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### Common Dyadic Coping Mediates the Associations Between We-Disease Appraisal and Relationship Satisfaction and Quality of Life in HIV Serodiscordant Couples

#### The Common Fate Mediation Model

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**Common dyadic coping mediated the associations between we-disease appraisal and relationship satisfaction and quality of life among HIV-serodiscordant couples:**

**The common fate mediation model**

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**Credit author statement:** JHH conceived the research idea and designed the study. JHH, RF, and TYJ performed the data acquisition and research execution. JHH made contributions to the analysis and interpretation of data. JHH drafted the manuscript. JHH and XNY performed the writing review and editing, and all authors read and approved the final version of the manuscript. XNY supervised the study.

**Transparency statement:** This study was not formally registered. The analysis plan was not formally pre-registered. De-identified data from this study are not available in a public archive. De-identified data from this study will be made available (as allowable according to institutional IRB standards) by emailing Nancy Xiaonan Yu (nancy.yu@cityu.edu.hk). Analytic code used to conduct the analyses presented in this study are not available in a public archive. They may be available by emailing the corresponding author.

## **Lay summary**

Numerous studies have shown that HIV serodiscordant couples may face HIV-related stress as a unit. Yet, it is not clear how the appraisal of HIV as a shared illness (i.e., we-disease appraisal) may influence relationship satisfaction and both partners' quality of life via common dyadic coping behaviors (e.g., collaboration). In this study, we collected data from 231 HIV serodiscordant couples. Participants completed reports of how they appraise HIV as a we-disease, their common dyadic coping behaviors, and their relationship satisfaction and quality of life. We found that we-disease appraisal was positively associated with common dyadic coping, which in turn was positively associated with relationship satisfaction and both partners' quality of life. Future couple-based interventions should incorporate psycho-educational components to raise awareness about we-disease appraisal, as well as skill-building components to encourage the use of common dyadic coping in clinical settings.

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## Common Dyadic Coping Mediates the Associations Between We-Disease Appraisal and Relationship Satisfaction and Quality of Life in HIV Serodiscordant Couples: The Common Fate Mediation Model

### Abstract

**Background:** Since HIV has evolved into a lifelong but manageable condition, improving the quality of life (QoL) of persons living with HIV (PLWHs) has become increasingly important. Living with HIV is life-altering and poses substantial challenges for both PLWHs and their partners, so identifying how HIV serodiscordant couples cope with HIV together is crucial. Here, Bodenmann's Systemic Transaction Model (STM) highlights common dyadic coping (CDC), which refers to both partners working together to alleviate the negative effects of stress.

**Purpose:** We examined the mediating role of CDC in linking we-disease appraisal with relationship satisfaction and QoL.

**Methods:** We recruited a convenience sample of 231 HIV serodiscordant couples via local grassroots organizations between June and October 2022. Participants completed measures of we-disease appraisal, CDC, relationship satisfaction, and QoL. We examined the mediation effect of CDC on the association between we-disease appraisal and outcomes using the common fate mediation (CFM) model.

**Results:** The mean age of PLWHs was 32.18 years (standard deviation [SD] = 8.61 years), and that of their partners was 32.55 years (SD = 9.24 years). The average time since HIV diagnosis was 4.18 years. Most couples were same-sex male couples. We found that CDC mediated the effect of we-disease appraisal on relationship satisfaction. Moreover, CDC significantly mediated the effect of we-disease appraisal on the QoL of PLWHs and their partners.

**Conclusions:** Our findings highlight the importance of CDC in dyadic illness

management among Chinese HIV serodiscordant couples.

**Keywords:** China, common dyadic coping, common fate mediation model, quality of life, relationship satisfaction, we-disease appraisal

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# **Common Dyadic Coping Mediates the Associations Between We-Disease**

## **Appraisal and Relationship Satisfaction and Quality of Life in HIV**

### **Serodiscordant Couples: The Common Fate Mediation Model**

HIV continues to have devastating health effects worldwide, with 1.5 million people newly infected with HIV and around 38.4 million people living with HIV (PLWH) in 2021 [1]. However, after starting antiretroviral therapy (ART), PLWHs have a similar life expectancy as the general community [2]. Since HIV is no longer a fatal illness but has evolved into a lifelong but manageable condition [3], improving and ensuring the quality of life (QoL) of PLWHs have become increasingly important in recent years. Scholars have even advocated the “fourth 90” treatment target to be the QoL target for PLWHs, extending the continuum-of-services paradigm beyond the current treatment endpoint of immune reconstitution and viral suppression [4].

Living with HIV is a life-altering experience, posing substantial challenges for not only PLWHs but also their partners [5]. For example, cross-partner HIV transmission, the negotiation of sexual relationships, couple-level stigma, and the disclosure of HIV-serodiscordancy to others are particular challenges for HIV serodiscordant couples [6-8]. Since HIV-related experience can be regarded as both indirect stress (e.g., stress contagion from the PLWH to their HIV- partner) [9] and direct dyadic stress (e.g., couple-level stigma) [10], treating HIV serodiscordant couples as a unit during illness management may be more effective for maintaining their relationship and the QoL of both partners [11, 12].

The concept of dyadic coping is useful in comprehending the challenges that couples dealing with chronic illnesses such as HIV face. This construct encapsulates a systemic approach to coping, which involves explicit or implicit stress communication from partner A, a coping response from partner B, and how partner A perceives the



1 responsiveness of partner B [13]. According to the Systemic Transaction Model (STM)  
2 [13], dyadic coping is not a simple combination of partners A and B's individual coping  
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4 but a transaction process wherein both partners adopt coping strategies, aiming not only  
5  
6 to help the stressed person but also to maintain relationship functioning [13, 14].  
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8 Regarding relationship satisfaction as an outcome, a recent meta-analysis revealed that  
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10 dyadic coping is positively associated with marital satisfaction among couples living  
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12 with medical conditions ( $r = .35$ ) [15]. However, the literature on individual outcomes  
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14 (e.g., QoL) has shown contradictory findings, with some studies suggesting the  
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16 beneficial roles of dyadic coping, wherein patients report a higher QoL, and other  
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18 studies failing to find these benefits [16].  
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24 The existing literature has limitations. First, dyadic coping is a multi-dimensional  
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26 construct that comprises three positive dyadic coping strategies and two negative dyadic  
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28 coping strategies [17], with varying effect sizes between each dimension and the  
29  
30 outcome [15, 18]. Therefore, calculating an average or total score may cause the  
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32 heterogeneity of each dimension to be ignored. Among the dyadic coping strategies,  
33  
34 common dyadic coping (CDC) denotes the collaborative efforts of two partners to  
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36 mitigate the detrimental effects of stressful events and incorporates emotional-based  
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38 strategies (e.g., showing affection to each other, helping each other to relax) and  
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40 problem-based strategies (e.g., helping one another to put the problem in perspective  
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42 and see it differently, searching for solutions together). CDC is distinct from other  
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44 dyadic coping strategies (i.e., unidirectional coping) since it reflects a collaborative  
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46 effort to cope with shared stress [13], which might be more adaptive in clinical settings  
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48 (e.g., cancer). For example, a systemic review and meta-analysis found that common  
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50 dyadic coping is positively associated with relationship quality ( $r = .42$ ) and emotional  
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52 functioning ( $r = .13$ ) in couples coping with cancer, whereas the effect sizes were  
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1 smaller ( $r = .17$  to  $.14$ ) for the associations between other dyadic coping strategies and  
2 relationship quality [18]. However, the findings from this meta-analysis were  
3 inconclusive due to the limited number of eligible studies included ( $N = 2$  to  $4$ ). The  
4 researcher also did not report the aggregated effect sizes between other dyadic coping  
5 strategies and emotional functioning due to the same issue. However, in a large  
6 longitudinal study ( $N = 538$ ), CDC outperformed all other dyadic coping strategies in  
7 predicting marital quality and mental health among couples living with breast cancer  
8 [19]. Since HIV may be transmitted from a PLWH to their partner [20], and they may  
9 both face HIV-related stigma as a unit [21], it is crucial to explore whether these dyadic  
10 stressors mobilize the use of couple resources (e.g., CDC) to better adjust to the illness.  
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24 Second, very few empirical studies have examined the antecedents of dyadic  
25 coping, which may have impeded the in-depth understanding of dyadic coping. Recent  
26 studies have identified some individual-level psychological constructs that may serve  
27 as antecedents for dyadic coping in clinical settings (e.g., self-efficacy [22], fear of  
28 illness progression [22], perceived stress [23], and resilience [24]). However, these  
29 studies were limited to individual-level antecedents. The term “we-disease” refers to  
30 the appraisal of an illness as a shared stressor and the consequent joint efforts that both  
31 partners make to manage the illness [25-27]. A qualitative study found that some  
32 couples coping with breast cancer viewed their stress as “ours” (i.e., a shared  
33 experience), discussing how breast cancer had changed their lives as a couple and how  
34 they transitioned from using individualistic coping strategies to mutual coping  
35 strategies [25]. A few studies have directly examined how couples’ appraisals of illness  
36 ownership (i.e., we-disease appraisal) influence their illness adjustment [28, 29]. For  
37 example, a recent study conducted with couples coping with diabetes found that we-  
38 disease appraisal and collaboration are independently linked to support interactions and  
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1 better mood [28]. However, it remains uncertain whether CDC can mediate the link  
2 between we-disease appraisal and relationship satisfaction and QoL. Furthermore,  
3  
4 unlike cancer or diabetes, HIV can be transmitted between partners. As a result, HIV is  
5 likely to be appraised as a “we-disease,” and coping effectively with the illness (e.g.,  
6 achieving viral suppression) can benefit both partners, which can result in improved  
7 health outcomes for both individuals and the potential enhancement of their sexual  
8 experiences, ultimately leading to greater relationship satisfaction. Therefore, HIV  
9 provides an ideal context for assessing the mediating mechanism of CDC, which links  
10 we-disease appraisal with adjustment outcomes.  
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22 Third, most empirical studies have adopted the Actor–Partner Interdependence  
23 Model (APIM) to investigate the association between dyadic coping and adjustment  
24 outcomes in couples living with chronic illness. However, not all variables are  
25 theoretically appropriate to test at the individual level. Although family and relationship  
26 scholars have often posed dyadic-level research questions, they have tended to conduct  
27 statistical analyses at the individual level [30]. The Common Fate Model (CFM) offers  
28 an alternative to the APIM since it assumes that two partners can be affected by a  
29 common relational latent variable [31]. That is, there are two types of common drives  
30 that affect both partners: common shared external forces (e.g., quality of housing) and  
31 common relational factors (e.g., we-disease appraisal, CDC, and relationship  
32 satisfaction in this study) [31, 32]. On the other hand, the APIM assumes that the  
33 interdependence among couples is driven by the direct effect of a person’s predictor on  
34 the partner’s outcomes (i.e., the partner effect), controlling for the effect on their own  
35 outcomes (i.e., the actor effect) [31]. In practice, the choice of statistical models (CFM  
36 vs. APIM) depends on how we measure the construct and the research questions. One  
37 major consideration is the wording of the scale items. If the variable measures a  
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1 relationship as an object (e.g., We both tell each other how we feel), and two partners  
2 report on the same variable, the variable is best modeled as common fate [31]. However,  
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4 if the reports of a construct are self-referential and evaluate one's own status (e.g., QoL),  
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6 it may not be appropriate to model the variable as common fate. Hence, while data may  
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8 be available for both members' levels of QoL, and their reports are likely to be  
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10 correlated, the variable is not at the dyadic level of measurement and may be better  
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12 suited for the APIM [30]. Therefore, in the current investigation, we conceptualized  
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14 we-disease appraisal, CDC, and relationship satisfaction as common fate variables, as  
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16 they assessed the relationship as an object, with both partners reporting on the same  
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18 construct. Contrastingly, QoL was operationalized as a manifested and observable  
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20 variable. Furthermore, due to the growing interest in dyadic-level mediation, scholars  
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22 have started employing the Common Fate Mediation Model (CFMeM) [33], an  
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24 extension of the CFM. One noteworthy example of this is the work of İnce and Işık  
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26 (34)], who adopted the CFMeM to explore the effect of differentiation of the self on  
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28 relationship satisfaction through the mediating role of love language.  
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36 Based on the aforementioned dyadic coping models and limitations of previous  
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38 empirical evidence, we assumed that CDC may act as a mediator in linking we-disease  
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40 appraisal with both relationship satisfaction and QoL. To this end, we proposed the  
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42 following theoretical framework using the CFMeM, with CDC serving as the potential  
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44 mediator. More specifically, we hypothesized that: 1) CDC mediates the association  
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46 between we-disease appraisal and relationship satisfaction at the dyadic level (H1); 2)  
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48 CDC mediates the association between we-disease appraisal and the QoL of PLWHs  
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50 (H2a) and the association between we-disease appraisal and the QoL of partner (H2b).  
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## 56 **Methods**

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58 Participants completed a cross-sectional survey about their demographic  
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1 characteristics (i.e., age, educational level, and ethnicity), clinical information (i.e.,  
2 current CD4+ T cell count and HIV viral suppression status), and couple characteristics  
3 (i.e., relationship duration and type of couple). They also completed measures of we-  
4 disease appraisal, CDC, relationship satisfaction, and QoL, as detailed below.  
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## 9 **Participants**

10 This study comprised 231 couples, wherein one partner was living with HIV while  
11 the other was HIV-. The sample consisted of 178 male-male (i.e., HIV+ male and  
12 HIV- male) couples, 15 female-male (i.e., HIV+ female and HIV- male) couples, and  
13 38 male-female couples (i.e., HIV+ male and HIV- female) couples. We recruited our  
14 convenience sample via local grassroots organizations from eight major cities (i.e.,  
15 Beijing, Changsha, Chengdu, Chongqing, Guangzhou, Shenyang, Shenzhen, and  
16 Urumqi) with a high prevalence of HIV in China between June and October 2022. Some  
17 of the grassroots organizations were in close collaboration with local hospitals that  
18 specialized in infectious diseases (e.g., HIV), while others collaborated with local  
19 disease control centers. The recruitment methods included online posting, peer referrals,  
20 flyers, and snowball sampling. Eligibility criteria for participation as a PLWH included  
21 the following: being 1) clinically diagnosed with HIV, 2) aged over 18 years, 3) in a  
22 committed relationship with one's current partner for at least six months, 4) able to  
23 understand Chinese, and 5) willing to join the survey with their partner. Eligibility  
24 criteria for participation as partners included the following: being 1) self-reported HIV-,  
25 2) aged over 18 years, 3) in a committed relationship with a PLWH for at least six  
26 months, 4) able to understand Chinese, and 5) willing to join the survey with their  
27 PLWH. Site staff screened all participants for eligibility, and participants provided  
28 informed consent to the site staff. Out of the 263 couples that the site staff reached, 16  
29 (6.3%) declined to participate because one partner was unwilling to, 13 (6.1%) were  
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1 not eligible because both partners were self-reported seropositive or seronegative, and  
2 three (1.1%) were not eligible because their relationship duration was shorter than six  
3 months. Participants completed the survey via an online platform (i.e., Wenjuanxing),  
4 and it took around 20 minutes to complete. We trained staff from local grassroots  
5 organizations to oversee the entire process of the study. Once couples were recruited,  
6 the local staff sent one dyadic member a unique participant ID and QR code and  
7 checked the quality after this member completed the questionnaire. The same process  
8 was then repeated with the other dyadic member of the couple. Finally, the local staff  
9 cross-checked the two questionnaires to ensure that they had not been completed using  
10 the same cellphone and that the response patterns were different. We could minimize  
11 the likelihood of the non-independent completion of the questionnaires by taking these  
12 measures. Furthermore, each couple received an incentive of 100 yuan (15 US dollars)  
13 for completing the survey. The Institutional Review Board of City University of Hong  
14 Kong approved this study.

## 33 **Measures**

### 34 *We-Disease Appraisal*

35 We adopted the Inclusion of Other in the Self Scale (IOS, range 0–6) [35] to  
36 measure couples' appraisals of HIV ownership. In the present study, we modified the  
37 introduction of the IOS scale to better suit our needs, posing the following introduction  
38 to each participant: "You see seven pairs of circles with varying degrees of overlap. One  
39 circle in each pair is labeled 'self,' and the second circle is labeled 'HIV– partner.' You  
40 choose one of the seven pairs to answer the following question, 'When you think about  
41 HIV, do you view it as 'our problem' (shared equally by you and your partner) or  
42 primarily your own problem?' The region where the two circles overlap represents the  
43 degree to which you appraise HIV as our problem." Higher scores indicated a higher  
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level of we-disease appraisal.

### ***Common Dyadic Coping***

We adopted the five-item CDC subscale of the Dyadic Coping Inventory (DCI, range 0–20) developed by Bodenmann and colleagues [17] to measure how both partners deal with HIV more or less symmetrically or complementarily (e.g., showing affection to each other and finding solutions together). The CDC subscale has commonly been used in clinical settings [36, 37]. Items were rated on a five-point Likert scale ranging from 0 (“very rarely”) to 4 (“very often”), and we calculated the total score. The internal consistency was .87 for PLWHs and .88 for partners in the present study.

### ***Relationship Satisfaction***

We used the four-item Couple Satisfaction Index (range 0–20) to assess satisfaction in a relationship [38, 39]. This scale has commonly been used to study sexual minority couples [40]. Items were rated on a six-point scale ranging from 0 (“extremely unhappy”) to 5 (“perfect”), from 0 (“not at all true”) to 5 (“completely true”), or from 0 (“not at all”) to 5 (“completely”), and we calculated the total score. Higher scores indicated better relationship satisfaction. The internal consistency was .93 for PLWHs and .94 for partners in the present study.

### ***Quality of Life***

We measured QoL using the brief version of the World Health Organization Quality of Life–HIV (WHOQoL–HIV BREF, 29 items, range 0–116) for PLWHs and the brief version of the World Health Organization Quality of Life (WHOQoL BREF, 24 items, range 0–96) for their partners [41]. Items were scored on a five-point scale ranging from 0 (“very poor”) to 4 (“very good”), from 0 (“very dissatisfied”) to 4 (“very satisfied”), from 0 (“not at all”) to 4 (“extremely”), or from 0 (“never”) to 4 (“always”).

1 We calculated the total score for the WHOQoL BREF by summing the scores for the  
2 four domains (i.e., physical, psychological, social relationships, and environment).  
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4 Compared to the WHOQoL BREF, the WHOQoL–HIV BREF contains five extra items  
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6 specific to PLWHs. We calculated the total score for the WHOQoL–HIV BREF by  
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8 summing the scores for the four domains (i.e., physical, psychological, social  
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10 relationships, and environment) and the five HIV-specific items. Higher scores  
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12 indicated a higher level of QoL. The internal consistency was .86 for PLWHs and .93  
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14 for partners in the present study.  
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### 19 **Covariates**

20 We considered the individual demographic variables (i.e., age, educational level,  
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22 and ethnicity), clinical information (i.e., current CD4+ T cell count and HIV viral  
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24 suppression status), and couple characteristics (i.e., relationship duration and type of  
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26 couple) as potential confounders. The Developmental-Contextual Model of Dyadic  
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28 Coping proposes that broader sociocultural factors (e.g., age) and more proximal  
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30 contextual factors (e.g., relationship duration, type of couple, specific demands of the  
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32 chronic illness) may shape the dyadic coping process during illness management [42].  
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34 Notably, educational level was categorized as below college versus college or above,  
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36 ethnicity as Han versus non-Han, current CD4+ T cell counts based on the most recent  
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38 physical examination results as greater than or equal to 500 cells/ml versus fewer than  
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40 500 cells/ml, current HIV viral suppression status based on the most recent physical  
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42 examination results as detectable versus undetectable, the type of couple as same-sex  
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44 male couples versus female (PLWH)–male (partner) couples versus male (PLWH)–  
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46 female (partner) couples. Age and relationship duration were modeled as continuous  
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## Statistical Analyses

We used SPSS 20 for the descriptive analyses and bivariate associations of the study variables. First, we performed mixed design analyses of variance using the type of relationship (male+/male- vs. female+/male- vs. male+/female-) as a between-couple factor and their role (PLWH vs. partner) as a within-couple factor for the measures of we-disease appraisal, CDC, relationship satisfaction, and QoL. Then, we examined the mediation role of CDC using the CFMeM. The CFMeM offered a conceptual and statistical framework to account for shared latent variables inherent to dyadic concepts. The theoretical assumptions of the CFMeM were that 1) two partners are influenced by a common latent variable, 2) mediation occurs and should be modeled at the dyadic level, and 3) the measurements from both partners are reliable indicators of common fate [31, 33]. Figure 1 shows the conceptual framework of the CFMeM for this study. We used we-disease appraisal as an independent variable, CDC as a mediator, and relationship satisfaction and QoL as outcomes. We then regressed the PLWH's dependent variable and mediator on their own covariates and couple-level covariates (i.e., type of couple) while regressing HIV- partners' dependent variable and mediator on their own covariates and couple-level covariates (i.e., type of couple). Moreover, we modeled we-disease appraisal, CDC, and relationship satisfaction as common fate (latent) variables and QoL as a manifest variable for each member of the couple. For mediation analysis, we examined the paths using the joint-significance test. If both component paths of the mediation effect were significant, then we concluded that there existed a significant mediation effect [43]. Next, we examined the magnitude and 95% confidence interval (CI) of the mediation effect using a 1000-times bias-corrected bootstrap [43]. We adopted four indices, including the comparative fit index ( $CFI > .95$ ), Tucker-Lewis index ( $TLI > .95$ ), root mean square error of approximation (RMSEA

1 <.06), and standardized root mean square residual (SRMR <.08), to assess the model  
2 fit [44]. We adopted the R package Lavaan to run two CFMeM analyses [45].  
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## 4 **Results**

### 5 **Descriptive and Bivariate Correlation Analyses**

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7 The mean age of the PLWHs was 32.18 years (standard deviation [SD] = 8.61  
8 years), and the mean age of their partners was 32.55 years (SD = 9.24 years). Almost  
9 all participants were of Han ethnicity (93%). More than half of the PLWHs (63.2%) and  
10 their partners (58.4%) hold a bachelor's degree or higher. Moreover, the median  
11 monthly income for PLWHs and their partners was 3000 to 4999 CNY (approximately  
12 450 to 750 US dollars). Around half of the PLWHs (58%) had successful immune  
13 recovery (i.e., CD4+ T cell counts greater than or equal to 500 cells/ml), and 169 (73.2%)  
14 had achieved HIV viral suppression status. The average duration since HIV diagnosis  
15 was 4.18 years (SD = 3.13 years). The relationship duration that PLWHs reported (mean  
16  $\pm$  SD: 4.21  $\pm$  4.66 years) and partners (4.32  $\pm$  4.77 years) was comparable. Most of the  
17 couples were same-sex male couples (77%). None of the main effects of role or  
18 interaction was statistically significant, except for the main effects of the type of couple  
19 on CDC ( $p = .03$ ) and relationship satisfaction ( $p = .01$ ) (Table 1).  
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41 Table 2 shows the bivariate correlations among all key modeled variables and the  
42 correlations between the covariates and key modeled variables. All bivariate  
43 correlations among the key modeled variables were significant (all  $ps < .01$ ), with effect  
44 sizes ranging from .18 to .57.  
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### 51 **The Common Fate Mediation Model for We-Disease Appraisal, Common Dyadic** 52 **Coping, and Relationship Satisfaction**

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54 The CFMeM for the mediating effect of CDC on the association between we-  
55 disease appraisal and relationship satisfaction had a good fit in all indices except for  
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1 TLI, with CFI = .959, TLI = .912, RMSEA = .049, and SRMR = .045. Confirming H1,  
2 CDC mediated the effect of we-disease appraisal on relationship satisfaction (a:  $\beta_a$   
3 = .538, SE = .089,  $p < .001$ , b:  $\beta_b = .617$ , SE = .135,  $p < .001$ ; ab:  $\beta_{ab} = .332$ , SE = .086,  
4  $p < .001$ ; bootstrapped 95% CI .180 to .649; Figure 1). The direct effect of we-disease  
5 appraisal on relationship satisfaction was also significant (c:  $\beta_c = .248$ , SE = .113,  $p$   
6 = .028). The proportion of each total effect mediated by CDC was 57.2%. The explained  
7 variance for relationship satisfaction was 54.7% for PLWHs and 61.1% for partners.  
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### 10 **The Common Fate Mediation Model for We-Disease Appraisal, Common Dyadic** 11 **Coping, and Quality of Life** 12 13 14 15 16

17 The CFMeM for the mediating effect of CDC on the association between we-  
18 disease appraisal and QoL also had a good fit, with CFI = .980, TLI = .957, RMSEA  
19 = .029, and SRMR = .039. The results indicated that CDC mediated the impact of we-  
20 disease appraisal on the QoL of PLWHs (a:  $\beta_a = .546$ , SE = .089,  $p < .001$ ; b:  $\beta_b = .531$ ,  
21 SE = .196,  $p = .007$ ; ab:  $\beta_{ab} = .290$ , SE = .120,  $p = .016$ ; bootstrapped 95% CI .030  
22 to .721; H2a) and, significantly, on the QoL of partners (a:  $\beta_a = .546$ , SE = .089,  $p < .001$ ,  
23 b:  $\beta_b = .388$ , SE = .187,  $p = .037$ ; ab:  $\beta_{ab} = .212$ , SE = .104,  $p = .041$ ; bootstrapped 95%  
24 CI .017 to .470; H2b; Figure 2). The direct effect of we-disease appraisal was not  
25 significant on either the QoL of PLWHs (c:  $\beta_c = .049$ , SE = .167,  $p = .771$ ) nor on the  
26 QoL of partners (c:  $\beta_c = .257$ , SE = .157,  $p = .101$ ). The proportion of each total effect  
27 that was mediated by CDC was 86.1% for the QoL of PLWHs and 45.2% for the QoL  
28 of partners. The explained variance for QoL was 18.8% for PLWHs and 18.3% for  
29 partners.  
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### 54 **Discussion**

55 To our knowledge, this was the first study to examine the effect of we-disease  
56 appraisal on dyadic adjustment (i.e., relationship satisfaction) and individual  
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1 adjustment (i.e., QoL) via CDC in the context of HIV. Using an innovative statistical  
2 model, the CFMeM, we examined the mediating role of CDC in linking we-disease  
3 appraisal with relationship satisfaction, as well as linking we-disease appraisal with  
4 QoL. This study found that CDC significantly mediated the association between we-  
5 disease appraisal and relationship satisfaction at the dyadic level. Moreover, CDC  
6 significantly mediated the associations between we-disease appraisal and the QoL of  
7 PLWHs and we-disease appraisal and the QoL of partners.  
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17       Confirming H1, our findings show that we-disease appraisal is significantly  
18 associated with a higher level of CDC, which, in turn, is significantly associated with a  
19 higher level of relationship satisfaction at the dyadic level. First, our findings supported  
20 the theoretical assumption that we-disease appraisal is the key driver of the initiation of  
21 CDC [42, 46]. Second, previous studies have found robust evidence showing that CDC  
22 is associated with relationship satisfaction for partners in both clinical settings and the  
23 community [15, 18]. CDC fosters the less-threatening appraisal of an illness and  
24 encourages the use of more coping resources, thus enhancing relationship satisfaction  
25 [13, 42]. Third, relationship satisfaction may play a dual role in intimate relationships  
26 by serving as both a predictor and an outcome of CDC [47]. Future longitudinal cohort  
27 studies should assess the temporal and bidirectional associations between these  
28 constructs in intimate relationships. Fourth, both the direct effect of we-disease  
29 appraisal and the mediation effect were significant. Additionally, we found that the  
30 proportion of the total effect mediated by CDC was 45.2%. This implies that CDC  
31 partially mediates the relationship between we-disease appraisal and relationship  
32 satisfaction. Aside from CDC, other relational factors such as mutual trust and openness  
33 may mediate this dyadic-to-dyadic-level association. Future studies should, therefore,  
34 explore other relational factors as mediators and use parallel mediation models to  
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compare their relative weights.

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3       Confirming H2a and H2b, our findings show that we-disease appraisal is  
4 significantly associated with a higher level of CDC, which, in turn, is significantly  
5 associated with a higher level of QoL for PLWHs and partners. QoL is a multi-  
6 dimensional construct, encapsulating psychological, physical, social, and  
7 environmental subdomains [41]. Our findings support the idea that CDC may have  
8 multifold beneficial effects among PLWHs and their partners. However, we should be  
9 cautious about the generalizability of our findings. Since the PLWHs in our sample  
10 were relatively healthy (i.e., not hospital patients), and the care burden for their partners  
11 was low, our findings may not be generalizable to PLWHs at severe illness stages and  
12 partners with a high care burden. Furthermore, CDC may not always be adaptive and  
13 relieving; it may instead be a stressor for partners when focusing exclusively on patients'  
14 needs [48] or when resources are scarce due to the severity of the disease [49]. However,  
15 these counter-intuitive findings were mainly drawn from couples coping with cancer  
16 and couples with general stress [48-51]. Nevertheless, future studies should also recruit  
17 PLWHs at more severe illness stages (e.g., WHO stage four) to assess the potential  
18 moderation effect of illness severity on these associations using the CFMeM [e.g., 52].  
19 Furthermore, neither the direct effect of we-disease on the QoL of PLWHs nor the direct  
20 effect on the QoL of partners was significant, whereas both mediation effects were  
21 significant. Moreover, the proportion of the total effect mediated by CDC was 86.1%  
22 for the QoL of PLWHs and 45.2% for the QoL of partners. According to the guideline  
23 that Kenny and colleagues proposed (i.e., "if one wants to claim complete mediation,  
24  $ab/c$  should be at least .80") [53], CDC completely mediated the association between  
25 we-disease appraisal and the QoL of PLWHs, with an effect size larger than 80%.  
26 Contrastingly, CDC only partially mediated the association between we-disease  
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1 appraisal and the QoL of partners. Therefore, while CDC appears to be a dominant  
2 dyadic-level mechanism for we-disease appraisal and the QoL of PLWHs, other partner-  
3 specific mechanisms such as caregiving responsibilities and experience may play a role  
4 in the QoL of partners [54]. Overall, these results suggest that CDC can act as a  
5 promising bridge between dyadic-level associations and individual-level outcomes.  
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12 Several limitations of the present study should be addressed. First, our results were  
13 obtained in a cross-sectional study, which precludes drawing conclusions about  
14 temporality and directionality. A longitudinal study using multiple waves of  
15 measurement is warranted to specify the dynamics of the dyadic coping process.  
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22 Second, our sample was dominated by younger, Han, male–male couples with a  
23 short relationship and diagnosis duration, making the results ungeneralizable beyond  
24 the current sample. Moreover, our findings may not be generalizable to other illnesses  
25 (e.g., cancer). HIV primarily affects marginalized communities such as sexual  
26 minorities or drug users, while other chronic illnesses are more likely to affect the  
27 majority [55]. Given this, HIV serodiscordant couples may have limited access to social  
28 or institutional resources compared to couples coping with other illnesses [56].  
29 Moreover, compared to other illnesses, HIV is a couple-level issue, characterized by  
30 potential transmission, couple-level stigma, sexual relationship negotiation, and HIV  
31 disclosure in HIV serodiscordant couples [57]. HIV serodiscordant couples may rely  
32 more on dyadic resources, such as we-disease appraisal and CDC, while couples coping  
33 with other illnesses may have more diverse resources available [58]. Therefore, we  
34 assumed that the use of we-disease appraisal and CDC may be higher in HIV  
35 serodiscordant couples than in couples living with other chronic illnesses. Furthermore,  
36 these dyadic resources can be especially important for illness adjustment in HIV  
37 serodiscordant couples. In the future, it would be helpful to extend this study and  
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examine these assumptions in couples with diverse demographics, clinical stages, or other illnesses.

Moreover, since our sample was dominated by male–male couples, our findings may have been biased. The small group sizes of female+/male– and female–/male+ disallowed group comparisons. Previous studies have found that gay couples utilize higher levels of dyadic coping compared to opposite-sex relationship couples [57], and gay couples may benefit more from dyadic coping behaviors than heterosexual couples [59]. Therefore, future studies are needed to replicate this study and discover any group differences. Moreover, the descriptive data suggest that the average relationship duration was slightly longer than the average diagnosis duration. Future studies may explore whether we-disease appraisals are more likely to occur in relationships that begin before or after HIV diagnosis.

Fourth, since race and gender are two interconnected social identities, future dyadic studies should be designed within the theoretical framework of intersectionality [60]. It is important for researchers to acknowledge the complexity of social identities and how they intersect, particularly in the context of HIV management. By using an intersectional approach, researchers will be better able to understand the unique experiences of individuals with multiple identities and how these experiences may differ from those with only one identity. This can lead to more targeted interventions and policies that are better tailored to the needs of diverse populations.

Fifth, since our sample was collected during the COVID-19 pandemic, our findings may have been confounded by COVID-19 contextual variables. For example, uncertainty about COVID-19 is associated with increased levels of stress and anxiety among young PLWHs and directly affects their mental well-being [61]. Future studies should consider how the “big era” (e.g., the pandemic era) affected individuals’ and

1 couples' lives.

2 Our study provides a compelling example of how illness management occurs  
3 within the context of HIV serodiscordant couples. Our findings offer empirical support  
4 for Bodenmann's STM [27], which was originally designed for non-clinical couples  
5 navigating everyday stressors, and extends the model to clinical populations. We also  
6 provide empirical support for the notion that we-disease appraisal is a key agent in  
7 navigating dyadic resources in HIV serodiscordant couples [25, 26]. Understanding  
8 how dyadic and individual mechanisms (e.g., dyadic and individual coping styles)  
9 interact in predicting the QoL of both partners is a fascinating area for further  
10 investigation.  
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24 In summary, this research provides new knowledge about the dyadic illness  
25 management of couples living with HIV due to its collection of dyadic data and  
26 application of theoretically appropriate dyadic approaches (i.e., the CFMeM).  
27 Moreover, the present study considered both dyadic and individual outcomes to capture  
28 important psychosocial indicators. Our findings illustrate a robust mediational process  
29 between we-disease appraisal and adjustment outcomes via CDC, suggesting that  
30 couple-based interventions should incorporate psycho-educational components to raise  
31 awareness about we-disease appraisal, as well as skill-building components to  
32 encourage the use of CDC in clinical settings.  
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**Table 1***The descriptive analyses for study variables (N = 231 dyads)*

	PLWH <i>M (SD)</i>	Partner <i>M (SD)</i>	<i>F</i>	<i>P</i>	<i>η</i> <sup>2</sup>
We-disease appraisal					
Male + & Male –	3.98 (1.90)	3.88 (1.71)			
Female + & Male –	3.09 (1.84)	3.07 (1.87)			
Male + & Female –	3.71 (2.12)	3.74 (1.88)			
The main effect of role			0.02	.89	<0.001
The main effect of type of couple			2.11	.12	0.02
Interaction effect			0.10	.91	0.001
Common dyadic coping					
Male + & Male –	13.96 (3.72)	13.82 (3.69)			
Female + & Male –	12.53 (2.45)	12.40 (3.22)			
Male + & Female –	12.97 (3.86)	12.16 (4.59)			
The main effect of role			0.77	.39	0.003
The main effect of type of couple			3.67	.03	0.031
Interaction effect			0.47	.63	0.004
Relationship satisfaction					
Male + & Male –	15.74 (3.73)	15.96 (3.44)			
Female + & Male –	14.20 (4.80)	13.47 (4.82)			
Male + & Female –	14.39 (4.02)	13.34 (4.30)			
The main effect of role			1.96	.16	0.009
The main effect of type of couple			7.32	.01	0.060
Interaction effect			2.25	.11	0.019
Quality of life <sup>#</sup>					
Male + & Male –	58.33 (14.66)	61.21 (14.68)			
Female + & Male –	52.93 (10.77)	52.00 (11.97)			
Male + & Female –	56.79 (16.91)	57.82 (18.59)			
The main effect of role			0.30	.58	0.001
The main effect of type of couple			2.69	.06	0.024
Interaction effect			0.47	.63	0.004

**Notes:** Male + & Male –: HIV seropositive male and seronegative male, Female + & Male –: HIV seropositive female and seronegative male, Male + & Female –: HIV seropositive male and seronegative female, M: Mean, PLWH: People Living with

HIV, QoL: Quality of Life, RL: Relationship Length, RS: Relationship Satisfaction, SD: Standard Deviation

\*When conducting ANOVA, we did not consider the five extra items specific to PLWH. Therefore, the statistic would not be contaminated by measurement differences.

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**Table 2**

*The correlations between the key modeled variables and their associations with covariates (N = 231 dyads)*

	WdA_ PLWH	CDC_ PLWH	RS_ PLWH	QoL_ PLWH	WdA_ Partner	CDC_ Partner	RS_ Partner	QoL_ Partner
WdA_ PLWH	1							
CDC_ PLWH	.39**	1						
RS_ PLWH	.43**	.50**	1					
QoL_ PLWH	.35**	.44**	.52**	1				
Age_ PLWH	-.04	-.18**	-.02	.01	-.13	-.10	-.01	-.01
Education_ PLWH	.08	.09	.03	.13	.15*	.10	.09	.11
Ethnicity_ PLWH	.03	.03	-.04	.12	-.02	.04	.12	.02
CD4+_ PLWH	-.04	-.01	.13*	.06	-.11	-.01	.13	.04
VS_ PLWH	-.15*	.01	-.20**	-.22**	-.02	-.12	-.26**	-.08
RL_ PLWH	-.07	-.04	-.01	-.05	-.03	-.14*	.01	-.05
ToC_ PLWH	.10	.13	.15*	.06	.08	.17**	.28**	.14*
WdA_ Partner	.53**	.29**	.28**	.18**	1			
CDC_ Partner	.34**	.45**	.40**	.27**	.34**	1		
RS_ Partner	.36**	.33**	.57**	.31**	.30**	.56**	1	
QoL_ Partner	.28**	.36**	.28**	.53**	.25**	.35**	.56**	1
Age_ Partner	-.03	-.20**	-.03	-.02	-.11	-.12	.01	-.06
Education_ Partner	.10	.18**	.01	.02	.13	.14*	.10	.13*
Ethnicity_ Partner	.03	-.07	-.18**	-.10	.08	-.06	-.16*	-.04
RL_ Partner	-.08	-.06	-.08	.04	-.04	-.19**	-.07	-.10

**Notes:** CDC: Common Dyadic Coping, PLWH: People living with HIV, QoL: Quality of Life, RL: Relationship Length, RS: Relationship Satisfaction, ToC: Type of Couple, VS: Viral Suppression, WdA: We-disease Appraisal

The key modeled variables are independent variables (i.e., both partners' we-disease appraisal), mediators (i.e., both partners' common dyadic coping), and dependent variables (i.e., both partners' relationship satisfaction and quality of life).

We report two decimals to save space. \* $p < .05$  \*\* $p < .01$

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2 **Figure 1 The common fate mediation model between we-disease appraisal and**  
3 **relationship satisfaction with the mediator of common dyadic coping (N = 231**  
4 **dyads)**

5 **Abbreviations:** CDC = Common Dyadic Coping, RS = Relationship Satisfaction,  
6 PLWH = People living with HIV

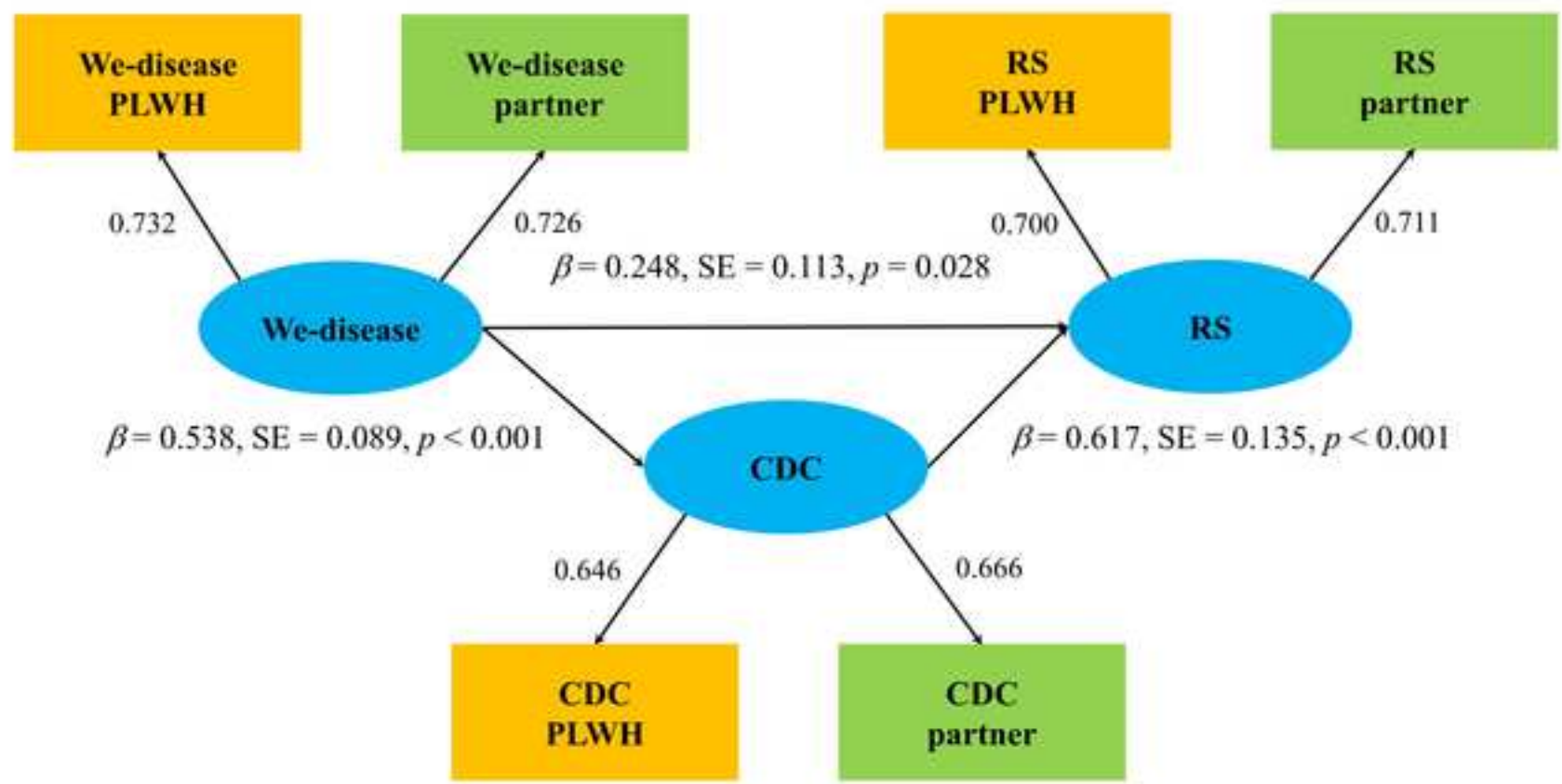
7 **Notes:** The manifested variables for PLWH were marked in yellow; The manifested  
8 variables for partners were marked in green; The common fates were marked in blue.

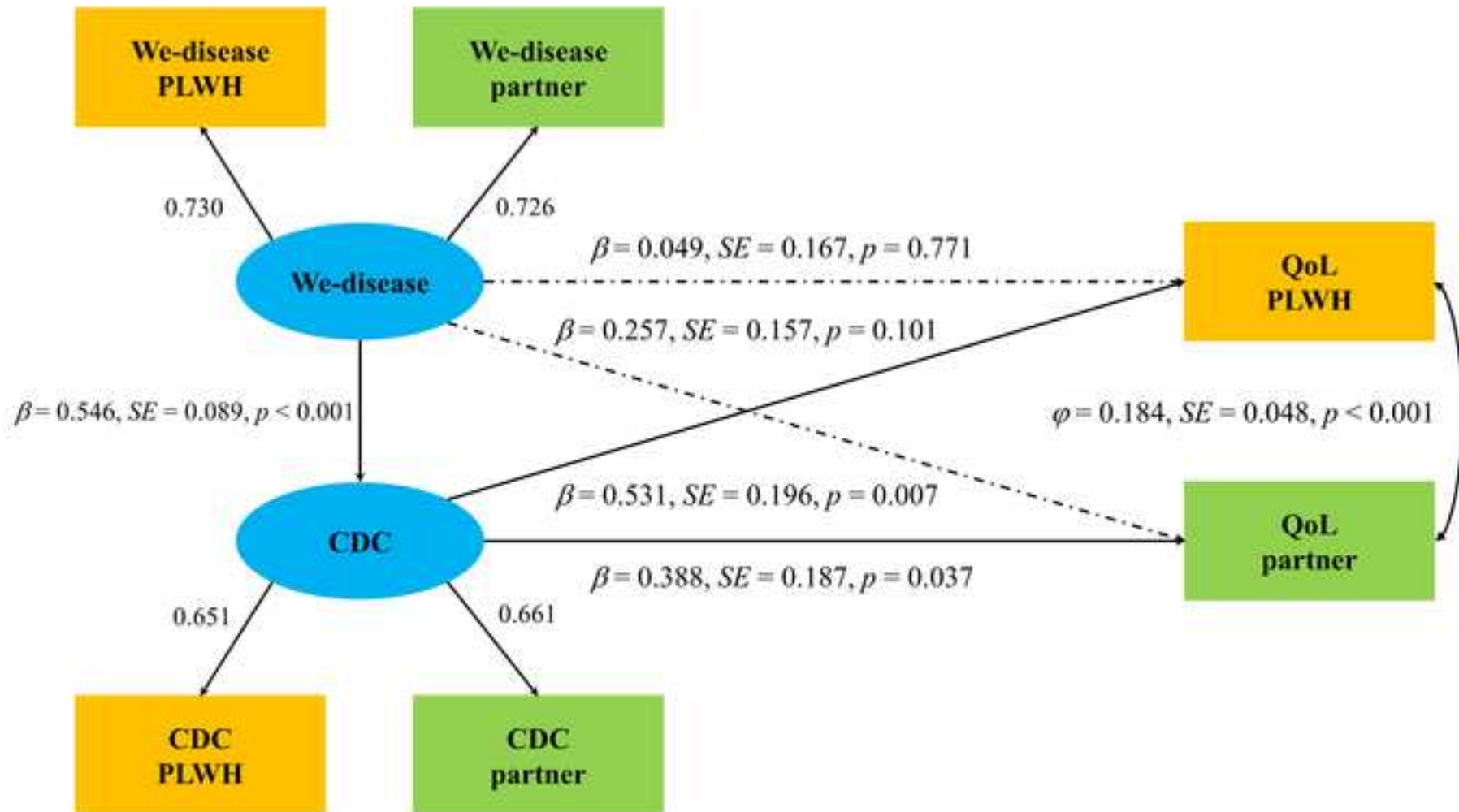
9 **Figure 2 The common fate mediation model between we-disease appraisal and**  
10 **quality of life with the mediator of common dyadic coping (N = 231 dyads)**

11 **Abbreviations:** CDC = Common Dyadic Coping, QoL = Quality of Life, PLWH =  
12 People living with HIV

13 **Notes:** The manifested variables for PLWH were marked in yellow; The manifested  
14 variables for partners were marked in green; The common fates were marked in blue.

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**Conflict of interests:** The authors declare no competing interests.

**Ethical adherence:** This study was approved by the Institutional Review Board of the City University of Hong Kong. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.