participants.

Laude (2005) suggests . . .

when confronted with the apparent nonsensical aspect of our existence, through concrete occurrences that defy efficacious rational and practical responses on our part, we can only react with a manifestation of ourselves in which the commanding coherence and autonomy of our individuality engages in its own collapse—and that manifestation is laughter.

Many rituals may include attitudes and expressions such as "mocking, clowning, play, parody, imitation, jest, laughter, role reversal, and competition" (Dempsey, et al. 2010). Social experiences equipped with humor can extend themselves to ritual and therefore create an environment not only filled with religious, social and personal value but can be playful, interactive and involve humor (Driver, 1998, 98; Martin, 2007).



While ritual is not always considered a leisure experience, a leisure experience can be part of a ritual channeled through the lens of humor and levity. Experiences of leisure, play and ritual can also be essential to human interaction and socialization (Dempsey, et al., 2010). Humor, like leisure, play and ritual can be experienced socially or as a social act. According to one estimate, we are thirty times more likely to laugh with other people than when we are alone (Provine, 2000).

The elements of humor in a ritual setting, in combination can contribute to a multidimensional and altering leisure experience that can be beneficial and has even linked to improvement to a person's health (Dempsey, et al., 2010). When grouped together, humor, leisure, play and ritual are important components of the human experience and remain instrumental in building commonality in communities, providing a collaboration and create a sense of belonging for individuals within a group (Dempsey, et al., 2010). The heart of celebration includes social interactions, and can require humor in communications to transmit heritage, fears, beliefs and traditions. Ritual and celebration communicate traditions of past into the present and give its members unity through symbolic participation.

In other instances, ritual inversion where norms and values are inverted temporarily also may rely on humor as a component to release social pressure. Carnival in the northern Mediterranean, and Mardi Gras in Bosa, Italy include "riotous" celebrations through breaking convention, social role reversal and parody (Miller, 2017).



Play, Ritual and Humor Cross Culturally

Gender differences are evident in the way people employ and respond to humor (Hay, 2000). Studies demonstrate that women tend to respond to humor with laughter more often than men do (Hay, 2001). In a study by Provine (2000), he suggests women laugh more often than men do, roughly at a 5 to 4 ratio. Men gain a sense of satisfaction when they elicit the laughter of women, and in effect women laugh more. In Powell (1993), studies show women were higher in using humor to cope and lower in humor productivity. Humor also increased with the age of the respondents.

Using humor in communication may also can increase one's likability and influence. During courtship men and women may engage in humor to show their cleverness, intelligence and adaptability and are perceived as positive and attractive (Bressler, et al, 2006). Humor becomes an important characteristic for romantic partners (Hansen and Hicks, 1980; Regan and Joshi, 2003). Beyond romantic affiliations, Westerners have positive perceptions about humorous individuals.

Women from around the world often tell funny stories about events, humorous true stories or anecdotes to create solidarity (Norrick, 2003). Anecdotes or negotiated storytelling, "binds women, builds intimacy, provides encouragement, and invites participation" (Leung 2009). Collaborative narration usually involves shared knowledge of the experience, shared power, shared values, feelings and memories (Hay, 2001). Collaborative narratives involve mutual settings and characters.

In an American study by Coates (2007), 22% of all the male narratives involved some form of collaboration while 50% of the female stories involved collaboration. Martin (2007), suggests that more often women tend to develop a theme, tell jokes, share playful insults and participate in wordplays, gags, and irony. Humor for the men was based on status and competition, and typically involved sexually aggressive themes (Martin, 2007).

A micro-ethnographic example of the use of humor during a ritual include the puja ritual of India. Through using humor devices, and levity the women transcend their daily living and create a sacred leisure or play experience. Bradley (2008) describes the puja of India as a gender-centered ritual where women offer devotional songs, meditations, prayers and worship while honoring a Hindu deity. The puja ritual fulfills not only spiritual or religious requirements, but provide networks of support

for woman of various castes, and ages. The puja ritual experience provides a relaxed, trusting environment, where women are valued as equals and can exchange views, strategies and stories on personal issues.



Pintchman (2010) reports that during an observed puja ritual that among the informal exchanges was . . . "banter, lighthearted exchange, and playful interchanges." The celebratory experience is used a format to bond and cultivate interpersonal relationships through play, ritual and humor. During the ritual, women forge solidarity that transcends beyond caste, and gender. The Puja ritual becomes a vehicle to forge social connections (Pintchman, 2010). The puja ritual provides opportunities for playful interchanges where the women use joking, teasing and humor to create mutual support (Pintchman, 2010).

There is also a tremendous amount of touching, laughing and joking that transpires between the women. The experience is very collective in nature with women gathering in circles and labeling members by familial names. Through this process women step out of the physical world and into the spiritual realm. Through joking, they narrow the gap between humans and the divine, impulse over spirit and even humanize the deities by making light of them. Humor in this instance functions to level hierarchies, or counteract caste discrepancies, and foster a feeling of equality. These women gain mutual support, intimacy and warmth through these exchanges. Topics include, joking about marriage and joking light heartedly about the deities.

An additional study in Goalpara, India by Koram (1999) on a puja ritual performed for Dharmaraj, suggests the need to reevaluate the synchronicity of religion, humor, ritual, leisure and play. Puja is this case is described as an event that is participated in by people of all economic and occupational groups (Koram, 1999). Small performative ritual acts within the puja include drumming, dancing, offerings and merrymaking. During the ritual it becomes difficult to separate leisure, play and ritual, and they are not mutually exclusive. Ritualistic leisure embodies the mystical experience, and expressive



human behavior becomes the product of flow (Csikszentmihalyi, et al. 1971) Puja is not complete without various types of transcendent leisure and play.

In the highlands of Chiapas, Mexico Bricker (1975), engaged in fieldwork with three Tzotzil speaking communities exploring major religious festivals involving a sequence of humor. In the case of the festival she refers to ritual humor as "fiesta humor" that includes inversion, dramatic play, metaphors that depart from cultural norms and reaffirm social order and existence (Gossan, 1975).

Concluding Comments

Humor is important for a number of reasons. Humor's effect on health includes positive changes in the physiological system, positive emotions, stress relief, and the social support (Martin, 2001). Many leisurely activities include elements of humor. Rituals both sacred and secular can be considered a form of leisure because of its positive outcome and use of free time. Often a ritual enhances the spiritual and social life of its participants. Like leisure and play, humor and ritual often operate outside of cultural norms.

The elements of humor in a ritual setting, in combination with humor, leisure and play can create a life altering experiences which may be linked to the improvement of one's quality of life. When grouped together, humor, leisure, play and ritual are important aspects of the human experience and together are instrumental in creating a sense of belonging for individuals within a group (Dempsey, et al., 2010) Together, such experiences can transcend the mundane and transform its participants. Funny thing about humor, as Mark Twain noted . . . "the minute it crops up, all our irritation and resentments slip away, and a sunny spirit takes their place." Much like the sunny disposition of my traveling companions many years ago. RMA

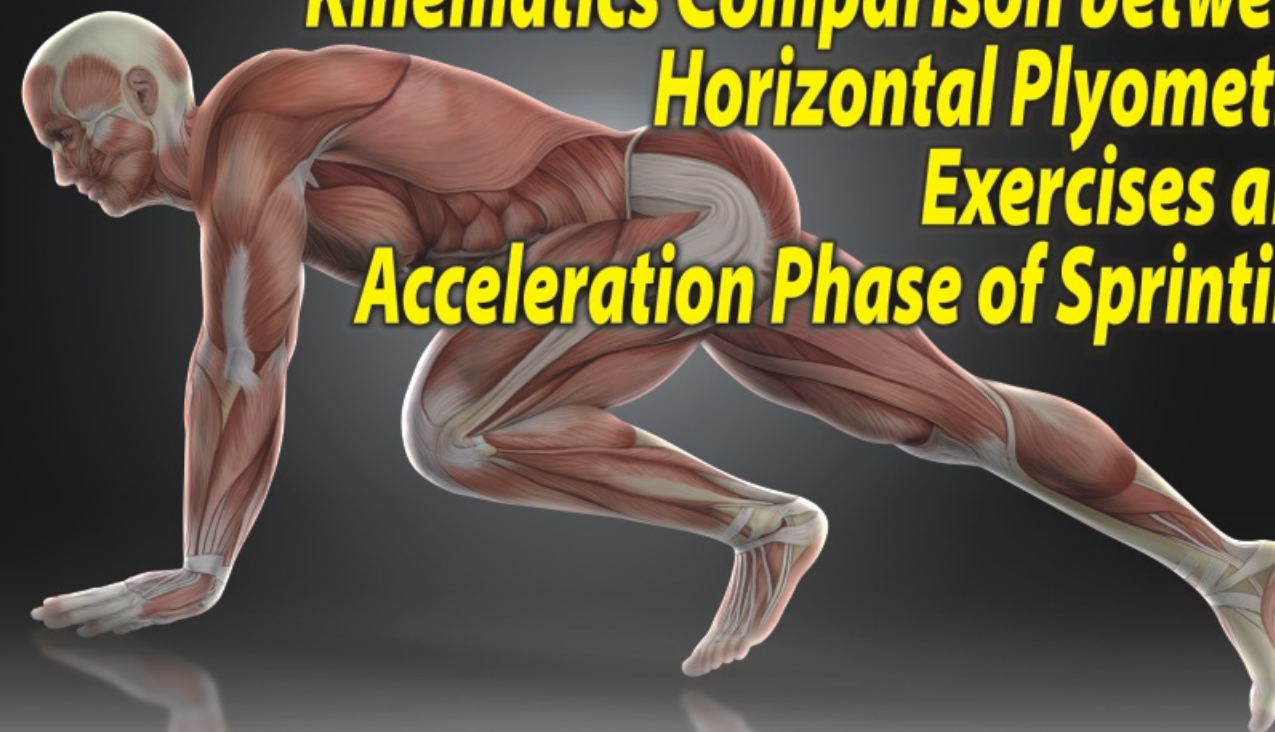
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Kinematics Comparison between Horizontal Plyometric Exercises and Acceleration Phase of Sprinting

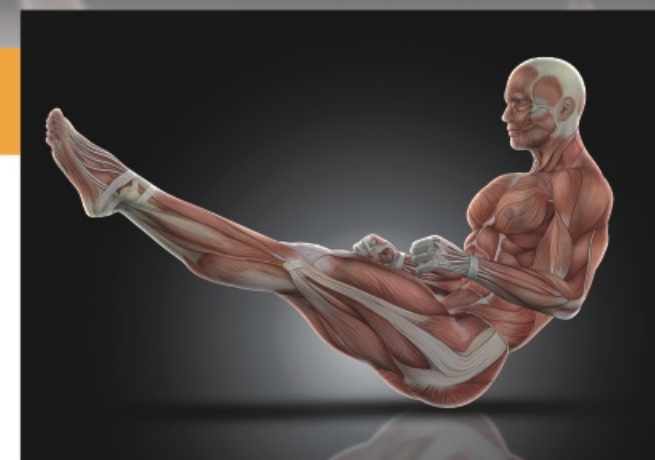


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Introduction

Plyometric training is broadly applied in various kinds of sports event because plyometric exercises are composed of natural component of most sport movements involving jumping, hopping, and skipping (Villarreal, Kellis, Kraemer & Izquierdo, 2009, Villarreal, Requena & Newton, 2010; Villarreal, Kellis, Kraemer & Izquierdo, 2009; Villarreal, Requena & Cronin, 2012). Plyometric training can be used to improve strength, muscular power, coordination, and athletic performance (Villarreal et al., 2009; Villarreal et al., 2010; Hermassi, Gabbett, Ingebrigtsen, Tillaar, Chelly & Chamari, 2014; Robionson, Devor, Merrick & Buckworth, 2004, Markovic, Jukic, Milanovic & Metikos, 2007). However, study found that plyometric training effects may vary depending on subject characteristics.

Plyometric exercises involves pre-stretching the agonist right before concentric contraction of the agonist, which also known as stretch-shortening cycle (SSC). Plyometric exercises can be explained by two different model, which is mechanical model and neurophysiological model (Baechle & Earle, 2008). Elastic energy in musculotendinous components is used in mechanical model to explain plyometric exercises, and involuntary concentric muscle contraction by stretch reflex is used in



neurophysiological model to explain plyometric exercises. Study found that plyometric exercises mainly affects fast-twitch fibers (Type II muscle fibers) (Macaluso, Isaacs & Myburgh, 2012), where sprint performance is strongly correlated with the percentage of type II fibers (Ross & Leveritt, 2001). However, review study found that studies were inconsistent, which some concluded to have improvements but some concluded to have no improvements in sprint time after plyometric training intervention (Villarreal et al., 2012). Also, few studies talk about the transfer of the training effects from plyometric training in the horizontal plane to sprint performance in the acceleration phases of sprinting (Villarreal et al., 2012).

Studies have found that the acceleration of center of mass in sprinting is determined by three external components, which are ground reaction force (GRF), gravitational force, and air/ wind resistance (Kawamori,

Nosaka & Newton, 2013; Hunter, Marshall & McNair, 2005). Hunter et al. (2005) concluded that it is likely that high magnitudes of horizontal propulsion are necessary to achieve high acceleration, which the strongest predictor of sprint velocity was relative horizontal impulse ($R^2 = 0.61$, $p < 0.001$). Kawamori et al. (2013) concluded that the ability to produce large net horizontal and propulsive impulses, or can be expressed as applying impulse in a more horizontal direction, shows to be important to achieve high acceleration during 10m sprints from a standing start. Rimmer and Sleivert (2000) found that sprint-specific plyometric exercise intervention made significant improvement in the 0-10m sprint.

Mero and Komi (1994) suggested that stepping and hopping exercises maybe used as strength exercises for sprinters, because the exercises are cyclic and sprint-specific and great strength demanding. To maximize the effect of transfer to sport, plyometric exercises should be specific to reflect the nature of the sport. When the plyometric exercises were specific, the training program will have a positive influence on specific athletic performance (Villarreal et al., 2012).

The use of the sprint-specific strength exercises is not well documented in the literature (Mero & Komi, 1994). The choice of sprint-specific plyometric exercise is largely based on the experience and observation of coaches, with little empirical evidence supporting their choices. The information will be useful for coaches in the selection of sprint-specific plyometric exercises and will facilitate sport scientists' understanding of the similarity of sprint-specific exercise to acceleration phase of sprinting (Villarreal et al, 2012). Taken together, this knowledge will lead to better selection of exercises and an improvement in the quality of training programs, which optimize athletic performance ultimately.

The purpose of this study is to determine sprint-specific plyometric exercises by comparing the i) horizontal linear velocity and acceleration ii) joint angular velocity and acceleration, iii) hip joint range of motion, iv) take-off angle, v) stride frequency, vi) stride length, and vii) ground contact time between horizontal plyometric exercises and acceleration phase of sprinting.

Methods

Study design

This study aims to compare the kinematic parameters between horizontal plyometric exercises and acceleration phase of sprinting. A cross-sectional analysis will be undertaken to examine the similarity of horizontal plyometric exercises and acceleration phase of sprinting.



Specifically, kinematic parameters included horizontal linear velocity and acceleration, knee and hip joint angular velocity and acceleration, hip joint range of motion, take-off angle, stride frequency, stride length and ground contact time. Participants will be required to perform horizontal plyometric exercises test for 20 meters and 20-m sprint test once only, which several steps will be captured during each test for further analysis.

Participants

All participants were asked for written informed

consent prior to partaking in the study. Five male university track-and-field players were recruited for this study. The inclusion criteria for this study required participants to: (i) have personal best of 100-m sprint under 12 seconds in recent one year (ii) have at least one year of regular track-and-field sprint training experience; (iii) have at least one year of horizontal plyometric training experience; (iv) be free of injury with no known musculoskeletal injuries that will be asked in a questionnaire. Participants for the study were recruited from university track-and-field team via email, and online advertisement through social network platform.

Five participants were included in the study, where one subject is dropped out before the test because of injury. The participants aged 19-23 years gave consent to participate in the study. All participants completed the same pre-screening questionnaire to ensure they were free of any lower body injury that might influence the testing performance, and ensure they had a personal best of 100m sprint under 12 seconds.

Table 1.

Participant information and background of performance(n=4)

Parameters	Information
Age (Year)	21.5 ± 1.66
Height (cm)	1.76 ± 0.0445
Body Mass (kg)	67.7 ± 2.01
Training Year [§]	6.25 ± 2.86
100-meter sprint personal best	11.6 ± 0.215

Values are means ± SD

[§]Training years with a regular athletics training

Sample size

A power analysis was performed using the result data of Mero and Komi (1994) and processed by GPower (Version 3.1.9.2, Heinrich-Heine-Universität Düsseldorf, Germany) prior the study to determine the number of participants required. Five participants was found to be required to be significant with 80% power and 5% possibility of type I error. Convenience sampling and volunteer sampling was used.

Procedure

The testing procedure involved the collection of descriptive data, horizontal plyometric exercises test and 20-m sprint test. The participants will be asked to attend two testing sessions in outdoor sportsground, which participants wear their own spike-shoes for all the test. (Figure 1.)

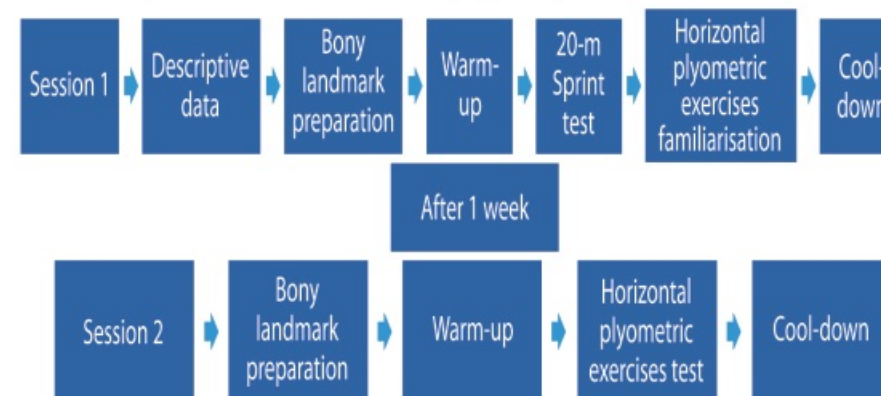


Figure 1. Overview of the testing procedure

The two sessions are separated by one week, which two sessions will be held on the same day in a week, and on the same time slot to minimize the variance in result of circadian rhythm of participants (Souissi, Souissi, Souissi, Chamari, Tabka, Dogui & Davenne, 2008). At the beginning of the first session, each participant was asked to fill in informed consent. Then descriptive data was obtained for every participant, including body height, body mass, and participants was asked to fill in a questionnaire about training background and injury history at the same time. After that, bony landmark of shoulder joint, hip joint, knee joint and ankle joint will be identified and marked for each participants. Then participants was instructed to carry out the warm-up protocol before performing maximal-effort 20-m sprint test. After finished the test, participants will be instructed to familiarize with the horizontal plyometric exercises that included in this study. After that, participants will be instructed to perform cool-down stretching before dismissal. At the second session, the participants was instructed to perform the same warm-up protocol as the first session and perform the horizontal plyometric exercises test without further practice of the horizontal plyometric exercises. After that, participants was instructed to perform cool-down stretching before dismissal.

Data collection & instruments

Sprint kinematics

Horizontal linear velocity and acceleration, knee and hip joint angular velocity and acceleration, hip joint range of motion, take-off angle, stride frequency, stride length and ground contact time were assessed during 20-meter sprint test. Rimmer and Sleivert (2000) found that sprint-specific plyometric exercises made significant improvement for the first 10 meters. Therefore, to ensure



maximal effort from participants for the first 10 meters, the distance of 20 meter was chosen. High speed cameras (EX-100, CASIO, Norderstedt) was used to collect sagittal-plane video data (sampled at 480Hz). Prior to the 20-m sprint test, bony landmark of all joints will be identified by contrastive-colour marker. Participants was instructed to perform a modified warm-up protocol of general and specific warm-up with static stretching, to maximize range of motion and to allow maximal-effort sprinting performance (Samson, Button, Chaouachi & Behm, 2012; Pagaduan, Pojskić, Užičanin & Babajić, 2012).

The protocol consist of 5 minutes run at 70% of the participant's age predicted maximal heart rate, which heart rate monitor (Polar Team2 Pro, Polar, Finland) was used to monitor each participant's heart rate. The heart rate monitor was secured around the participant's chest at the level of the ziphoid process. After that, static stretches was instructed to perform in randomized order including

assisted hamstring stretch (supine lying, hip flexed with extended leg), assisted quadriceps stretch (split legs with front knee and hip flexed to 90°, rear knee on floor and flexed to maximum range of motion), assisted low back stretch (sit on a flat surface, hip flexed to maximum range of motion with legs partially abducted and knees slightly flexed), and calf stretch (stand with hands touching wall, front leg dorsiflexed against the wall with rear leg support). All stretching exercises was held at the point of mild discomfort and repeated for 3 times of 30 seconds. Then, three exercises including high knee skipping(hip flexion to approximately 90°), high knee running (hip flexion to approximately 90°), and butt kick (knee flexion with the participant to touch the buttocks with the heel) running. Each exercise was performed three times repeatedly for a distance of 20 meters.

The rest period of 5 minutes was arranged between sprints trials to minimize the fatigue effect (Girard, Mendez-Villanueva & Bishop, 2011).

Horizontal plyometric kinematics

The same variables as the 20-m sprint test will be assessed during the horizontal plyometric exercises test. Participants perform the same warm-up protocol as prior the 20-m sprint test on testing session one. Then three

horizontal plyometric exercises were performed by each participants in same order. (Table 1.) Each participant will asked to perform each horizontal plyometric exercise for 20 meters.



Figure 2. Double leg bound

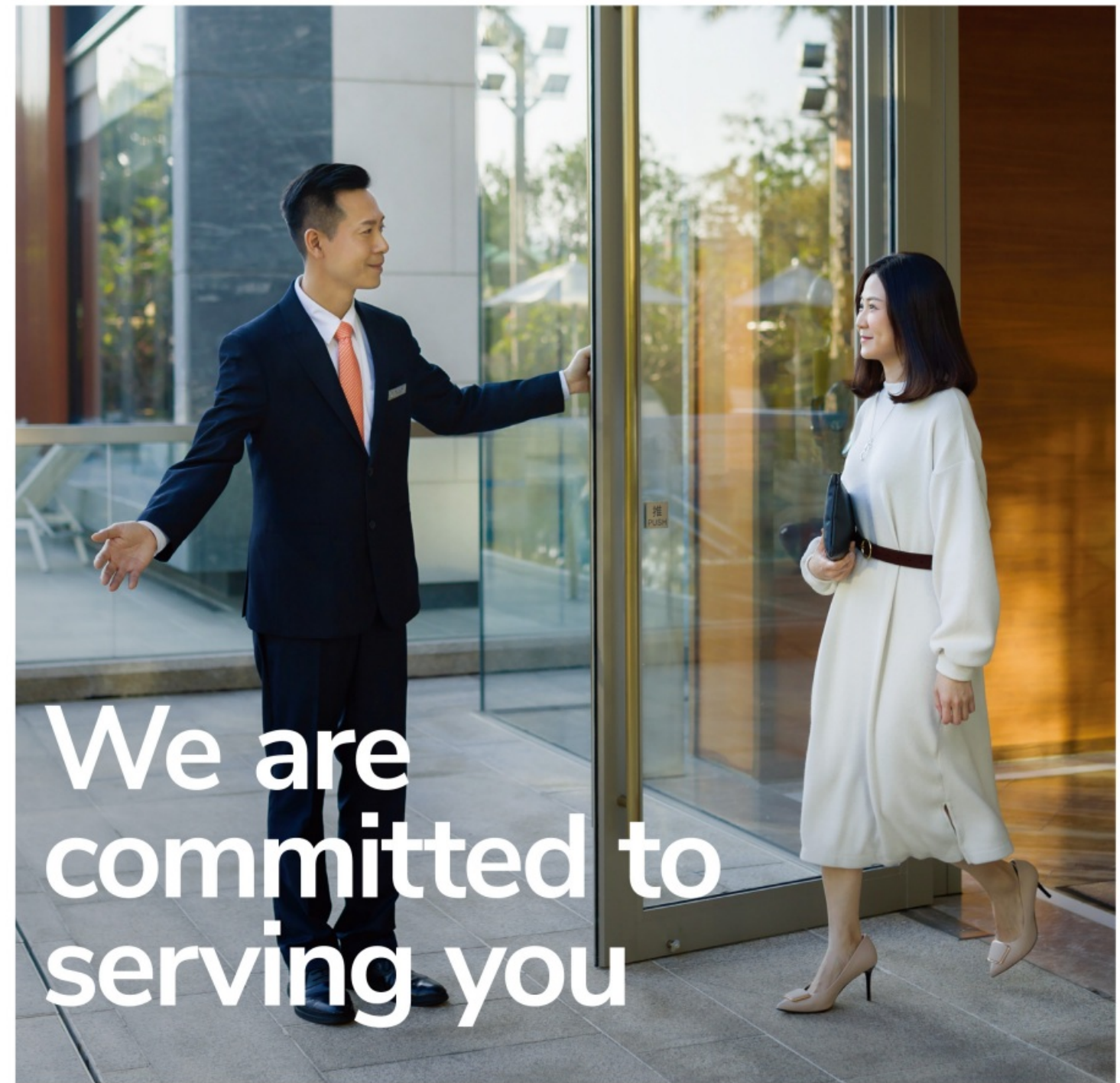


Figure 3. Sprint bound



Figure 4. Single-leg hop

There was a 3-minute rest between each exercise to allow maximum recovery between efforts and minimize the effect of fatigue (Chu & Myer, 2013).



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Data reduction

High speed cameras were set perpendicular to the sagittal-plane-movement captured. The two 30-cm indicator for calibration was used, which was placed 4-meter apart. One camera was placed in the middle to

capture the whole 20-m test, and another camera was placed closer to capture only part of the test, which consist of several steps (Figure 5.)

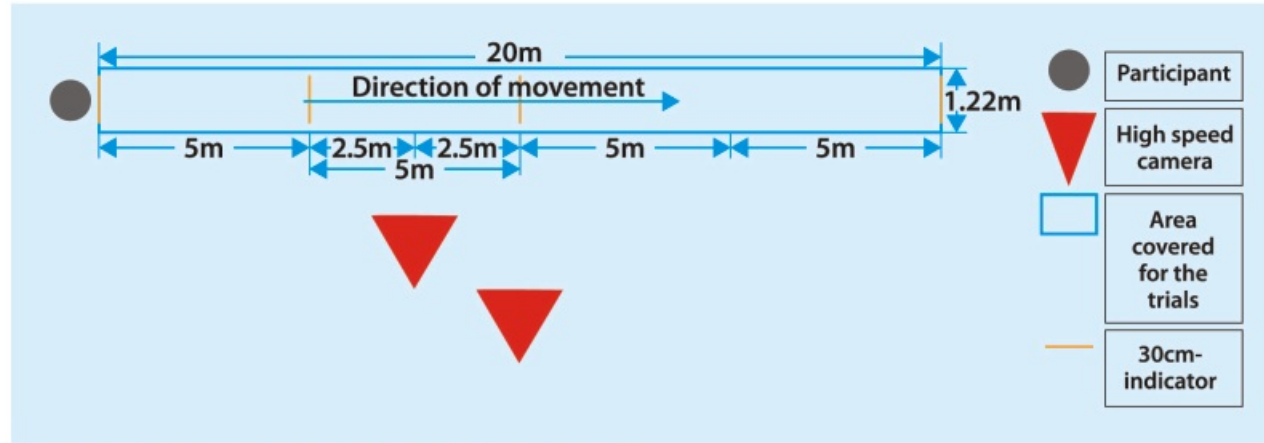


Figure 5. Overview of the setting of data collection

Video player with semi-automated points tracking software (VICON MOTUS, Version 10.0.1, USA) was used to measure the displacement/ joint angle difference and process the corresponding velocity and acceleration. Range of motion of hip, take-off angle, stride frequency, stride length and ground contact time was also examined by using the software.

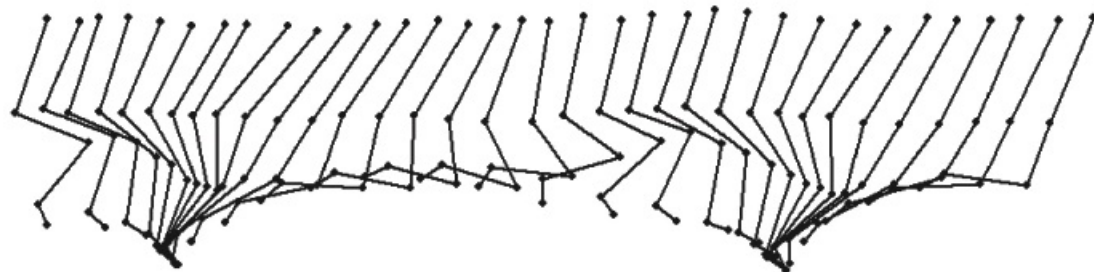
Statistical analysis

Descriptive statistics for all participants was presented as means and standard deviations (SD). Standard

statistical methods was used for the calculation of means and standard deviations (SD) for all testing variables. One-way Analysis of Variance (One-way ANOVA) was used to compute statistically differences between the sprint trials and the horizontal plyometric exercises, and the statistically difference within the horizontal plyometric exercises. All statistical analyses was conducted using Statistical Package for the Social Sciences (SPSS, Version 22.0.0.0, SPSS Inc., Chicago). Criterion for statistical significance was set at an alpha level of $p \leq 0.05$.

Results

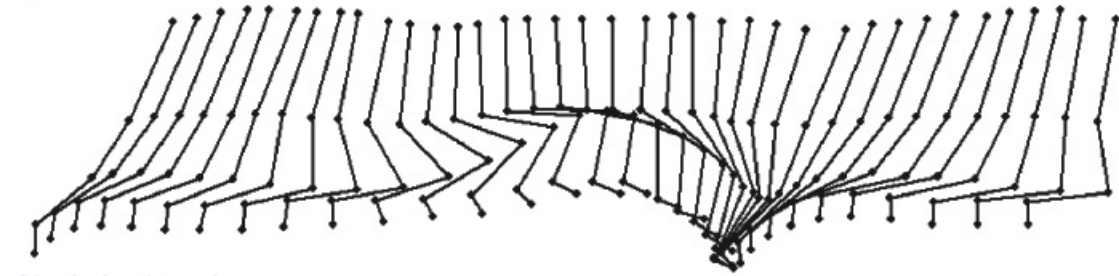
20m sprint (5-10m)



Double-leg bound



Sprint bound



Single leg bound



Figure 6. Stick figures of 20m sprint (5-10m) and three kinds of horizontal plyometric exercises at 5-10m

Table 2.

Horizontal linear velocity and acceleration variables of horizontal plyometric exercises and acceleration phase of sprinting.

Take-off Phase	Horizontal Linear Velocity (m/s)	Hip Joint Horizontal Linear Velocity (m/s)	Hip Joint Horizontal Linear Acceleration (m/s ²)
Sprint (5-10m)	7.59±0.261	0.886±0.0452	-0.255±0.563
Double-Leg Bound	2.73±0.492**	0.494±0.0701**	-0.409±0.204
Single-Leg Bound	4.48±0.629**	0.507±0.0924**	0.222±0.763
Sprint Bound	6.23±0.415*	0.676±0.0339**	0.0450±0.483

*Significantly different from Sprinting (5-10m) at $p < 0.05$.

**Significantly different from Sprinting (5-10m) at $p < 0.01$.

Table 3.

Angular velocity and acceleration variables of horizontal plyometric exercises and acceleration phase of sprinting.

Take-off Phase	Hip Joint Angular Velocity (m/s)	Knee Joint Angular Velocity (m/s)	Ankle Joint Angular Velocity (m/s)	Hip Joint Angular Acceleration (m/s ²)	Knee Joint Angular Acceleration (m/s ²)	Ankle Joint Angular Acceleration (m/s ²)
Sprint (5-10m)	38.5±15.5	-26.9±10.5	46.7±11.6	-135±356	-479±184	-456±209
Double-Leg Bound	43.4±31.9	14.0±25.5	22.3±18.0	-219±315	-490±131	-460±339
Single-Leg Bound	-9.68±17.3	-48.7±20.9	3.80±20.4	82.6±315	-239±102	-278±20.4
Sprint Bound	28.8±24.2	0.276±18.3	45.2±24.1	-36.3±442	-240±249	-791±324

Table 4.

Stride parameters of horizontal plyometric exercises and acceleration phase of sprinting.

Take-off Phase	Hip Joint Range Of Motion (°)	Take Off Angle (°)	Stride Frequency (Hz)	Stride Length (m)	Ground Contact Time (s)
Sprint (5-10m)	97.4±4.60	50.2±2.32	2.23±0.0816	3.40±0.0741	0.129±0.00579
Double-Leg Bound	166±27.1**	48.4±2.00	0.964±0.0576**	2.82±0.328	0.589±0.0835**
Single-Leg Bound	81.4±13.8	56.0±5.18	1.77±0.07**	2.53±0.340*	0.213±0.0183
Sprint Bound	111±10.5	53.1±4.22	1.46±0.239**	4.33±0.491*	0.163±0.0261

*Significantly different from Sprinting (5-10m) at $p < 0.05$.

**Significantly different from Sprinting (5-10m) at $p < 0.01$.

There are no significant difference between double-leg bound, single-leg bound, sprint bound and acceleration phase of sprinting in hip joint horizontal linear acceleration, and angular acceleration of hip joint, knee joint and ankle joint as hypothesised (Table 2., Table 3.). Moreover, there is no significant difference between horizontal plyometric exercises and acceleration phase of sprinting in angular velocity of hip joint, knee joint, and ankle joint (Table 3.). However, not all the horizontal plyometric exercises have significant difference with acceleration phase of sprinting in stride length and ground contact time, and there is no significant difference in take-off angle between horizontal plyometric exercises and acceleration phase of sprinting, which opposed the hypothesis (Table 4.).

Besides the hypothesis, single-leg bound (4.48 ± 0.629 m/s), double-leg bound (2.73 ± 0.492 m/s), and sprint bound (6.23 ± 0.415 m/s) showed significantly slower in horizontal linear velocity than acceleration phase of sprinting (7.59 ± 0.261 m/s) (one-way ANOVA, $DF=3$, $p<0.05$) (Table 2.). Also, the single-leg bound (0.507 ± 0.0924 m/s), double-leg bound (0.494 ± 0.0701 m/s), and sprint bound (0.676 ± 0.0339 m/s) showed significantly slower in hip joint horizontal linear velocity than acceleration phase of sprinting (0.886 ± 0.0452 m/s) (one-way ANOVA, $DF=3$, $p<0.01$) (Table 2.).

From Table 4., double-leg bound showed significantly larger hip joint range of motion ($166 \pm 27.1^\circ$) than acceleration phase of sprinting ($97.4 \pm 4.6^\circ$) (one-way ANOVA, $DF=3$, $p<0.01$). Also, Double-leg bound (0.964 ± 0.0576 Hz), single-leg bound (1.77 ± 0.07 Hz), and sprint bound (1.46 ± 0.239 Hz) showed significant less stride frequency than acceleration phase of sprinting (2.23 ± 0.0816 Hz) (one-way ANOVA, $DF=3$, $P<0.01$), which aligned with the hypothesis. Single-leg bound showed significantly shorter (2.53 ± 0.34 m) and sprint bound showed significantly longer (4.33 ± 0.491 m) in stride length than acceleration phase of sprinting (3.4 ± 0.0741 m) (one-way ANOVA, $DF=3$, $p<0.05$). Moreover, double-leg bound showed significantly longer (0.589 ± 0.0835 s) in ground contact time than acceleration phase of sprinting (0.129 ± 0.00579 s) (one-way ANOVA, $DF=3$, $p<0.01$).



Discussion

The purpose of this study was to determine the sprint-specific plyometric exercises by comparing different kinematics variables between horizontal plyometric exercises and acceleration phase of sprinting. Various kinematic variables were obtained in the present study, however the sprint-specific plyometric exercises cannot be determined by looking at all of the variables at the same time. Variables are breaking down to be discussed to determine whether the horizontal plyometric exercises are specific in which component(s) of movement.

Hip joint horizontal linear acceleration

Sprint performance gains will be optimized by the use of training programs that incorporates greater horizontal acceleration (Villarreal et al., 2012). Also, Schiffer (2009) mentioned that the acceleration ability is greatly influence the competition results. From the current study, single-leg bound shows the highest hip joint horizontal linear acceleration compared to double-leg bound and sprint bound (Table 4.). Therefore single-leg bound is recommended for enhancing hip joint horizontal linear acceleration.

Joint angular velocity

Delecluse (1997) suggested the powerful extensions of hip, knee and ankle joints are the main accelerators after the starting of the sprint. In the current study, the hip joint and ankle joint angular velocity at the take-off phase of

sprinting (Table 5.) found to be positive value which means both joints are extending, however the knee joint angular velocity was found to be negative which shows the subjects already flexing the knee just before the moment of take-off. It is consistent to the finding of Bezodis, Salo, and Trewartha (2014), which the knee joint began to flex just before toe-off. It is also consistent with the modern sprinting technique discussed in the study of Schiffer (2009), which there is only a slight knee extension, but the ankle and the hip joints are fully extended. Based on the findings of the current study (Table 5.), double-leg bound is more similar in hip joint angular velocity, single-leg bound is more similar in knee joint angular velocity, and sprint bound is more similar in ankle joint angular velocity compared to the acceleration phase of sprinting. Therefore, all three horizontal plyometric exercises are recommended to train for different intended joint motion.

Ground contact time

The mean ground contact time of step fifth and seventh in sprinting is consistent with the findings in the study of Čoh, Tomažin, and Štuhec (2006). From Young (1992), reactive ability is defined as the ability to change rapidly from eccentric to concentric contraction, and it act as an important role in propulsion of sprinting. Based on Tidow (1990), there is no event in athletics has a ground contact time longer than 300 milliseconds (ms), and the ground contact time of maximal speed of sprinting is 80-100ms. However, ground contact time in the acceleration phase of sprinting is considerably longer in maximum speed phase of sprinting. According to Young (1992), SSC in various sports can be divided into two categories that are long (>350 ms) or short (<250 ms). And it is critical to choose plyometric exercises which has similar SSC duration to the targeted sport, in order to obtain high specificity towards the sport performance. In the current study, double-leg bound was found to be a long SSC plyometric exercises, which the specificity to sprinting is low. Besides, ground contact time of single-leg bound and sprint bound were found to be similar to the early acceleration phase of sprinting (5-10m), and sprint bound is relatively more similar to the sprinting. However, the double-leg bound and single-leg bound that included in this study, were aiming to finish the tested distance with least steps, and the sprint bound is aiming to finish the tested distance with the fastest time. This may implies that if the subjects perform the double-leg speed bound and single-leg speed bound will have a much faster ground contact time than the double-leg bound and single-leg bound that

being selected in this study. As the study of Young (1992) found that sprint bound will have a shorter ground contact time than normal alternative bound. Also, Mero and Komi (1994) found that single-leg speed bound has a faster ground contact time (196 ± 14 ms) than the single-leg bound that involved in the current study (213 ± 18.3 ms).

Besides, Villarreal et al. (2012) also concluded that greatest transfer of plyometric exercises to sprinting is likely to occur when contact times of the exercises are similar to that during the initial acceleration phase of a sprint. Therefore, from the result of current study, sprint bound is recommend.

Take-off angle

In current study, there is no significantly difference in take-off angle between horizontal plyometric exercises and acceleration phase of sprinting. According to Maulder, Bradshaw, and Keogh (2008), the take-off angle of the third step is the same as the take-off angle of double-leg bound that obtained in the current study. Also, current study found that take-off angle of double-leg bound is more similar to the take-off angle of the acceleration phase of sprinting. It implies that double-leg bound is more specific to the first few steps in sprinting. Besides, Cunha, Alves, and Veloso (2002) found that the take-off angle is $61.3 \pm 1.84^\circ$ between 30-35 meters of a 40m maximal sprint, and Hunter et al (2004) found that the take-off angle is $50 \pm 2^\circ$ for high step rate group, and $52 \pm 2^\circ$ for long step length group at 16 m from a 25m maximal sprint. And, the take-off angle of acceleration phase of sprinting between 5-10m of a 20m maximal sprint ($50.2 \pm 2.32^\circ$), was found to be similar with Hunter et al. (2004). And the current study found that the take-off angle of double-leg bound, sprint bound and single-leg bound are $48.4 \pm 2^\circ$, $53.1 \pm 4.22^\circ$, and $56 \pm 5.18^\circ$ (Table 6.), respectively. It shows that the three horizontal plyometric exercises are



favor acceleration phase of sprinting from 3m (third step from starting) to 35m, which the double-leg bound is more specific in the early stage, sprint bound is more specific in the middle stage, and single-leg bound is more specific in the late stage of acceleration phase of sprinting. It may also explained that why the study of Rimmer and Sleivert (2000) found that there is significantly faster time in 0-10m and 20-30m of a 40m sprint test after an 8-week plyometric intervention.

Kugler and Janshen (2010) found that maximum force vector is strongly correlated with the forward lean of the body at toe-off ($r=0.93$, $p \leq 0.001$), which the sprinters should maintain a stable body posture when applying the optimal propulsive force. Therefore, the horizontal plyometric exercises is specific for sprinters to train for maintaining a stable body posture while applying maximal force at corresponding angle.

Stride length & stride frequency

The mean stride length and mean stride frequency of step fifth and seventh in 20m-sprinting is consistent with the findings in the study of Čoh et al. (2006). And, Čoh et al. (2006) concluded that step length and step frequency need to be coordinated in order to allow equivalent ground contact times and those of the flight phases within the shortest time possible. Donati (1995) suggested the training for sprinters should breakdown into two parameters which are stride length and stride frequency, and sprinters should utilize strides in longer or shorter than normal in training. Based on the findings obtained in the current study, all of the horizontal plyometric exercises are significantly slower in stride frequency than the acceleration phase of sprinting ($p < 0.01$). However, the stride frequency of single-leg bound is comparatively closer to the acceleration of sprinting. Besides, single-leg bound is significantly shorter in stride length ($p < 0.05$) and sprint bound is significantly longer in stride length ($p < 0.05$) than acceleration phase of sprinting. Therefore, single-leg bound is recommended to train for stride frequency, and sprint bound is suggested to train of stride length.

Conclusion

The results obtained through motion analysis cannot directly reflect the specificity of the horizontal plyometric

exercises. It is because different variable has different characteristics, and the statistically different between horizontal plyometric exercises and acceleration phase of sprinting may imply specific or not specific. The ground contact time, take-off angle, and joint angular velocity need to be more similar between horizontal plyometric exercise and acceleration phase of sprinting in order to be specific. However, the stride length and stride frequency were found to be specific if they are significantly lower or higher. Also, hip joint horizontal linear acceleration was found to be specific if it is high.

Traditional heavy resistance training convert type IIB fibre into type IIA fibre and coaches need to aim for optimal balance between sprint specific and nonspecific training components (Delecluse, 1997). Therefore, the horizontal plyometric exercises can act as the sprint-specific training components to enhance performance. Coaches should set the intended outcome of the training of which element or which specific phase of the sprint the athlete needs to focus on, then select the corresponding horizontal plyometric exercises that specific to that element or that phase to achieve the intended outcome (Table 7.). By having a clear view and better understanding of the horizontal plyometric exercises, coaches can select appropriate exercise and utilize the exercise to allow greatest transfer to sprinting performance (Villarreal et al., 2012). RMA



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Life Fitness 引領健康生活

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頂級的健身器材

Life Fitness 作為行業的領導先鋒，一直努力為用戶尋找和開發新的運動解決方案。為針對沒有駐場教練的會所客戶，推出全新的 Life Fitness™ On Demand 有氧健身課程供 Discover SE3 HD 控制台用戶使用。課程庫內容包羅萬有，訓練長度從 10 分鐘到 40 分鐘不等，適合任何階段的鍛煉者跟着不同風格的導師於有氧健身器材上作不同類型的訓練，當中包括高強度間歇訓練 (HIIT)、耐力及速度訓練等。伴隨着充滿活力的導師們鼓勵及專業指導，想要達成健身目的更能事半功倍。



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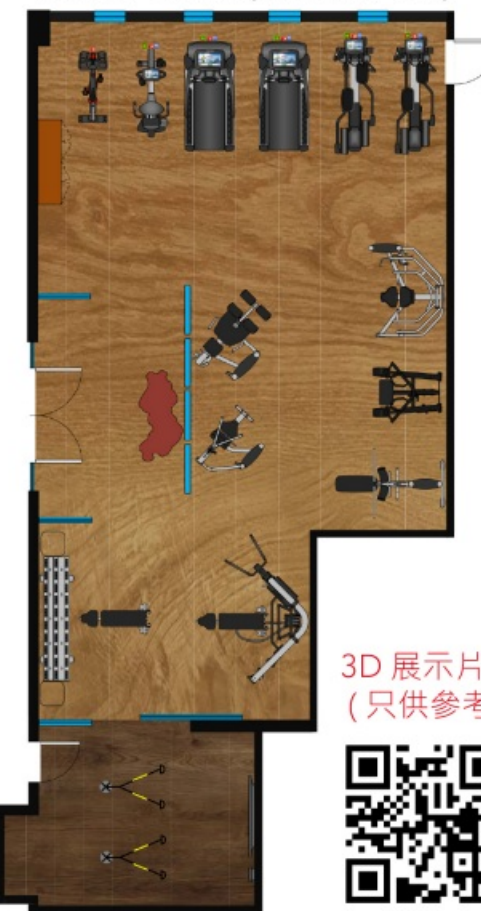
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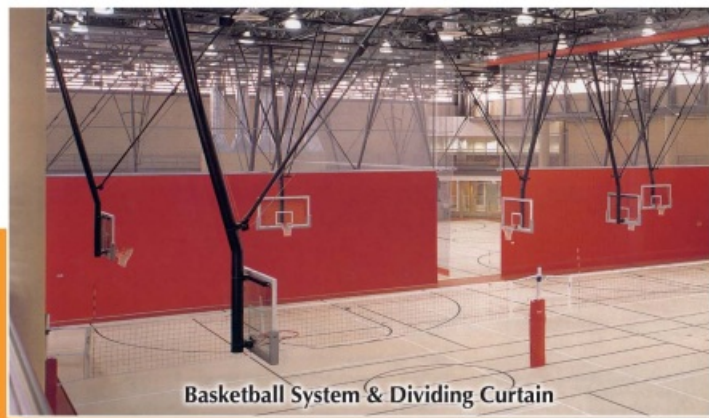
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The Relationship between Fan Motivation and Live Game Attendance among Students in Guangzhou Sport University



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Introduction

Sport fans or sport spectators want to watch sports event because of various kinds of motivations. Associated with fan motivation, fan attendance is a crucial part which sponsors and organizers pay much attention to. Compared with attendance through media, attendance in live games is more attractive to sport fans.

There is no doubt that sport industry plays an important role in the global economy. The sports industry have experienced tremendous growth and it is flourishing around the world (Shank, 2009). New media has changed the traditional way of spectator to attend sport event in live. However, there are considerable fans still choose to attend the sport event in live because of the strong fan motivation.

In previous studies, researches did not make a clear distinction in fan attendance. Fan attendance can be divided into two channels: live attendance and multi-media attendance. With the new mass media and televised driven consumption, Chao (2010) held a view that sport fans could now be differentiated into two different categories: the traditional fans that support their local area teams and the new fans that support large franchises that got a lot of media attention. Because of the limitation, the fan

attendance through multi-media is difficult to calculate so this paper will concentrate on the fan attendance in live games.

Sloan et al. (1987) found spectator behaviors were related to achievement. Sports Need for Achievement and Power Scale (SNAPS) showed psychological desires related to fan motivation (Sloan et al. 1989). Wann (1995) developed the scales of Sport Fan Motivation Scale (SFMS), however, the scale of Motivation Scale Consumption (MSC) met the demand of sport consumption market based on SFMS. In addition, Trail and James (2001) explained the scale of Motivation Scale for Sport Consumption (MSSC) were suitable for spectators compared with SFMS and MSC. Besides, fan attendance combined with many aspects. Self-esteem as the representation of fan identification combined with fan attendance formatted the theories of Basking in Reflected Glory (BIRGing) (Cialdini et al, 1976) and Cutting Off Reflected Failure (CORFing) (Snyder, Lassengard & Ford, 1986). Sport fan identification would have relationship with sport fan satisfaction and fan attendance (Madrigal, 1995), especially there was the theory of FAM (Kahle, Kambara, and Rose, 1996). Moreover, factors of team loyalty and stadium factors would influence fan attendance (Wakefield & Sloan, 1995). Some researchers also put forward to practical ways to increase fan attendance in live (Mumford, Kane & Maina, 2004).

Overall, fan attendance contains many aspects such as fan identification, fan satisfaction and fan motivation so sport fans' motivation is directly related to their fan attendance. Many researchers pointed out various factors such as achievement and knowledge which combined with fan motivation theories. These factors influence sport fans to attend live sports events.

Purpose of the Study

The present study examined the impact of demographic information (like gender and grade) on students' fan motivation and fan live game attendance. Meanwhile, it examined the relationship between fan motivation and live game attendance.

Hypotheses

The following hypotheses were tested for the seven independent variables (gender, age, grade, department, cost of living, cost of watching live game matches and student status) and two dependent variables. First dependent variable is MSSC with nine factors: achievement, knowledge, aesthetics, drama, escape, family, physical attraction, physical skills and social interaction (Trail and James 2001). Second dependent variable is fan attendance in live game matches.

1. There would be no significant difference between male and female subjects in the mean scores on the MSSC factors.
2. There would be no significant difference between different age subjects in the mean scores on the MSSC factors.
3. There would be no significant difference between different grade subjects in the mean scores on the MSSC factors.

4. There would be no significant difference between different cost of living subjects in the mean scores on the MSSC factors.
5. There would be no significant difference between different cost of watching live game matches subjects in the mean scores on the MSSC factors.
6. There would be no significant difference between different department subjects in the mean scores on the MSSC factors.
7. There would be no significant difference between different student status subjects in the mean scores on the MSSC factors.
8. There would be no significant difference between male and female subjects in the mean scores on fan attendance in live game matches.
9. There would be no significant difference between different age subjects in the mean scores on fan attendance in live game matches.
10. There would be no significant difference between different grade subjects in the mean scores on fan attendance in live game matches.
11. There would be no significant difference between different cost of living subjects in the mean scores on fan attendance in live game matches.
12. There would be no significant difference between different cost of watching live game matches subjects in the mean scores on fan attendance in live game matches.
13. There would be no significant difference between different department subjects in the mean scores on fan attendance in live game matches.
14. There would be no significant difference between different student status subjects in the mean scores on fan attendance in live game matches.
15. There would be no relationship with fan motivation and live game attendance.



Method

Participants

Participants are Chinese university students (N=256) who studied in Guangzhou Sport University during 2014 to 2015. Questionnaires were distributed to all students in different departments in the university.

Data Collections

A convenient sampling method was used to collect data. Data collection was started in May, 2016 and ended in June, 2016. E-questionnaires were distributed through the Internet. Two weeks were given to the students in Guangzhou Sport University to complete the e-questionnaire. The e-questionnaire was collected by Sojump through Internet.

Instrumentation

This study used the Motivation Scale for Sport Consumption (MSSC) developed by the Trail and James in 2001 to measure the fan motivation.

The investigator would examine the relationship between fans motivation and live game attendance in sport events which held in Guangzhou city during 2014 to 2015. Fan motivation was measured by using Motivation Scale for Sport Consumption (MSSC) developed by Trail and James (2001). The reasons why this study chose the scale of MSSC are the scale of MSSC had more factors compared with SFMS and MSC that means the MSSC has more reliability and validity. On the one hand, MSSC can meet the demand of sport consumption market. On the other hand, the scale of MSSC were suitable for spectators' researches compared with others fan motivation scales.

The scale includes nine factors: achievement, knowledge, aesthetics, drama, escape, family, physical attraction, physical skills and social interaction. 9 mean MSSC sub-scores were compared among respondents grouped by (a) Age: the age of students in university mainly among 18 to 22 years old also with graduate students more than 22 years old; (b) Grade, grades in this study are freshman, sophomore, junior, senior and graduate students; (c) Gender, (d) Level of cost of living: there were set up six levels for cost of living; (e) Cost of watching live game matches: there were set up six levels for cost of watching live game matches; (f) Department: because of the totally student numbers in Guangzhou Sport University, this study divided samples into seven departments instead of major and (g) Student status: subject student were athlete or not. The frequency of live game attendance would be measured by the questions in



the questionnaires. Also, this paper investigated which sports event was most popular among students.

Data Analysis

SPSS Version 22.0 was used to conduct statistical analysis in this study. The statistical analysis contained the descriptive statistics such as mean and standard deviation from demographic data for example gender, age, cost of living and cost of watching. And then analysis conducted reliability tests and correlations among all factors. Also, this study used Post Hoc, Tukey HSD when equal variances were assumed and use Tamhane's T2 or Dunnett's T3. Moreover, the regression analysis was used to investigate the relationship between fan motivation and fan attendance in live games.

Results

This study examined the relationship with fan motivation and fan attendance in live game by using the scale of MSSC (Trail and James, 2001) to collect data from students. There are nine dependent variables: achievement, knowledge, aesthetics, drama, escape, family, physical attraction, physical skills and social interaction in scale of MSSC and also six independent variables (a) Age: (b) Grade (c) Gender, (d) Level of cost of living (e) Cost of watching live game matches and (f) Department. Moreover, the questionnaires included the questions of frequency of fan attendance in live games.

Among the 256 subjects, there were 61.3% (n=157) male students. For age distribution, 82% (n=210) of subjects were between 18 to 24 years old. In distribution of grade, there were 34% (n=87) senior students and freshmen students (Table 1). Students from seven different department watched live games for 1 to 2 times which took into account 37.5% (n=96). Based on Table 1.3, students liked watching basketball matches the most and the percentage was 46.9% (n=120). For the cost of living among students, 30.9% (n=79) spent 1001 to 1500 (RMB) per month. Among 256 subjects, 43.4% (n=111) students who came from Sports Journalism and Communication Department and 18.8% (n=48) of students were from Physical Education Department (Table 1.4)



Table 1.1
Background Information of the Subjects

Gender	Education	Age
Males 61.3%	Freshman 17.2%	18-24 82 %
Freshman 38.7%	Sophomore 7.4%	25-29 15.2%
	Junior 17.6%	30-34 0.8%
	Senior 34%	35-39 0.8%
	Graduate Student 23.8%	40-44 0.4%
		45 above 0.8%

Table 1.2
Background Information of the Subjects

Cost of living (RMB)	per month	Cost of watching live games(RMB)	during 2014 to 2015
500-1000	18%	0	41.8%
1001-1500	30.9%	1-50	15.6%
1501-2000	20.7%	51-100	14.8%
2001-2500	7.8%	101-150	9.4%
2501-3000	5.5%	151-200	5.1%
3001 above	17.2%	201 above	13.3%

Table 1.3
Background Information of the Subjects

Most Times	during 2014 to 2015	Most Kinds	during 2014 to 2015
0	7.8%	Basketball	46.9%
1-2	37.5%	Football	29.7%
3-4	33.2%	Badminton	3.5%
5-6	10.9%	Tennis	2.3%
7-8	3.5%	Table Tennis	2.3%
9-10	1.2%	Running	2.0%
More than 10	5.9%	Golf	7.8%
		Others	5.5%

Table 1.4
Background Information of the Subjects

Student state	Department
Athlete 50.4%	Physical Education Department 18.8%
Non athlete 49.6%	Sports Training Department 8.6%
	Sports and Leisure Management Department 12.1%
	Sports Journalism and communication Department 43.4%
	Sports and Health Department 6.6%
	Sports and Art Department 5.5%
	Martial Arts Department 5.1%



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The descriptive statistics are presented in Table 2. The factor of Physical Skills had a highest mean score (M=5.86), demonstrating that respondents focused on the performance of athletes towards watching live games. In addition, compared with other factors, the factor of

Escape (M=4.66) had lower level which meant students might not have much pressure in life. Compared with Social factor, the reliabilities of other factors were generally considered to be acceptable because the most of Cronbach's Alpha of factors were more than 0.70.

Table 2
Descriptive Statistics and Reliability of the Subjects (N=256)

Factors	Mean	SD	Alpha
Achievement(AC)	5.52	1.27	0.82
I feel like I have won when my favorite team and players wins.	5.42	1.58	
I feel a personal sense of achievement when the team does well.	5.78	1.55	
I feel proud when my favorite team and players play well.	5.10	1.30	
Knowledge(KN)	4.60	1.62	0.90
I regularly track the statistics of specific players.	4.54	1.74	
I usually know my favorite team and players' win/loss record.	4.56	1.82	
I read the box scores and team statistics regularly.	4.70	1.77	
Aesthetics(AE)	5.40	1.16	0.78
I appreciate the beauty inherent in the game.	5.05	1.53	
There is a certain natural beauty to the game.	5.55	1.28	
I enjoy the gracefulness associated with game.	5.59	1.33	
Drama(DR)	5.68	1.20	0.77
I enjoy the drama of a "one run" game.	5.59	1.42	
I prefer a "close" game rather than a "one-sided" game.	5.66	1.52	
A game is more enjoyable to me when the outcome is not decided until the very end.	5.80	1.38	
Escape(ES)	4.66	1.43	0.80
Games represent an escape for me from my day-to-day activities.	4.50	1.87	
Games are a great change of pace from what I regularly do.	4.95	1.51	
I look forward to games because they are something different to do in the summer.	4.54	1.71	
Family(FA)	5.17	1.29	0.74
I like going to game with my family.	4.54	1.71	
I like going to game with my spouse.	5.13	1.70	
I like going to game with my friends.	5.84	1.36	
Physical Attraction(PA)	5.16	1.41	0.79
I enjoy watching my favorite players who are physically attractive.	5.37	1.63	
The main reason that I watch is because I find the players attractive.	4.89	1.71	
An individual player attractive is a big reason why I watch.	5.21	1.70	
Physical Skills(PS)	5.86	1.09	0.83
The physical skills of the players are something I appreciate.	5.88	1.27	
Watching a well-executed athletic performance is something I enjoy.	5.85	1.19	
I enjoy a skillful performance by the team.	5.84	1.22	
Social(SO)	5.01	1.23	0.68
Interacting with other fans is a very important part of being at games.	5.43	1.37	
I like to talk to other people sitting near me during the games.	4.98	1.64	
Games are great opportunities to socialize with other people.	4.61	1.68	
Fan Attendance in live game(AT)	4.34	2.27	



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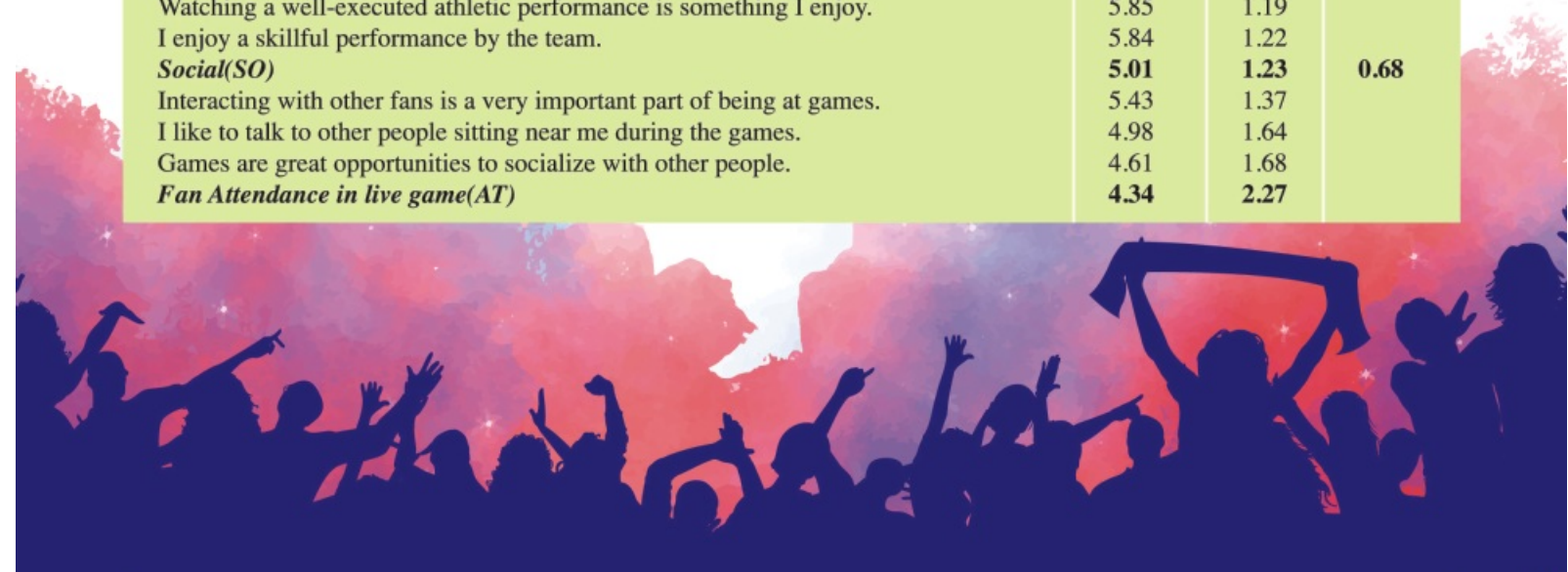


Table 3 demonstrated the highest correlation was 0.49 between Knowledge with Social and Escape ($p < 0.01$). With respect to Table 3, there were no significant correlation between Fan attendance in live game with the factor of Drama and Physical Skills.

Table 3

Correlation among motivation factors and fan attendance in live game match

Factors	AC	KN	AE	DR	ES	FA	PA	PS	SO	AT
AC	1									
KN	.44**	1								
AE	.35**	.45**	1							
DR	.20**	.14*	.35**	1						
ES	.46**	.49**	.43**	.29**	1					
FA	.34**	.33**	.42**	.23**	.44**	1				
PA	.30**	.22**	.22**	.23**	.31**	.26**	1			
PS	.39**	.38**	.50**	.27**	.39**	.37**	.25**	1		
SO	.33**	.49**	.38**	.29**	.48**	.52**	.31**	.44**	1	
AT	.14*	.38**	.29**	.11	.13*	.13*	-.05	.21*	.18**	1

Note: AC = Achievement, KN = Knowledge, AE = Aesthetics, DR = Drama, ES = Escape, FA = Family, PA = Physical Attraction, PS = Physical Skills, SO = Social, and AT = Fan attendance in live game

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

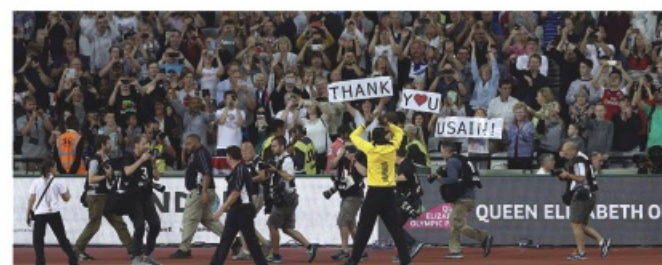
According to the results in Table 4, there was a significant difference between male and female students on fan attendance in live game in mean scores.

Table 4

Results of t-test and Descriptive Statistic for Fan Motivation factors and Fan attendance in watching live game match among gender

Factors	Gender								
	Male				Female				
	M	SD	n	M	SD	n	95% CI of Difference	t	df
AC	5.4	1.3	157	5.64	1.20	99	-0.51, 0.12	-1.18	254
KN	4.8	1.6	157	4.18	1.50	99	.289, 1.09	3.39	254
AE	5.4	1.1	157	5.28	1.16	99	-0.10, 0.48	1.30	254
DR	5.7	1.2	157	5.63	1.16	99	-0.22, 0.38	0.53	254
ES	4.7	1.4	157	4.54	1.41	99	-0.16, 0.56	1.08	254
FA	5.1	1.2	157	5.16	1.43	99	-0.32, 0.34	0.06	254
PA	4.9	1.4	157	5.46	1.27	99	-0.83, -0.15	-2.84*	254
PS	5.9	1.0	157	5.66	1.13	99	0.05, 0.59	2.30	254
SO	5.1	1.16	157	4.83	1.31	99	-0.02, 0.60	1.84	254
AT	4.9	2.2	157	3.33	2.00	99	1.12, 2.17	6.18*	254

* $p < 0.05$



Results of Table 5 and Table 6 stated that there was no significant difference among six different levels of age or grades in all factors of fan motivation and fan attendance in live games.

Table 5

Results of ANOVA for Fan Motivation factors and Fan attendance in watching live game matches among age

Factors	df1	df2	F	Sig
AC	5	250	2.24	0.51
KN	5	250	1.22	0.30
AE	5	250	1.39	0.23
DR	5	250	1.84	0.11
ES	5	250	1.54	0.18
FA	5	250	1.29	0.27
PA	5	250	1.54	0.18
PS	5	250	1.66	1.44
SO	5	250	1.94	0.08
AT	5	250	1.16	0.33

Table 6

Results of ANOVA for Fan Motivation factors and Fan attendance in watching live game matches among grades

Factors	df1	df2	F	Sig
AC	4	251	0.44	0.78
KN	4	251	0.25	0.91
AE	4	251	0.86	0.49
DR	4	251	0.95	0.43
ES	4	251	0.66	0.62
FA	4	251	1.49	0.21
PA	4	251	1.69	0.15
PS	4	251	1.20	0.31
SO	4	251	1.62	0.17
AT	4	251	0.74	0.56

Based on Table 7, ANOVA was conducted to test for the differences between the six levels of cost of living. It is found that significant differences existed factors of Aesthetics [$F(5,250)=2.69, p=0.02$] and Drama [$F(5,250)=2.49, p=0.03$] in different cost of living per month.

Table 7

Results of ANOVA for Fan Motivation factors and Fan attendance in watching live game matches among cost of living

Factors	df1	df2	F	Sig
AC	5	250	0.98	0.43
KN	5	250	1.27	0.27
AE	5	250	2.69	0.02*
DR	5	250	2.49	0.03*
ES	5	250	0.35	0.89
FA	5	250	0.97	0.44
PA	5	250	1.22	0.30
PS	5	250	0.42	0.84
SO	5	250	1.18	0.32
AT	5	250	1.68	0.14

* $p < 0.05$


Table 8

Results of Tamhane for factor of Aesthetics among different cost of living

Tamhane	(I)cost of living (RMB)	(J) cost of living (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	2501-3000	500-1000	0.51	0.24	0.46	Lower Bound	Upper Bound
		1001-1500	0.75*	0.23	0.04*	0.02	1.48
		1501-2000	0.21	0.24	1.00	-0.56	0.98
		2001-2500	0.08	0.31	1.00	-0.89	1.05
		Over 3001	0.65	0.27	1.00	-0.20	1.50

* $p < 0.05$

Table 9

Results of Dunnett T3 for factor of Aesthetics among different cost of living

Dunnett T3	(I)cost of living	(J) cost of living	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	2501-3000	500-1000	0.51	0.24	0.42	Lower Bound	Upper Bound
		1001-1500	0.75*	0.23	0.04*	0.02	1.47
		1501-2000	0.21	0.24	1.00	-0.56	0.98
		2001-2500	0.08	0.31	1.00	-0.89	1.05
		Over 3001	0.65	0.27	0.28	-0.20	1.50

* $p < 0.05$

Table 10

Results of Tukey HSD for factor of Drama among different cost of living

Tukey HSD	(I)cost of living (RMB)	(J) cost of living (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	1001-1500	500-1000	-0.39	0.22	0.48	Lower Bound	Upper Bound
		1501-2000	-0.61*	0.21	0.048*	-1.21	0.00
		2001-2500	-0.65	0.30	0.24	-1.50	0.20
		2501-3000	-0.16	0.34	1.00	-1.14	0.83
		Over 3001	-0.06	0.22	1.00	-0.70	0.57

* $p < 0.05$

According to above tables, there were significant differences between different cost of living and watching live game students in mean scores on the MSSC factors.

Table 11

Results of ANOVA for Fan Motivation factors and Fan attendance in watching live game matches among cost of watching live game watches

Factors	df1	df2	F	Sig
AC	5	250	3.16	0.01*
KN	5	250	6.39	0.00*
AE	5	250	1.81	0.11
DR	5	250	1.84	0.11
ES	5	250	2.86	0.02*
FA	5	250	0.94	0.46
PA	5	250	0.82	0.54
PS	5	250	2.15	0.06
SO	5	250	2.27	0.81
AT	5	250	4.44	0.00*

* $p < 0.05$

Table 12

Results of Tukey HSD for factor of Achievement among different cost of watching live game watches during 2014 to 2015

Tukey HSD	(I)cost of watching (RMB)	(J) cost of watching (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	0	1-50	-0.31	0.23	0.75	Lower Bound	Upper Bound
		51-100	-0.25	0.24	0.90	-0.92	0.43
		101-150	-0.75	0.28	0.24	-1.55	0.06
		151-200	-0.85	0.37	0.19	-1.90	0.20
		Over 201	-0.72*	0.25	0.04*	-1.42	-0.02

* $p < 0.05$

Table 13

Results of Tukey HSD for factor of Knowledge among different cost of watching live game watches during 2014 to 2015

Tukey HSD	(I)cost of watching (RMB)	(J) cost of watching (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	0	1-50	-0.30	0.28	0.90	Lower Bound	Upper Bound
		51-100	-0.52	0.29	0.47	-1.36	0.31
		101-150	-1.27*	0.35	0.00*	-2.26	0.27
		151-200	-1.38*	0.45	0.03	-2.27	0.08
		Over 201	-1.32*	0.30	0.00*	-2.19	-0.45

* $p < 0.05$

Table 14

Results of Tukey HSD for factor of Escape among different cost of watching live game watches during 2014 to 2015

Tukey HSD	(I)cost of watching (RMB)	(J) cost of watching (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
	0	1-50	-0.20	0.26	0.97	Lower Bound	Upper Bound
		51-100	-0.39	0.27	0.69	-1.15	0.38
		101-150	-0.83	0.32	0.10	-1.74	0.09
		151-200	-0.27	0.41	0.99	-1.46	0.91
		Over 201	-0.88*	0.28	0.02*	-1.67	-0.08

* $p < 0.05$



Table 15

Results of Tukey HSD fan attendance in live game among different cost of watching live game watches during 2014 to 2015

Tukey HSD	(I) cost of watching (RMB)	(J) cost of watching (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
Over 201	0		1.95*	0.43	0.00*	Lower Bound 0.71	Upper Bound 3.20
	1-50		1.64*	0.51	0.02*	0.17	3.11
	51-100		1.37	0.51	0.09	-0.12	2.86
	101-150		0.93	0.59	0.61	-0.75	2.52
	151-200		1.15	0.72	0.60	-0.91	3.21

*p<.05

According to the above results, there was no significant difference between different department's students in mean scores on live game attendance.

Table 16

Results of ANOVA for Fan Motivation factors and Fan attendance in watching live game matches among departments

Factors	df1	df2	F	Sig
AC	6	249	1.80	0.10
KN	6	249	1.02	0.41
AE	6	249	1.24	0.29
DR	6	249	3.06	0.07*
ES	6	249	0.59	0.74
FA	6	249	1.01	0.39
PA	6	249	0.62	0.71
PS	6	249	0.94	0.47
SO	6	249	1.53	0.17
AT	6	249	0.65	0.69

*p<.05

Table 17

Results of Tukey HSD for factor of Drama among different departments

Tukey HSD	(I) cost of watching (RMB)	(J) cost of watching (RMB)	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
PED	STD		-0.73	0.31	0.19	Lower Bound -1.63	Upper Bound 0.16
	SLMD		-0.04	0.27	1.00	-0.84	0.76
	SJCD		-0.62*	0.20	0.04*	-1.23	-0.03
	SHD		-0.83	0.33	0.16	-1.81	0.15
	SAD		-0.61	0.36	0.61	-1.66	0.45
	MAD		-0.03	0.37	1.00	-1.12	1.06

Note: PED = Physical Education Department,
 STD = Sports Training Department,
 SLMD = Sports and Leisure Management Department,
 SJCD = Sports Journalism and communication Department,
 SHD = Sports and Health Department,
 SAD = Sports and Art Department, and
 MAD = Martial Arts Department.

*p<.05

Table 18

Results of t-test and Descriptive Statistic for Fan Motivation factors and Fan attendance in watching live game match among student state

Factor	Student State						95% CI of Difference	t	df
	Athlete			Non Athlete					
	M	S	n	M	SD	n			
AC	5.3	1.	129	5.66	1.2	127	-0.58, 0.05	-1.68	254
KN	4.4	1.	129	4.76	1.6	127	-0.72, 0.67	-1.64	254
AE	5.2	1.	129	5.56	1.1	127	-0.61, -0.04	-2.28	254
DR	5.5	1.	129	5.80	1.1	127	-0.53, -0.05	-1.61	254
ES	4.6	1.	129	4.70	1.5	127	-0.42, 0.29	-0.35	254
FA	5.1	1.	129	5.23	1.5	127	-0.44, 0.20	-0.74	254
PA	4.9	1.	129	5.34	1.3	127	-0.71, 0.02	-2.09	254
PS	5.9	1.	129	5.76	1.4	127	-0.09, 0.45	1.34	254
SO	4.9	1.	129	5.10	1.1	127	-0.49, 0.11	-1.26	254
AT	4.7	2.	129	3.91	2.2	127	0.32, 1.42	3.11	254

*p<.05

Multiple linear regression analysis was employed to test nine factors of MSSC if it affected student's live game attendance. According to the result, factors of Knowledge, Aesthetics and Physical Attraction predicted the live game attendance (p<.05). As displayed in Table 20, the value of Rsquare (0.20) indicated that the proposed model was able to represent 20% of variance in live game attendance.

Table 19

Results of multiply linear regression for MSCC by frequency of live game attendance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.20	0.93		1.30	0.20		
AC	-0.04	0.12	-0.02	-0.29	0.77	0.67	1.49
KN	0.52	0.11	0.37	4.94	0.00*	0.59	1.70
AS	0.32	0.15	0.16	2.20	0.03*	0.59	1.69
DR	0.09	0.12	0.05	0.75	0.46	0.81	1.24
ES	-0.15	0.12	-0.10	-1.30	0.20	0.58	1.72
FA	-0.02	0.13	-0.01	-0.13	0.90	0.64	1.56
PA	-0.25	0.10	-0.16	-2.47	0.01*	0.83	1.21
PS	0.14	0.15	0.07	0.92	0.36	0.64	1.56
SO	0.00	0.14	0.00	0.01	0.10	0.56	1.80

Note. a. Dependent variable: Frequency of live game attendance
*p<.05

Table 20

Results of multiply linear regression for MSCC by frequency of live game attendance in Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.44 ^a	0.20	0.17	2.07

a. Predictors (Constant), Social, Drama, Physical Attraction, Achievement, Aesthetics, Family, Physical Skills, Knowledge, Escape.

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Discussion

The purpose of this study is to examine the relationship between fan motivation and live game attendance among students in Guangzhou Sport University. This paper used Motivation Scale for Sport Consumption (MSSC) (Trail & James, 2001) which contained nine factors to examine fan motivation of students while using e-questionnaires to calculate the frequency of live game attendance. Besides fan motivation and live game attendance as dependent variables, the independent variables of this study included: age, grade, gender, cost of living, cost of watching live games, department and student status. Moreover, the e-questionnaire in this study calculated what kinds of sports events participants watched most and how many times they participated in live sports events.

Correlation between all factors in MSSC and live game attendance

Results of correlation indicated that motive of Knowledge in MSSC had strong relationship with motives with Escape and Social Interaction in this study. Meanwhile, the factor of Knowledge also had relationship with live game attendance in group of subjects' students. Similar with this study, Chao (2010) indicated that factors of knowledge which showed the strong relationship with live participation but the results of Family did not show the consistency. Also, the factor of Social Interaction indicated the relationship with fan attendance. This can be further explained by the socializing component of attending sport events (Chen, 2011).

Factors of fan motivation and live game attendance with all independent variables

Results demonstrated that male and female participants had significant difference in Physical Attraction of fan motivation but also in live game attendance which seemed not aligned with Chao (2010) findings. However, Cohen

and Avrahami in 2005 supported the present findings and they suggested to increase the promotion to women in live games attendance. For present finding, female students had higher mean scores than male students in the factor of Physical Attraction which meant female were easier attracted by the athletes in sport events.

As for current results, mean scores of all factors in MSSC and mean scores of fan attendance seemed no significant difference with age. This finding was contradictory to Chen (2011) who demonstrated that sports fans had differences based on age.

In current study, results showed that different cost of living had different impact on the factors of Drama and Aesthetics respectively. In contrast, Chen (2011) indicated that there was no significant difference between motivation in terms of level of income. Meanwhile, results of this study indicated that different cost of living had the similar impact on live game attendance which was contradictory to study published by Cohen and Avrahami (2005) and they stated those who are more actively involved are those whose parents could afford the expenses associated with such participation.

There were no significant differences between different grades with mean scores of all factors in MSSC and mean frequency of fan attendance. Compared with that, Wu (2013) who found spectators were more likely to be male, young and more educated which was similar with Shank (2009).

Students had low level of watching sports event in live which took account into 57.4% and it was similar with previous study (Song & Wang, 2006) and supported by Horne (2006) who stated that sport fans usually show support of the franchise by attending games. Moreover, students' financial status demonstrated significant differences in the factors of Achievement, Knowledge and Escape in MSSC as well as in frequency of fan attendance.

The status of students as athlete or non-athlete had no significant difference in all factors of fan motivation and live participation. That meant that student athletes had similar motivation and fan attendance with non-athletes. In previous studies, researchers mainly focused on the motivation as an athlete instead of spectators especially as student athlete (Alexanda et al, 2015).

Relationship between fan motivation and live game attendance

Fan motivation and fan attendance in live game had a relationship based on the results of multiple regressions. According to the results of multiple regressions, factors of Knowledge, Aesthetics and Physical Attraction predicted influence the frequency of live game attendance in students. In addition, Andrew et al (2009) pointed out aesthetics were one of the most important motives to attend Sport Event. In contrast, the study of Cohen and Avrahami (2005) did not support the factor of Aesthetics to the live participation. The present study showed that motive of Aesthetics had medium correlation with fan attendance in live games. In MSSC, Aesthetics stands for the excellent and beautiful performance and it attracts individuals to consume in sports (Wann, 1995). In this study, Aesthetics represents students pursued the excellent performance of athletes and team called loyalty.

Moreover, this study discovered the factor of knowledge, family and achievement had the impact of live participation. Andrew et al (2009) also demonstrated that motive of knowledge was important for attending events. The importance of sport fans' knowledge can add the considerable impact on the growth of the sport event.

Conclusion

To conclude, Knowledge, Aesthetics and Physical Attraction were key divers to influence students to attend live game. Knowledge also had the relationship with live game attendance. Male and female students had no similar interest to attend live game watches in fan motivation but female had higher scores in Physical Attraction. The findings indicated that the organizer should provide more basic information about the team to satisfy the purpose of knowledge like statistics and win-lose record. It is also vital for athletes to produce excellent and beautiful performance in order to attract individuals to consume in sports. In addition, the organizers should pay much more attention about sport athletes' physical condition. Organizer should know the differences of fan motivation between gender and cost of living in order to increase student consumer base.



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An Investigation about Motivation and Participation of Recreational Sport Activities among College Students in Hangzhou

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Introduction

According to the World Health Organization (WHO, 2011), physical activity (PA) can improve children's health quality such as cardiovascular endurance, weight balance, mental health and quality of life (Rhodes, Matheson, Blanchard, & Rachel, 2008). Although many people are aware that PA has many benefits, but they still maintain a sedentary lifestyle. Lack of PA has become an urgent health issue (WHO, 2011).

Although many people have the awareness that the regular sport activities will bring health benefit and they intend to be more physically active, most of them remain sedentary. One key factor that may determine whether people adopt an active lifestyle is if they are optimally motivated for doing sport (Haerens et al., 2010). Therefore, a study on people's motivations is an appropriate way to understand their participation and non-participation in sport (Seo et al., 2007).

Chuan et al. (2014) pointed out that sport activities can encourage students to participate in PA, which is one of the mediums to achieve better public health objectives. Students' participating in sports can provide an opportunity



for them to continue with further active sports in their school life. In order to improve students' participation in sports and recreational activities, it is necessary to determine the affected factors in student recreational sports activities involvement. Lin (2008) notes that a recreational activity includes general practice function, its main purpose is to achieve physical and psychological satisfaction, and change the quality of life with creative and meaningful activities in one's free time. College student is an important part of the social groups, in the future, college students will take more social responsibilities. To improve college students' body and mind quality, it is necessary to help students establish correct values of sport awareness, develop a life-long habit of leisure-time PA, laying the foundation for their future health development.

Although we have strongly advocated the recreational sport activities in the education, the leisure hours of the college students do not lead to the appropriate use of leisure times. Based on previous study, it can be discovered that having fun and experiencing joy, having a healthy body, and becoming fit were the major factors that motivated them to participate in sport. Learning about how people participate

in sports activities driven by different motives is very important to sports researchers. By exploring adolescent participation in recreational activities in Hangzhou and understanding their motivation to recreational sport activities and participation performance, this study may help to provide valuable information for the relevant authorities in their efforts to promote recreational sport activities to help both the mental and physical development of college students in Hangzhou.

According to the self-determined theory (SDT) (Vallerand, 2001), the consequences of motivation can be classified into three different types: cognitive, affective, and behavioral. Cognitive consequences have some examples such as memory, learning, concentration, and attention. Affective consequences include interest, satisfaction, mood, and anxiety. And behavioral consequences include behavioral intentions, persistence on task, intensity, and performance (Vallerand & Losier, 1999). It has been put forward that different types of motivations will lead to different consequences (Vallerand, 2001). Some researchers demonstrated that positive consequences were created when intrinsic motivation and identified regulation were high and amotivation and external regulation were low (Vallerand & Losier, 1999).

Many previous studies used the sport motivation scale (SMS) to measure the motivation. Pelletier et al (1995) developed the SMS to measure the athlete's motivation toward participation in sports. The SMS consists of seven subscales, and these seven subscales measure three kinds of motivation, which conclude intrinsic motivation, extrinsic motivation and amotivation. Intrinsic motivation can also be divided into Intrinsic motivation to know, Intrinsic motivation to accomplish things and Intrinsic motivation to experience stimulation, while extrinsic motivation also has three forms: identified regulation, introjected regulation and external regulation.

The present study aims to investigate college students' different motivation for participating in recreational sport activities and different participation frequency among college students in Hangzhou, China. Specific objectives were to (1) explore the relationship between college students from different demographic backgrounds and their motivation of recreational sport activities to see whether the gender, grade and major type has influence on the college students' participation frequency on recreational sport activity; (2) explore the relationship between the different motivation subscales and participation frequency.

Based on the purposes of this study, the following hypotheses shall be examined:

- H1:** There will be a statistically significant difference in the different types of motivation between male and female students.
- H2:** There will be a statistically significant difference in the different types of motivation among different grade levels students.

H3: There will be a statistically significant difference in the different types of motivation among different majors.

H4: There will be statistically significant relationships between the motivation subscales in both intrinsic motivation and extrinsic motivation, and the amotivation has no relationship with both intrinsic motivation and extrinsic motivation.

H5: There will be statistically significant differences in the monthly frequency of their participation in sport activities among college students depending upon the different types of motivation.

Although the recreational sports have been generally promoted, the leisure time of college students do not effectively lead to appropriate use. College students may be easily attracted by those negative activities and thus may cause many social problems.

By exploring the college students' participation in recreational activities and to understand the relationship between their motivation and participation, this study may help to provide valuable information for the relevant authorities in their research to promote recreational sport to help both mental and physical development of college students in Hangzhou.

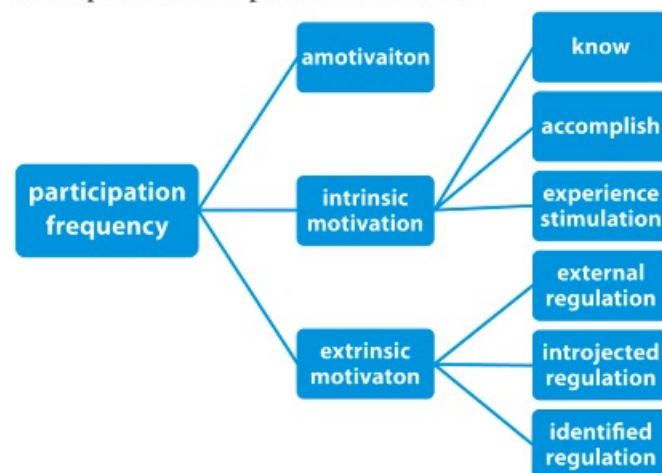
Methodology

Participant

In this study, the researcher chooses 3 universities in Hangzhou. They are Zhejiang University, Hangzhou Normal University, and Hangzhou Dianzi University. The total number of participants were 239.

Instrumentation

This study based on the self-determined theory, divided the motivation into three scales (amotivation, intrinsic motivation and extrinsic motivation). It also based on the SMS which measures seven forms of motivation: amotivation, external regulation, introjected regulation, identified regulation and intrinsic motivation to know, to accomplish and to experience stimulation.



The data collection was conducted with the assistance of university sport managers in each of the 3 selected universities in a 3-week period, during the 2015-2016 academic year. Students were asked to respond to the questions on a 5-point Likert scale ranging from 5 -strongly agree to 1-strongly disagree. The questionnaire consisted of three parts. The first part requested information about the college students' gender, grade and major. The frequency instruments adopt the four scale by Tsorbatzoudis et al. (2006), which divided the frequency into four categories: occasional, daily, weekly, monthly.

The second part requested information about the frequency of participation. In the third part, a modified version of Mallett et al.'s questionnaire (2007), which measured people's motivation for sport in three dimensions with 21 items. The questionnaire included four multiple choice question, which investigated the students' gender, grade, major type and participation frequency in sports. The second part included 21 questions that were under 5-point scale measurement method, among them, the 9th, 14th and 19th were related to amotivation, the 2nd, 10th and 15th were related to intrinsic motivation to know, the 5th, 11th and 17th were related to intrinsic motivation to accomplish, the 1st, 8th and 18th were designed to exam the intrinsic motivation to experience stimulation, the 4th, 16th and 21st aimed to exam external regulation, the 6th, 13th and 20th were about the introjected regulation and the 3rd, 7th as well as the 12th were designed to evaluate the identified regulation.

Table 1

Participation frequency distribution in different demographic groups

Frequency	Gender		Grade				Major	
	male	female	1	2	3	4	Arts	Science
Occasional	28(25.2%)	51(39.8%)	12(42.9%)	12(15.4%)	22(34.4%)	33(47.8%)	39(32.5%)	40(33.6%)
Daily	37(33.3%)	32(25.0%)	6(21.4%)	35(44.9%)	19(29.7%)	9(13.0%)	37(30.8%)	32(26.9%)
Weekly	45(40.5%)	42(32.8%)	10(35.7%)	29(37.2%)	22(34.4%)	26(37.7%)	41(34.2%)	46(38.7%)
Monthly	1(0.9%)	3(2.3%)	0(0.0%)	2(2.6%)	1(1.6%)	1(1.4%)	3(2.5%)	1(0.8%)
Total	111(100%)	128(100%)	28(100%)	78(100%)	64(100%)	69(100%)	120(100%)	119(100%)

Bivariate correlations between and among scores of the scales were run to examine the relations between motivation dimensions. The results are presented in Table 2. As shown, the intrinsic motivation to know was significantly and positively correlated with the other 6 motivation subscales. The intrinsic motivation (IM to know, IM to accomplish, IM to experience stimulation) was significantly correlated with extrinsic motivation (external regulation, introjected regulation, identified regulation). The amotivation only has two significant correlations with intrinsic motivation to know and external regulation. The correlations among the seven subscales were not as expected as the presence of the self-determination continuum postulated by Deci and Ryan (1985) which the adjacent subscales (e.g., external regulation and introjection) have positive correlations, and the subscales at the opposite ends of the continuum (i.e., IM and amotivation) have the most negative correlations.

Results

Means, standard deviations and Cronbach alpha values for the motivation subscales and most of the items had acceptable alphas (0.75, 0.67, 0.72, 0.72, 0.70, 0.62, 0.71) for amotivation, Intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation to experience stimulation, external regulation, introjected regulation and identified regulation. Participants had the highest mean score on the intrinsic motivation to experience stimulation (M=3.89, SD=0.74), followed by the intrinsic motivation to accomplish (M=3.73, SD=0.76), identified regulation (M=3.71, SD=0.80), intrinsic motivation to know (M=3.64, SD=0.76) and introjected regulation (M=3.62, SD=0.79). As expected, participants had the lowest mean score on the amotivation (M=2.80, SD=1.00) and external regulation (M=3.11, SD=0.91).

The demographic characteristics of the participants (Table 1) indicated that female students (53.6%) were the majority of the sample. In terms of the grade, the sophomore (32.6%) were the majority of the sample, followed by those senior students (28.9%). Four groups were created based on participation frequency. An analysis of participation frequency indicated that 36.4% of the sample participated on a weekly basis (Weekly group), 33.1% reported participation less than once per month (Occasional group), 28.9% of the participants reported that they participate at a daily basis (Daily group) and only 1.7% reported participation at least once per month (Monthly group).

Table 2

Bivariate Correlations between motivation subscales.

Correlations	Amotivation	Know	Accomplish	Experience	External	Introjected	Identified
Amotivation							
Know	.168**						
Accomplish	0.087	.757**					
Experience	-0.021	.692**	.700**				
External	.511**	.575**	.538**	.408**			
Introjected	0.059	.587**	.581**	.574**	.453**		
Identified	0.061	.713**	.699**	.747**	.535**	.647**	

** . Correlation is significant at the 0.01 level (2-tailed).



The independent-samples t-test was conducted to compare the means of different types of motivations for different gender and major. There was no significant difference in amotivation for males (M=2.89, SD=1.01) and females [M=2.73, SD=1.00; t(237)=1.23, p>0.05]. There was no significant difference in three types of intrinsic motivation between males and females. But there was significant difference in three types of extrinsic motivation between different genders (Table 3).

Table 3
Results of t-test and descriptive statistics for difference in motivation types between different gender.

Gender	Male		Female		95% CI of the Difference		t	df
	M	SD	M	SD				
	Amotivation	2.89	1.01	2.73	1.00	-0.10		
IM-know	3.74	0.76	3.56	0.74	-0.02	0.37	1.80	237.00
IM-accomplish	3.81	0.76	3.66	0.75	-0.05	0.34	1.50	237.00
IM-experience	3.97	0.74	3.81	0.74	-0.03	0.35	1.67	237.00
External regulation	3.31	0.90	2.93	0.89	0.15	0.61	3.27*	237.00
Introjected regulation	3.72	0.85	3.52	0.73	0.00	0.40	1.99*	237.00
Identified regulation	3.88	0.80	3.57	0.78	0.11	0.51	3.00*	237.00

*p<0.05

Based on the result of independent t-test, it was found that three types of intrinsic motivation all have significant difference between two different majors (Table 4). There was significant difference in intrinsic motivation to know for students from liberal arts (M=3.51, SD=0.82) and students from science major [M=3.77, SD=0.67; t(237)=-2.71, p<0.05]. There was significant difference in intrinsic motivation to accomplish for students from liberal

Table 4
Results of ANOVA and descriptive statistics for difference in motivation types between different participation frequency.

Participation frequency	Amotivation		IM-know		IM-accomplish		IM-experience		External regulation		Introjected regulation		Identified regulation	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
	Occasional	2.94	0.96	3.45	0.86	3.60	0.86	3.69	0.89	2.92	0.93	3.30	0.90	3.48
Daily	2.86	1.01	3.73	0.67	3.72	0.74	3.97	0.65	3.20	0.81	3.80	0.67	3.79	0.73
Weekly	2.62	1.02	3.74	0.70	3.87	0.66	4.00	0.64	3.20	0.95	3.75	0.69	3.87	0.73
Monthly	3.17	1.14	3.83	0.58	3.67	0.54	3.75	0.63	2.92	1.29	3.50	0.88	3.75	0.63
	F(3,235)=1.76 p=0.156		F(3,235)=2.67* p=0.049		F(3,235)=1.81 p=0.147		F(3,235)=2.93* p=0.034		F(3,235)=1.70 p=0.167		F(3,235)=6.72* p=0.00		F(3,235)=3.68* p=0.013	

*p<0.05



arts (M=3.63, SD=0.80) and students from science major [M=3.83, SD=0.70; t(237)=-2.04, p<0.05]. And there was also significant difference in identified regulation for students from liberal arts (M=3.56, SD=0.87) and students from science major [M=3.86, SD=0.70; t(237)=-2.93, p<0.05].

Table 4
Results of t-test and descriptive statistics for difference in motivation types between different major.

Major	Arts		Science		95% CI of the Difference		t	df
	M	SD	M	SD				
	Amotivation	2.81	1.01	2.80	1.00	-0.24		
IM-know	3.51	0.82	3.77	0.67	-0.45	-0.07	-2.71*	237.00
IM-accomplish	3.63	0.80	3.83	0.70	-0.39	-0.01	-2.04*	237.00
IM-experience	3.75	0.84	4.02	0.60	-0.46	-0.08	-2.85*	215.0
External regulation	3.06	0.89	3.15	0.94	-0.32	0.14	-0.76	237.00
Introjected regulation	3.54	0.78	3.69	0.80	-0.36	0.04	-1.55	237.00
Identified regulation	3.56	0.87	3.86	0.70	-0.50	-0.10	-2.93*	237.00

*p<0.05

The one-way ANOVA was used to test for differences between the different types of motivation towards different participation frequency, the results of the one-way ANOVA with an alpha level at 0.05 were shown at Table 5. It was found that there was significant difference existed between the intrinsic motivation and different participation frequency [F(3,235)=2.67, p=0.049], also found significant difference between frequency and Intrinsic motivation to experience [F(3,235)=2.93, p=0.034]; introjected regulation [F(3,235)=6.72, p=0.00] and identified regulation [F(3,235)=3.68, p=0.013].

A Scheffe post hoc test was conducted to examine which two groups of participation frequency were different in terms of the different motivation. The result of the post hoc test (see Table 6) indicated a significant difference between the occasional group and the weekly group as it related to the intrinsic motivation to experience. As it related to introjected regulation, the occasional group has significant difference with both the daily group and the weekly group. And there is significant difference between the occasional group and the weekly group as it related to the identified regulation.

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Table 6
Comparison of different participation frequency groups as related to different motivation subscales.

Dependent Variable	Tukey HSD		Multiple Comparisons				
	(I) frequency	(J) frequency	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Amotivation	1	2	0.081	0.165	0.961	-0.345	0.507
		3	0.324	0.155	0.161	-0.078	0.726
		4	-0.226	0.512	0.971	-1.552	1.100
	2	1	-0.081	0.165	0.961	-0.507	0.345
		3	0.243	0.161	0.434	-0.174	0.660
		4	-0.307	0.514	0.933	-1.637	1.024
	3	1	-0.324	0.155	0.161	-0.726	0.078
		2	-0.243	0.161	0.434	-0.660	0.174
		4	-0.550	0.511	0.705	-1.873	0.773
	4	1	0.226	0.512	0.971	-1.100	1.552
		2	0.307	0.514	0.933	-1.024	1.637
		3	0.550	0.511	0.705	-0.773	1.873
Know	1	2	-0.287	0.124	0.095	-0.607	0.033
		3	-0.288	0.116	0.066	-0.590	0.013
		4	-0.386	0.384	0.747	-1.380	0.608
	2	1	0.287	0.124	0.095	-0.033	0.607
		3	-0.001	0.121	1.000	-0.314	0.311
		4	-0.099	0.385	0.994	-1.097	0.898
	3	1	0.288	0.116	0.066	-0.013	0.590
		2	0.001	0.121	1.000	-0.311	0.314
		4	-0.098	0.383	0.994	-1.090	0.894
	4	1	0.386	0.384	0.747	-0.608	1.380
		2	0.099	0.385	0.994	-0.898	1.097
		3	0.098	0.383	0.994	-0.894	1.090
Accomplish	1	2	-0.116	0.124	0.787	-0.437	0.206
		3	-0.271	0.117	0.099	-0.574	0.033
		4	-0.068	0.386	0.998	-1.067	0.932
	2	1	0.116	0.124	0.787	-0.206	0.437
		3	-0.155	0.122	0.581	-0.469	0.160
		4	0.048	0.388	0.999	-0.955	1.052
	3	1	0.271	0.117	0.099	-0.033	0.574
		2	0.155	0.122	0.581	-0.160	0.469
		4	0.203	0.386	0.953	-0.794	1.201
	4	1	0.068	0.386	0.998	-0.932	1.067
		2	-0.048	0.388	0.999	-1.052	0.955
		3	-0.203	0.386	0.953	-1.201	0.794
Experience	1	2	-0.279	0.121	0.100	-0.592	0.034
		3	-0.31185*	0.114	0.034	-0.607	-0.016
		4	0.058	0.377	0.999	-1.033	0.917
	2	1	0.279	0.121	0.100	-0.034	0.592
		3	-0.033	0.119	0.993	-0.339	0.274
		4	0.221	0.378	0.937	-0.757	1.199
	3	1	.31185*	0.114	0.034	0.016	0.607
		2	0.033	0.119	0.993	-0.274	0.339
		4	0.254	0.376	0.906	-0.719	1.226
	4	1	0.058	0.377	0.999	-0.917	1.033
		2	-0.221	0.378	0.937	-1.199	0.757
		3	-0.254	0.376	0.906	-1.226	0.719
External	1	2	-0.279	0.150	0.248	-0.667	0.109
		3	-0.279	0.141	0.201	-0.645	0.087
		4	0.007	0.466	1.000	-1.199	1.214
	2	1	0.279	0.150	0.248	-0.109	0.667
		3	0.000	0.147	1.000	-0.380	0.379
		4	0.286	0.468	0.928	-0.924	1.497
	3	1	0.279	0.141	0.201	-0.087	0.645
		2	0.000	0.147	1.000	-0.379	0.380
		4	0.286	0.465	0.927	-0.917	1.490
	4	1	-0.007	0.466	1.000	-1.214	1.199
		2	-0.286	0.468	0.928	-1.497	0.924
		3	-0.286	0.465	0.927	-1.490	0.917
Introjected	1	2	-0.49813*	0.126	0.001	-0.825	-0.172
		3	-0.45099*	0.119	0.001	-0.759	-0.143
		4	-0.196	0.392	0.959	-1.211	0.819
	2	1	-0.49813*	0.126	0.001	0.172	0.825
		3	0.047	0.123	0.981	-0.272	0.366
		4	0.302	0.394	0.869	-0.717	1.320
	3	1	-0.45099*	0.119	0.001	0.143	0.759
		2	-0.047	0.123	0.981	-0.366	0.272
		4	0.255	0.391	0.915	-0.758	1.268
	4	1	0.196	0.392	0.959	-0.819	1.211
		2	-0.302	0.394	0.869	-1.320	0.717
		3	-0.255	0.391	0.915	-1.268	0.758
Identified	1	2	-0.311	0.13	0.081	-0.646	0.025
		3	-0.38911*	0.122	0.009	-0.706	-0.073
		4	-0.273	0.403	0.906	-1.317	0.77
	2	1	0.311	0.13	0.081	-0.025	0.646
		3	-0.078	0.127	0.926	-0.407	0.25
		4	0.037	0.405	1	-1.009	1.084
	3	1	.38911*	0.122	0.009	0.073	0.706
		2	0.078	0.127	0.926	-0.25	0.407
		4	0.116	0.402	0.992	-0.925	1.157
	4	1	0.273	0.403	0.906	-0.77	1.317
		2	-0.037	0.405	1	-1.084	1.009
		3	-0.116	0.402	0.992	-1.157	0.925

*. The mean difference is significant at the 0.05 level.

The one-way ANOVA was used to test for differences between the different types of motivation towards different grade, the results of the one-way ANOVA with an alpha level at 0.05 were shown at Table 7. It was found that there was significant difference existed between the amotivation and different grade [F(3,235)=2.906, p=0.035], but there was no significant difference between both the Intrinsic motivation and Extrinsic motivation with the different grade. And according to the post hoc test, the grade 2 group has a significant difference with the grade 4 group as it related to the amotivation.



Table 7

Results of ANOVA and descriptive statistics for difference in motivation types between different grade.

Grade	Amotivation		IM-know		IM-accomplish		IM-experience		External regulation		Introjected regulation		Identified regulation	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
1	2.82	1.11	3.40	0.91	3.62	0.91	3.77	0.87	3.02	1.04	3.42	1.08	3.70	0.97
2	3.06	0.89	3.68	0.62	3.74	0.66	3.80	0.70	3.25	0.78	3.68	0.61	3.71	0.74
3	2.66	1.05	3.81	0.72	3.89	0.77	3.98	0.70	3.21	0.95	3.64	0.71	3.85	0.70
4	2.64	0.99	3.53	0.83	3.62	0.77	3.94	0.78	2.88	0.93	3.59	0.90	3.59	0.87
	F(3,235)=2.906* p=0.035		F(3,235)=2.619 p=0.052		F(3,235)=1.574 p=0.196		F(3,235)=0.997 p=0.395		F(3,235)=2.46 p=0.063		F(3,235)=0.817 p=0.486		F(3,235)=1.128 p=0.339	

*p<0.05

Discussion

Previous research has shown that motivation is associated with a variety of positive behavioral outcomes such as increasing the level of involvement and improving the consequence of participation. According to the SDT, the self-determined motivation has important cognitive, affective and behavioral consequences. The results of the present study provided evidence for the relationship between the motivation and participation frequency. The influence of intrinsic motivation to know and to experience on the frequency of participation was expected. And the influence of introjected regulation and identified regulation on the frequency of participation was also demonstrated. But as the results shown, there was no significant relationship between the amotivation and participation frequency, and there was no significant relationship between the external regulation and the participation frequency, which was not in conformity with the hypothesis. Based on the SDT, the least self-determined motives (introjected regulation and external regulation) and amotivation should be negatively related to positive outcomes. Results for external regulation and amotivation did not support this hypothesis, since amotivation and external regulation were found to be no significant relationship with the outcomes. These results were in contrast with previous research studies. Different samples may lead into the different results. Examining the college students is different from examining the athlete, the characteristics of the college student sample group are different from the athletes' characteristics, both in mental and physical aspects. Besides, the context of recreational sport activities is also different from competitive sports, where the majority of research on the motivation subscales were conducted.

According to the present study, it can be inferred that college student participated in recreational sport activity

frequently not for the satisfaction in learning or exploring something, neither for some material rewards or external sources. The individuals did not get intrinsically motivated or extrinsically motivated, but still might have frequently participation, which is not as same as some research expected that the amotivation may have negative influences on participation. Deci and Ryan put forward their view on amotivation in 1985 that when the amotivation was present, the athlete may have no awareness to continue the participation, they might feel confused about the reason they took part in the sport activity. While the result in this study demonstrated that amotivation played no role in the participation frequency, when college student felt there was no reason to continue the recreational sport, they might still take part in it frequently. This was an important difference compared with the previous study.

Gender has impact on the extrinsic motivation, which indicated that male and female were differently motivated by external factors, and different gender has different non-self-determined behaviors. The results supported previous studies that there is gender difference in extrinsic motivation. But the mean scores of male on the external regulation, introjected regulation and identified regulation are were higher than the female's, which is different from some researches which showed that men reported higher levels of motivation than women for challenge, competition, social recognition, strength and endurance, while women reported higher levels of motivation for body shape and weight management than men. The result was not similar to Mallett, et al. (2007) which indicated that males had higher motivation than females for preserving their physical and mental health and for having a fit body whereas females had higher motivation for spending leisure time, reducing stress and for being with friends. The present results indicated that when participating in recreational sport



activities, male were deeper motivated by all those external factors including social benefits, body shape, life skills and personal relationships.

There were little previous studies that worked on the behavior difference in sport caused by study major. However, different study major type may have different effect on student's way of thinking, then in turn affect their behavior. Thus, more researches are needed to examine the major's influence on sport participation. In this study, the result showed that the study major influenced the intrinsic motivation. Students from liberal arts and students from science major were motivated differently by self-determined minds such as exploring new things and experiencing stimulation sensations. The students from science major had higher level of intrinsic motivation to participate in



recreational sport activities. They cared more about the learning and exploring experience during the participation.

The grade had no significant influence on intrinsic motivation and extrinsic motivation, but the amotivation among sophomore and senior students were obviously different. It may relate to the age or the study period, which needs to be further examined.

Conclusion

The primary purpose of this study was to investigate the relationship between the motivation and participation frequency about recreational sport. The research used the self-determined theory and the sports motivation scales to measure the motivation of college students in Hangzhou. Further research is needed to investigate the different relations between determinants, motivation, and consequences in the recreational sport domain.

The present results demonstrated that some motivation subscales in intrinsic motivation and extrinsic motivation have influence on participation frequency of recreational sport activities, but there was no significant relationship between the external regulation and the participation frequency. Gender had different preference in extrinsic motivation but no significant difference was demonstrated in intrinsic motivation, while the intrinsic motivation was influenced by study major. Further research is needed to examine the applicability of self-determination theory in sport and recreation settings among college students. **RMA**

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