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Chapter

Introductory Chapter: Synchrony or Divergence in Social Interaction – The Application of Dyadic Approach in Interpersonal Relationship Studies

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1. Introduction

Developing and maintaining interpersonal and inter-group relationships are essential to successful human social interactions and healthy human developments. The knowledge about how to wisely maintain and strategically develop interpersonal relationships has to be revealed in individuals of different roles in dyadic relationships, such as between educators and students, parents and children, policymakers and citizens, business partners, health counselors and patients, and so on.

Decades of research on interpersonal relationships have witnessed findings accumulated regarding the cognitive, behavioral, and psychological underpinnings of building interpersonal relationships in dyads in different social settings. In the clinical setting, the dyadic relationship has been a crucial factor to indicate success after suffering health status problem, for example, heart failure. Dyads were reported to hold a positive perspective toward the quality of life after HF when the strength of the interpersonal relationship was the motivator for care. The dyadic relationship between family caregivers and the patient was affected by the caregiver's health conditions [1]. Semi-structured interview was conducted in family dyads. Strong emphasis was given to understanding the relationship challenges in dyads between stroke survivors and family caregivers in order for the social workers to assist dyads with disrupting negative communication [2]. Moreover, nonverbal communication in dyads can be an effective marker for interpersonal relationship. Individuals with a longer hearing impairment reported more nonverbal leading from their significant others than those with a shorter hearing impairment [3]. If they felt more closeness, fewer leading behaviors were shown by the significant others. Coping outcomes in patients with heart failure were investigated in patient-family dyads to show the factors leading to positive contributions to dyadic heart failure management. The management of HF was reported to be successful when the strength of interpersonal relationships and love were the main motive for care [4]. The type of interpersonal relationship men and women have with an observer could affect how they respond to pain. In particular, the presence of another person resulted in an increase in pain

threshold and such effect was largest when that person was a male friend of a man [5]. Nonverbal cues in interpersonal relationships are the relevant predictors of one's physical and mental health.

In the family setting, the dyadic approach was taken to reveal the role of interdependence between individuals within married couples, including a partner's perceptions and interactions on one's health. The actor-partner models were also tested to establish the link between a partner's level of perceived social support and the inflammation in their spouse [6]. In another study, couples were recruited to report the interpersonal electronic surveillance (IES) each member had conducted on the partner and their trust, jealousy, and relationship behaviors. The actor-partner interdependence model was calculated to show which partner of the couple had a significant impact on the relationship perception following the IES perpetration [7]. The interpersonal relationship between a child and their caregivers in their early life can also be a predictor of their later success in developing a certain religious belief. The attachment style demonstrated during early childhood can become the motivating factor for an individual to commit to practice to develop a collaborative and trusting relationship with their god [8].

In the organizational and management setting, the quality of interpersonal relationships also contributes to organizational citizenship behaviors. The quality of the supervisor-nurse relationship in hospitals is positively associated with the nurse's organizational citizen behavior practice [9]. The similarity in the mental representation between dyads contributes to the perceived relationship quality. For example, the dyadic similarity in work-domain construal level is positively associated with leader-follower exchange quality, suggesting a relation between cognitive similarity and the leadership process [10].

Besides these recent observations, novel methodologies have also been developed to quantify interpersonal synchrony at the behavior and neurocognitive levels and have been associated with performances in dyadic activities. Interpersonal brain synchronization was a novel index adopted to show the possible temporal-spatial mechanisms underlying team performance. The synchrony in brain responses was measured between dyads with equal or unbalanced experiences. The performance in a dyad task of joint drawing was correlated with the participants' interbrain synchrony [11]. Rhythmic patterns in interpersonal behaviors are traced to reflect one's engagement in a cooperative vs. competitive joint task. Cooperative behaviors between dyads showed enhanced theta-band phase coherence than competitive conditions. The synchronous fluctuation of cooperative behaviors of dyads provided a behavioral counterpart of theta-band interbrain synchrony in cooperative behaviors [12]. Observational coding methods are developed to enable the continuous tracking of the personal traits of the dyads during interpersonal interaction. The continuous assessment of interpersonal dynamics (CAID) has been demonstrated as effective to show the variations and underlying sources of moment-to-moment behavior between dyads and has proven to be sensitive in clinical practice [13].

The rapid-growing empirical evidence has led to intriguing issues that reflect the novel developments and relevant challenges in the field of interpersonal relationships, especially *via* works conducted with the dyadic approach to interpersonal synchrony and interpersonal divergence. This chapter aims to make an endeavor to analyze the converging trends in interpersonal relationships through repeatedly used keywords and bibliographies that were cited repeatedly.

2. Trends of interpersonal research using dyadic approach

A growing trend of research interests has been witnessed by researchers that apply dyadic approaches to examining the cognitive, behavioral, psychological, and neural mechanisms underlying the formation and maintenance of interpersonal relationships in different social domains and settings. The practice of measuring the level of synchrony and the level of divergence in multifaceted aspects in the qualities, performances, and behaviors of individuals in a dyad, and that of associating these variations in interpersonal synchrony with social, psychological, and clinical outcomes in interpersonal relationships, have increasingly become attended to by researchers in the related fields.

Based on research articles from the Web of Science database from 2012 to 2022, the bibliometric co-occurrence analysis based on keywords (see **Figure 1**) shows trending patterns which the readers rely on for searching the desired articles on interpersonal relationships with dyadic approaches [14].

The first cluster reveals the focus on interpersonal interactions between dyads in romantic relationships. The second cluster shows the trend of applying actor-partner interdependence model to various issues related to coping behaviors in dyads (e.g., alcohol and HIV). The third cluster highlights the mental problems (e.g., depression and anxiety) that reside in interpersonal relationships and their impact on individuals

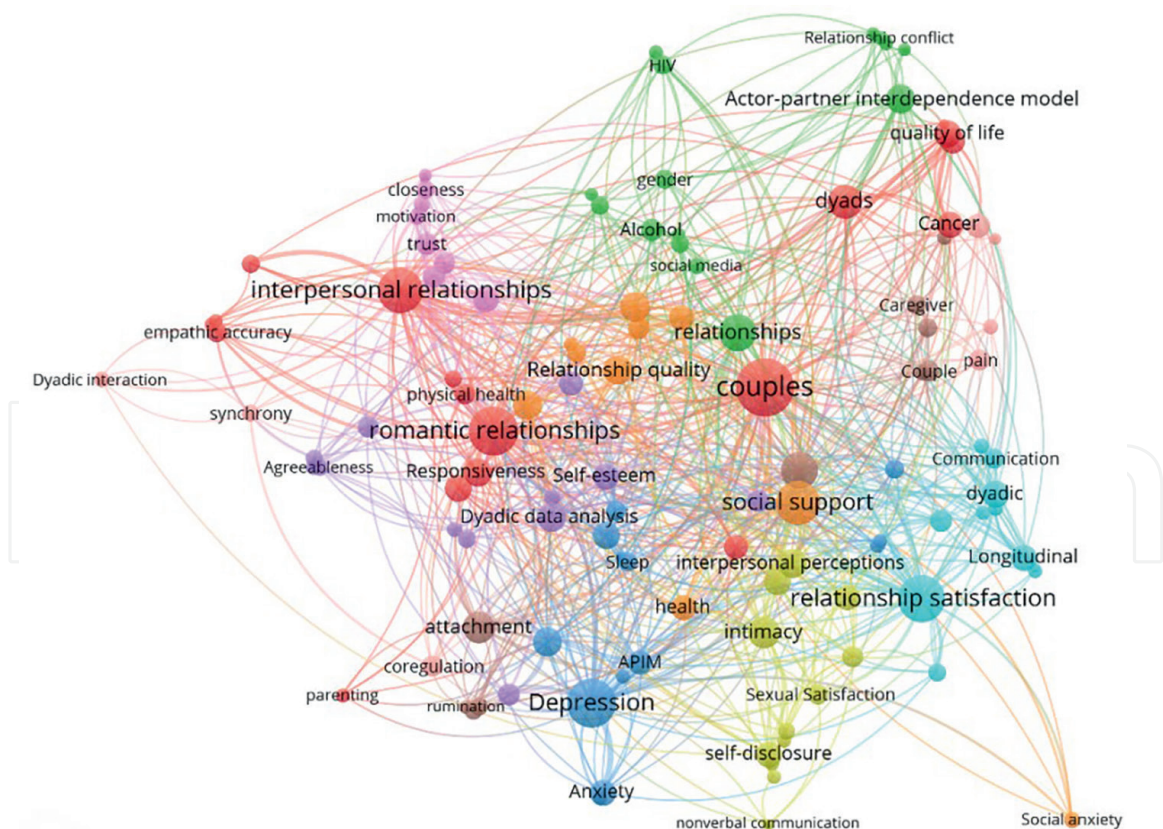


Figure 1. Co-occurrence map of keywords ($n = 128$) over publications relevant to interpersonal studies using dyadic approaches. Nodes reflect keywords, and the size of the nodes represents their frequencies. Links reflect the relationships between keywords, and the thicknesses represent the total link strength between nodes. Clusters of keywords are color coded.

and dyads. The fourth cluster mainly reflects how individuals' personalities and how interpersonal perceptions can affect the intimate ties between dyads. The fifth cluster focuses on the use of dyadic data analysis in crucial factors of personal well-being (e.g., self-esteem and depressive symptoms) that are shaped by interpersonal relationships. The sixth cluster reflects the trend on longitudinal analysis of satisfaction in dyadic communications. The seventh cluster concerns how social supports, especially those in close relationships, can affect individuals' health. The eighth cluster mainly reflects the focus on dyadic coping and the attachment patterns within. The ninth cluster reveals the focus on how trust and commitment in interpersonal perceptions can lead to interpersonal closeness and relationship satisfaction. The tenth cluster shows a focus on the synchrony in dyadic relationships and its influence on couple therapy targeting various symptoms (e.g., pain).

Based on citations that shared references, research topics of interest discussed in articles seem to be divided into seven groups (see **Figure 2**). The first cluster of research articles focuses on key indicators (e.g., personality, attachment styles, and supporting behaviors) in dyadic interactions between close partners and their impact on various indicators of life quality (e.g., well-being and satisfaction). The second cluster of research articles is mainly about building and maintaining interpersonal relationships in workplaces (e.g., leader-member exchange, and coworkers). The third cluster of research articles mainly discusses the personal traits (e.g., personality, self-esteem) that affect relationship forming in actor-partner dyads. The fourth cluster of research articles concerns the application of various approaches (e.g., dyadic coping and attachment theory) on diversified interpersonal relationships (e.g., couples, coach-athlete, and patient-caregiver) that could engage relationship challenges. The fifth cluster of research articles highlights the synchrony between

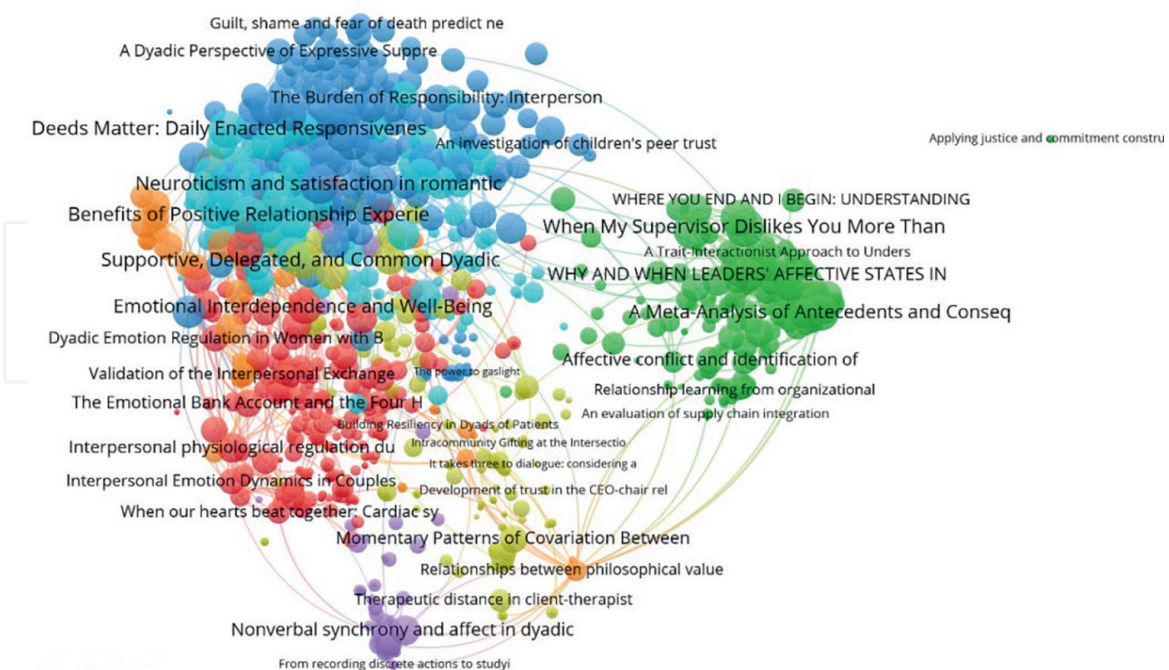


Figure 2. Bibliographic coupling network map for articles with shared citations ($n = 937$) relevant to the interpersonal relationship studies using dyadic approaches. Nodes represent the title of the articles, and the size of the nodes represents the number of citations in that article that co-occur in another article. Links reflect the relationships between keywords, and the thicknesses represent the total link strength between nodes. Clusters of articles are color coded.

interpersonal dyads. The sixth cluster of research articles mainly discusses different patterns in interpersonal interactions (e.g., attachment styles and responsiveness) and the impacts on dyads and individuals. The seventh cluster highlights interpersonal topics mainly related to sex (e.g., sexual satisfaction and sexual behavior).

3. Aim of this book

This book aims to show several emergent themes which are highly relevant to interpersonal relationship studies but have not received sufficient examinations with the dyadic approach. Despite the majority of research being focused on relationships in families, clinical and business settings, it is intriguing the constituents and structures underlying interpersonal or intergroup relationships across different contexts, such as friendships, romantic relationships, family relationships, religious relationships, and relationships in and across organizations, communities, and groups.

The ability to encode and decode nonverbal communicative cues can lead to differential outcomes in the maintenance of interpersonal relationships in dyads (Jiang, 2021) [15]. It is intriguing how interpersonal relationships are communicated and perceived by others. In particular, what challenges people are facing in interpersonal relationships during the COVID-19 pandemics? How do virtual communication (e.g., Wechat) and social distancing affect interpersonal relationships? How do facial masks affect the effectiveness of communicating meanings?

While conventional relationship studies focused on human-human relationship building, it is rarely investigated how human beings build relationships with nonhuman existing, such as animals and machines. The human-robot relationship building can be the next important challenge to tackle for researchers from interdisciplinary fields on interpersonal relationships.

The cognitive impacts of the quality of interpersonal relationships on the cognitive processes of individuals in a dyad, such as the ability to comprehend languages, coordinate between attentional resources and implement executive functions, are essential to understand the downstream effect of building a healthy interpersonal relationship. The inter-brain coupling has become an effective dyadic approach to dynamically quantify interpersonal synchrony at the neural level. This novel approach is especially suitable to address whether processes related to interpersonal relationships suffer from individual differences and cultural differences. For example, what are the potential (neuro) cognitive factors that could block the group outsiders from building relationships with group members, how is the elderly maintain interpersonal relationships and how does aging affect such a process? What are the pathological relationships and what are their underlying psychological consequences and impacts on the psychiatric status? What are the prerequisites for children and adolescents to develop interpersonal relationships with others? Can such skills be trained?

These new possibilities constitute the outlook of the current book, which is dedicated to making some contributions to revealing research trends on applying novel dyadic paradigms and measuring tools to tapping the mechanisms and processes crucial to interpersonal relationships in under-investigated domains.

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