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Interpersonal trust in doctor-patient relation: Evidence from dyadic analysis and association with quality of dyadic communication

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ABSTRACT

Rationale. Although they form a dyadic relationship, doctor's and patient's levels of trust in the other have usually been investigated separately. As members of dyadic relationships, they influence each other's behaviors and are interdependent because they share a past history and eventually a common future. Objectives. The aim of this paper was to examine the composition of trust in doctor-patients relationship and estimate its association with quality of doctor's communication. One-With-Many analyses (OWM) were used to examine the composition of trust variance into "doctor and patient effects", "relationship effects", and "reciprocity effects," taking into account the interdependence of the data. Method. Twelve General Practitioners (GPs; Mage = 54.16, SD = 12.28, 8 men) and 189 of their patients (Mage = 47.48, SD = 9.88, 62% women) took part in the study. GPs and their patients completed postconsultation questionnaires on trust and quality of communication. Results. The findings revealed that "doctor" and "patient" effects were significant. However, the most important part of the variance was attributable to the relationship and reciprocity effects, meaning that if a doctor reported high trust in a particular patient, then the patient reported a similarly high level of trust. Higher quality of communication was positively associated to those relationship effects of trust. Conclusions. Our study stresses the importance to investigate trust in doctor-patients relationship as a dyadic and interdependent phenomenon applying appropriate methodological design and analysis. Convergence between doctor's and patients' perceptions of their relationship may enhance trust more than conventional intervention and may ultimately contribute to better health outcomes.

1. Introduction

Medical trust is an inherent dyadic construct capturing relationships, interactions, and exchanges that occur between the two partners of a dyad (Rempel et al., 1985; Rotenberg, 2010; Street et al., 2008; see also Kenny et al., 2010). As Rowe and Calnan (2006) speculate, the shift towards more patient participation in medical decision-making puts patients and doctors in a higher interdependence and increases the need of mutual trust. On the patient side, research shows that trust in doctors is positively associated with adherence to treatment, continuity of care, willingness to recommend the physician to others, and self-reported health (Hall et al., 2002; Kim et al., 2008; Rotenberg and Petrocchi, 2018; Safran et al., 1998; Thom et al., 1999; Yang-Lee and Lin, 2011). A recent meta-analysis demonstrated that patients reported more beneficial health behaviours, less symptoms, and higher quality of life when they had a higher level of trust in their health care professionals (Birkhaèuer et al., 2017). The same authors also found a small but significant correlation between trust and health-related quality of life and symptom-related outcomes and a strong association between trust and patient satisfaction.

Wilk and Platt's (2016) scoping review noticed that physicians' trust in their patients significantly affects the quality of their care (Kaasalainen et al., 2007; Moskowitz et al., 2011; Martin et al., 2014), the longevity of the relation (Succi et al., 1998; Rogers, 2002; Gilson et al., 2005; Fulton et al., 2011; Moote et al., 2011; Martin et al., 2014), and ultimately physicians' satisfaction. The increasing attention for physicians' trust in patients and a more comprehensive understanding of the relevant dynamics of trust could shed light on the mechanisms that develop or destroy trust and the way in which these dynamics affect patients' health care (Wilk and Platt, 2016). Trust in clinical

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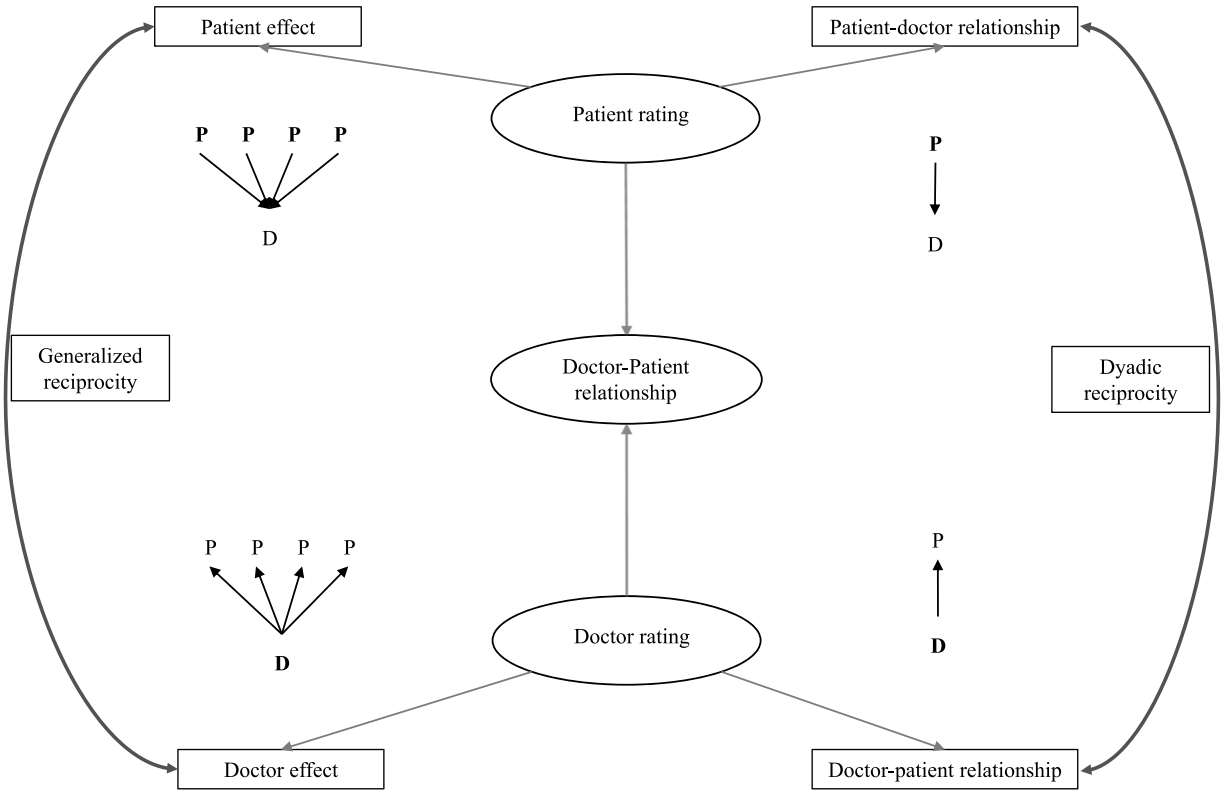

Fig. 1. The variance components of the doctor-patient trust derived from reciprocal one-with-many (adapted from Marcus et al. 2009,Marcus et al., 2011). (D = Doctor; P = Patient).

consultation is maintained through consolidated interactions of consecutiveness, time-continuity, and positive expectations (Riva et al., 2014a, 2014b) and eventually to psychological ownership (Misfud et al. 2019). The development of trust depends on the quality of the doctor's communication and provision of information (Chandra et al., 2018; Pearson and Raeke, 2000), his/her ability to take patients' problems seriously and treat them with care and concern (Croker et al., 2013), as well as his/her behavioural competence, including listening and talking skills (Gopichandran and Chetlapalli, 2013).

The essentially dyadic nature of patient-doctor trust tends to be measured as a set of behaviours shown by one actor of the dyad, more often the patient (Muller et al., 2014; Petrocchi et al., 2017; Wilk and Platt, 2016), and to apply standard individual-level analyses. Such traditional methods fail twofold. From a theoretical point of view, the dyadic conceptualization of trust and the methodology employed to get data from only one side of the dyad, do not correspond to one another. Reciprocal designs providing data from both partners should be developed to overcome this deficiency. From a statistical point of view, traditional analyses (e.g., regression, analysis of variance (ANOVA)) applied on dyadic data affect the variance estimation and then the *p*-values of the analyses (see Kenny et al., 2006). Hence, appropriate levels analysis should be applied to interpersonal trust in the medical context.

1.1. Dealing with dyadic constructs and non-independent data

Members in a dyadic relationship influence each other's behaviours (Campbell and Kashy, 2002; Woody and Sadler, 2005) and are interdependent because they share a history and eventually a common future. Interdependence makes an individual's behaviours vary significantly depending on the relational context and the individual's cognitive, emotional, and social functioning to evolve from recognizing, evaluating, and responding to the dynamics of the relation (Reis and Collins, 2004). Another consequence of dyadic interdependence is that social functioning and behaviours of one partner can influence the functioning of the other partner (Campbell and Kashy, 2002).

In an attempt to consider the complexity of dyadic constructs, Kenny et al. (2006) defined the concept of non-independence. Conceptually speaking, dyadic non-independence occurs when two scores measured in the two members of a dyad are more similar to (or different from) one another than two scores measured in two people outside this dyad (Kenny et al., 2006). As many other forms of close relationships, data on doctor-patient relations are naturally non-independent since they arise from individuals who know, interact with, and influence each other. In addition, two patients who see the same doctor must be considered non-independent, even if they never interact with each other, because they share the same medical care environment (Kenny et al., 2006). From a statistical point of view, dyadic constructs require a specific set of analyses that considers the non-independence of the data (Kenny et al., 2006). The standard parametric statistical methods currently under use (ANOVA, correlation, and multiple regression) work under the assumption of independence of the data; that is, data from each individual in a study should be unrelated to data from every other individual.

One way to address non-independent data is treating them with multilevel models or generalized estimating equations (Del Piccolo et al., 2007; Epstein et al., 2005). Although these approaches correct for statistical bias, they fail to examine the richness of non-independent data (Hagiwara et al., 2014). The one-with-many (OWM) is a family of analyses purposely developed to overcome these limitations (Kenny et al., 2006). The OWM allows the evaluation of the non-independence of the data in the form of the estimation of the variance shared between patients (the many) and doctor (the one). The OWM allows for the consideration of the patient's point of view (i.e., many perceivers, one target design) or the doctor's point of view (i.e., one perceiver, many targets design). However, a more comprehensive class of OWM allows researchers considering both partners of the relation (i.e., reciprocal design). The application of such designs provides a solution to the

above-mentioned theoretical and statistical problems linked to limiting the analysis to one partner of the dyad and to application of standard individual-level analyses.

Applied to trust between doctor and patient, the reciprocal OWM implies collecting data from dependent dyads in which multiple *partners* (the patients) share a *focal person* (the doctor). Every patient provides a rating of trust in his/her doctor, and the doctor provides ratings of trust in each patient. Avoiding abstract terminology of the methodological description, the fundamental concept of the OWM applied to the doctor-patient relationship is that interpersonal trust may vary as a function of three main components: the doctor, the patient, and their relationship (see Fig. 1 for a depiction of variance partitioning). The *doctor effect* is the share of variance due to the doctor assessing different patients in the same way. For example, Dr L reports high (or low) levels of trust across all his patients, which indicates that a doctor sees his/her patients similarly and does not distinguish between patients with regard to the variable under scrutiny (i.e., assimilation effect). The *patient effect* is the share of variance due to the same doctor being assessed by different patients in a similar fashion. For example, all Dr L's patients report high (or low) levels of trust towards him. A high level of patient variance can be due to invariance in doctor behaviour—he treats all patients alike—or to similar patterns of perceptions in all his/her patients—no matter what a doctor does, all patients consider him/her consistently (i.e., consensus effect). Through the correlation of doctor and patient effect, the *generalized reciprocity* is estimated by measuring the degree of the agreement between doctor's and patients' evaluations. A high level of generalized reciprocity means that, if doctors report a high level of trust, so will patients.

The other variance component partition is the relationship effect that, in reciprocal OWM, takes two forms. *Patient-doctor relationship* measures the unique part of variance due to the specific dyadic relation between a patient and his/her doctor from the patient's point of view, over and above any other effect. It should be noted that the OWM does not allow the estimation of either patient perceiver effect or patient partner effect. Patient perceiver effect pertains to the patient's evaluation of several doctors, while patient partner effect is the evaluation of a patient made by several doctors. The OWM does not estimate the two effects, which become part of the two relationship effects. As an example of the patient-doctor relationship effect, Anna may think that her relationship with Dr L is characterized by high (or low) level of trust over and above the evaluation given by Dr L or by the Dr L's other patients. It indicates, one may say, what is ‘special’ or ‘unique’ about a given dyad.

Finally, *Doctor-patient relationship* estimates the unique part of variance due to the specific relation between a doctor and a patient from the doctor's point of view, over and above any other effects, indicating what is ‘special’ about a dyad in the doctor's eyes. For example, Dr L may think that his relationship with Anna is characterized by a high (or low) level of trust over and above the evaluations given by Anna or by the Dr L's other patients. Through the correlation between the two relationship effects, the *dyadic reciprocity* is estimated measuring the degree of the agreement between the two dyadic relationship effects. A high level of dyadic reciprocity indicates that, if a patient sees his/her relationship with the doctor as ‘special’, then the doctor reports similar evaluation. The variance components partitioned through the application of reciprocal OWM allow investigators to disentangle the relational process between patients and doctor and would answer to a number of new analytical questions on the specific contribution of both parties of the relation, their mutual influence and interdependence, the antecedents and consequences of those effects. Table 1 shows examples of types of such research questions.

Previous studies have analysed the variance components of the dyadic relations applied to the working alliance between therapists and clients and to the quality of communication between doctors and patients. In their seminal work on therapeutic alliance with clients, Marcus et al. (2009, 2011) found that there was a substantial part of the variance explained by relationship effects, as rated by therapists and clients. They found a low consensus among the alliance of clients who saw the same therapist (i.e., non-significant client effect), whereas some therapists reported stronger alliance than others did (i.e., low but significant therapist effect). There was a relevant dyadic reciprocity, meaning that, if a therapist reported a good alliance with a particular client, then that client was also likely to report a good alliance with the therapist. Similar results were found when the quality of the working alliance was studied in a sample of adolescents with cannabis dependence or abuse (Marcus et al., 2011). Also, in this research, the most important parts of the variance partitioning were related to the relationship effects and dyadic reciprocity. In both studies, clients who rated their therapeutic alliance as high, over and above perceiver or partner effects, had better outcomes in terms of cannabis reduction (Marcus et al., 2011) and improved mental health (Marcus et al., 2009, 2011).

Table 1
Examples of research questions that can be answered through the application of the one-with-many design.

1. What are the sources of variability (i.e., partner effect, perceiver effect, relationship effects, reciprocity) in dyad members' ratings of their relationships (i.e., trust, quality of communication, expectations, satisfaction)?
2. What characteristics of the doctor and his/her patients (i.e., cognition, emotional intelligence, self-confidence, behaviour, and personality traits) influence doctors' evaluations of the relationships with patients and patients' ratings of the relationships with the doctor?
3. What are the consequences (i.e., well-being, adherence, compliance to medical regime) of the sources of variability (i.e., partner effect, perceiver effect, relationship effects, reciprocity) in dyad members' ratings of their relationships?
4. Is there a change over time on the sources of in dyad members' ratings of their relationships? What are the factors determining the change? What are the consequences?

Note. OWM = one-with-many.

More recently (Altena et al., 2017), the OWM has been applied to the working alliance between homeless young adults and their social workers. The authors found a significant but medium level (34%) of social worker variance, indicating that some social workers reported a stronger alliance with their homeless young adults while others reported generally weaker alliance with their clients. Even in this study, the largest part of the variance can be attributed to the homeless-rated and social workers-rated relationship effects with the former significantly related with an improvement of homeless young adults' self-determination. Dyadic and generalized reciprocity were not significant.

Kenny et al. (2010) carried out an application of the OWM design to the patient-doctor perceived quality of communication. Findings demonstrated that there was little consensus among patients of the same doctor about his/her quality of communication (i.e., low but significant patient effect), whereas doctors were consistent across patients (i.e., low but significant doctor effect). Findings also demonstrated that doctors' perceptions of their communication skills were not congruent with the way patients perceived them (i.e., non-significant generalized reciprocity) whereas dyadic agreement between doctor and patient was significant but weak (i.e., dyadic reciprocity). In a subsequent application of the OWM, Hagiwara et al. (2014) considered talk time in the patient-physician communication and the sense of being in the same team. For both variables, the two relationship variances and the dyadic reciprocity were significant, but only the physician-reported relationship effect for “teamness” was significantly related to the patients' adherence to medical regime. Therefore, patients adhered better to treatment when their doctor reported a high-perceived sense of being in the same team.

In the field of interpersonal trust, Coran et al. (2013) studied dyadic concordance in physician-patient interactions evaluating the effect of both socio-demographic characteristics (notably gender, race, and education) and psychological variables (i.e., confidence and trust). They matched psychological data collected from patients and

physicians and found a perfect concordance in 36% of dyads. They also found that physicians tend to overestimate patient's confidence and trust, compared to the patients' evaluations. Those analyses were carried out by comparing the scores collected from doctors and patients, without applying a dyadic analysis. Discordance was found to be negatively associated with the length of the relationship and low patients' satisfaction.

Although trust is an essential reciprocal phenomenon, previous research shows several limitations. First, the relations between doctors and patients trust have never been studied with appropriate reciprocal designs. Research on antecedents (Gopichandran and Chetlapalli, 2013) and consequences of trust (Hall et al., 2002; Kim et al., 2008; Yang-Lee and Lin, 2011; Rotenberg and Petrocchi, 2018; Safran et al., 1998; Thom et al., 1999) has considered patients' perspectives only or both perspectives but not with reciprocal analyses. The consequence is a misalignment between theoretical definition of the construct and its methodological implementation. Reciprocal design considering patients' and doctors' perspectives should be implemented. Because patients' trust is related to health outcomes, an understanding of doctor's perceptions of the levels of trust showed by their patients could give an insight on the relation itself and a signal of non-compliance. Second, dyadic analyses have been barely applied to trust (see Betts et al., 2014 for an application on children) and not at all in the context of health professionals-patient/client relationship (Petrocchi et al., 2017), even when a reciprocal design was used (Coran et al., 2013; Street et al. 2008).

The present research aimed to redress this gap by applying a reciprocal OWM design to the study of trust in patient-physician relations. With a reciprocal design, we examined the level of consensus (i.e., patient effect), assimilation (i.e., doctor effect), and relationship effects after a routine consultation. We also evaluate dyadic and generalized reciprocity. More specifically, our research questions were:

1) Do patients of a specific doctor agree on their level of trust in their doctor (i.e., significant patient effect)?
2) Do doctors report a similar level of trust across patients (i.e., significant doctor effect)?
3) Is the unique part of the variance due to a specific patient-doctor relation significant (i.e., significant relationship effects)?
4) If doctors have a high level of trust in their patients, do their patients in turn have a high level of trust in them (i.e., generalized reciprocity)?
5) If patients report a high level of trust in a doctor, does the doctor report a high level of trust with him/her (i.e., dyadic reciprocity)?

We examined whether the evaluations of the patient-rated and doctor-rated trust are affected by their perceived quality of communication during the consultation and, finally, whether gender and age are linked to variance partitioning for both trust and quality of communication.

2. Method

2.1. Procedure

Data originated from a cross-sectional study carried out between October 2017 and April 2018. General practitioners (GPs) and their patients completed a post-consultation questionnaire that included a measure of trust, quality of communication, and socio-demographic variables. Doctors were recruited by an invitation letter. A research assistant recruited patients in the clinics while they were waiting for the visit. Both doctors and patients signed a consent form before completing the questionnaire and did not receive any incentive. The Ethical Committee of the Catholic University of the Sacred Heart provided a letter with ethical approval (approval number 19133). After the consultation, doctor and patient independently completed questionnaires. Doctors filled out the questionnaire before visiting the next patient; patients filled out the questionnaire in the waiting room before going home.

2.2. Participants

Participants were 12 GPs (M age = 54.16, SD = 12.28; 8 men) working at a primary care facility in three big cities in Italy, and 189 of their patients (M age = 47.48, SD = 9.88; 62% women; doctor-patient range 1–30, M = 14, SD = 9.3). Thirty percent of the patients had a secondary educational degree, 44% had a post-secondary educational degree, and 26% had a university degree. The majority had an occupation (62%), 7% were not occupied, 20% homemakers, 3% university students, and 7% retired. Patients declared they had consultations with the doctor during the past year with a range from 1 to 30 (M = 5.16, SD = 4.91). The outcome of the consultation was a new therapeutic plan for 40% of the patients, a change of the therapeutic plan for 20%, a confirmation of the plan for 38% of the patients, and a test prescription for 3% of them. The mean of years of experience for doctors was 27.31 (SD = 12.39, range 7–38 years).

2.3. Measures

Trust. The five items of the Patient Trust Scale (PTS) measured patients' trust in their physician (Dugan et al., 2005) on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The PTS asks patients to indicate their level of trust in physicians defined as: 1) fidelity, which is caring for the patients' interests and avoiding conflicts of interests, 2) competence, which is having good knowledge and practice, 3) honesty, which is telling the truth, 4) confidentiality, which is proper use of sensitive information, and 5) global trust, which is a dimension that reflects the irreducible "soul" of trust (M = 4.43, SD = 0.55, α = 0.82, rs > 0.32). The same five items were used to measure doctors' trust (M = 4.10, SD = 0.51, α = 0.65, rs > = 0.33). For both versions, higher values indicated higher levels of trust.

Quality of communication. Patients and doctors completed a questionnaire on their perceived quality of communication during the consultation through the Matched-Pair Instrument (MPI; Campbell et al., 2007; Kenny et al., 2010). MPI comprises 19 items that assess both the content and the process of doctor's communication skills. The doctor's version assesses self-perception, while the patient's version assesses his/her perceptions of the doctor's skills. Answers were provided on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Both the doctors' and patients' versions demonstrated acceptable internal consistency (doctor version: M = 4.39, SD = 0.41, α = 0.94, rs > = 0.42; patient version: M = 4.47, SD = 0.50, α = 0.94, rs > = 0.53), with higher scores indicating higher ability.

2.4. Statistical procedure

There was no missing data in the data set. The data set was dyadically structured and represented a reciprocal OWM design (i.e., one doctor, many patients) with indistinguishable partners (i.e., all the partners are patients). A multilevel modelling framework was applied following Kenny et al. (2010) and Marcus et al. (2009, 2011) to estimate the different parts of the variance. In the analyses, doctors were treated as the upper-level units and patients as the lower-level units. The current design was reciprocal because each patient provided his/her evaluation of trust towards their doctor and of the quality of his/her communication skills, whereas each doctor provided his/her levels of trust and an assessment of the quality of his/her communication with the patient. The multilevel modelling (MLM) analysis for the OWM requires the application of the two-intercept approach and the data set requires a unique data structure. For both trust and quality of communication patient effects, doctor effects, relationship effects, generalized reciprocity, and dyadic reciprocity were estimated. Appendix A

Table 2
Variance partitioning.

	Proportion of Variance			
	Doctor	Patient	Relationship	Total
Patients				
Trust	–	67%*	34%***	0.21
Quality of Communication	–	77.5%*	22.5%***	0.25
Doctors				
Trust	41.2%*	–	58.8%***	0.22
Quality of Communication	55.5%*	–	44.5%***	0.29

Note. For perceiver, partner, and relationship, the variance partitioning is presented in percentages; the total is presented in decimal. *$p < .05$, ***$p < .001$.

provides information about how the data set was organized and analysed.

3. Results

3.1. Variance partitioning for trust

The variance partitioning for the patients-rated and doctor-rated versions of the PTS is reported in Table 2. The variance partitioning yielded a significant doctor effect, $s^2 = 0.086$, Wald $Z = 2.12$, $p = .017$, doctor-patient relationship effect, $s^2 = 0.12$, Wald $Z = 9.11$, $p < .001$, patient effect, $s^2 = 0.14$ Wald $Z = 1.64$, $p = .05$, and patient-doctor relationship effect, $s^2 = 0.073$, Wald $Z = 9.33$, $p < .001$. Nearly half of the variance (41.2%) in doctor-rated trust could be attributed to the doctor effect, indicating that, across patients, some doctors consistently assessed different patients in the same way. For example, Dr L reports high (or low) levels of trust across all his patients, which indicates that a doctor sees his/her patients similarly and does not distinguish between patients with regard to the variable under scrutiny (i.e., assimilation effect). The remaining part of the variance (58.8%) was attributed to the doctor-patient relationship effect (plus patient partner and error variances). From the patients' perspective, the majority of the variance (67%) could be attributed to the patient effect, meaning that there was a consensus among some patients who reported a higher level of trust with the same doctor. The remaining part (34%) could be attributed to the patient-doctor relationship effect (plus patient perceiver and error variances).

Doctor's and patient's age and gender were tested as covariates in two separated models. Both variables were not significant predictors of trust (t (313.21) = 1.74, $p = .083$ for age; t (8.06) = 0.67, $p = .52$ for gender).

3.2. Reciprocity

The raw correlation between the doctor-rated and patient-rated trust, ignoring the non-independence of patients within doctors, was $r = -0.15$ ($p = .05$). Given that the correlation actually subsumes two different processes, reciprocity variances yielded a positive but weak dyadic reciprocity ($r = 0.14$, $p = .031$) and a non-significant generalized reciprocity ($r = -0.07$, $p = .42$).

3.3. Quality of communication and trust

The MLM was conducted with MPI patient-rated and doctor-rated scores as predictor of trust. If there is evidence of actor, partner, and relationship variance, we can then estimate if quality of communication is a significant covariate of trust. There was a significant positive effect of the quality of communication on the actor effect, whereas the association was non-significant for partner effect. Quality of communication was also associated with the doctor-patient relationship effect and patient-doctor relationship effect, whereas results for dyadic and generalized reciprocity were not significant. See Table 3 for detailed results.

Finally, the quality of communication itself may be treated as an OWM variable with a reciprocal design. This analysis yielded a significant actor effect, $s^2 = 0.16$, Wald $Z = 2.27$, $p = .01$, doctor-patient relationship effect, $s^2 = 0.13$, Wald $Z = 9.22$, $p < .001$, partner effect, $s^2 = 0.18$ Wald $Z = 1.98$, $p = .02$, and patient-doctor relationship effect, $s^2 = 0.05$, Wald $Z = 9.35$, $p < .001$. Half of the variance (55.5%) in doctor-rated quality of communication could be attributed to the doctor, indicating that, across patients, some doctors consistently reported higher quality of communication than other doctors did. The other proportion of the variance (44.5%) was attributed to the doctor-patient relationship effect (plus patient partner and error variances). From the patients' perspective, most of the variance (77.5%) could be attributed to the partner effect, meaning that there was a consensus among some patients who reported a higher level of quality of communication with the same doctor. The remaining part (22.5%) could be attributed to the patient-doctor relationship effect (plus patient perceiver and error variances). See Table 2. Dyadic reciprocity ($r = 0.17$, $p = .013$) and generalized reciprocity ($r = -0.81$, $p < .001$) were both significant. Doctor's and patient's age and gender were tested as covariates in two separated models. Both variables were not significant predictors of quality of communication (t (3784.47) = 0.43, $p = .66$ for age; t (84.4) = 0.61, $p = .54$ for gender).

4. Discussion

The purpose of the current study was to examine trust in doctor-patient relationships as a dyadic phenomenon, measuring both patient's and doctor's point of view with a reciprocal design and applying the appropriate level of analysis. The significance of doctor variance (corresponding to the 41% of the total variance; see Table 2) means that some doctors, when rating their patients' level of trust, tend to report higher scores across all of them, whereas other doctors reported weaker trust across all their patients. In other words, some doctors think they established a comparably good trusting relationship with all their patients, whereas others had a more negative view of their ability to build trustful relationships among their patients. The doctor variance demonstrates that there is an unknown facet of trust between doctor and patient. Why some doctors saw themselves as establishing higher trust across patients, whereas others did not, is an area of interest that should be developed. Previous studies found significant actor effects considering both doctor-patient quality of communication (Hagiwara et al., 2014; Kenny et al., 2010) and therapist-client working alliance (Altena et al., 2017; Marcus et al., 2009, 2011), but, to the best of our knowledge, this is the first study that attempts to estimate variance

Table 3
Association between quality of communication and trust.

	Proportion of Variance			
	Doctor	Patient	Doctor-patient Relationship	Patient-doctor Relationship
Quality of Communication	$\beta = .10$ t (156.23) = 2.1*	$\beta = .01$ t (65.02) = .83	$\beta = .11$ t (179.38) = 9.15***	$\beta = .07$ t (61.81) = 9.33***

Note. *$p < .05$, ***$p < .001$.

partitioning of trust in a medical context. Based on current knowledge, we can say that physical (i.e., ethnic background, race, culture, and skin colour) and psychological similarities (i.e., style of communication, general values, and spiritual beliefs) between doctor and patient have been found to promote trust (Street et al., 2008). Therefore, those doctors who tend to see patients as similar may share some characteristics with the patient that determines the assimilation effect. It should be noted that Street et al. (2008) did not address the non-independence of the data, so research is required that aims at understanding which variables are implicated in the actor effect. For example, the assimilation effect could be determined by differences among doctors in personality traits, self-confidence, commitment to the relationship, empathic skills, and feelings of exhaustion and burnout.

The significant partner effect (corresponding to the 67% of the total variance; see Table 2) identifies a source of consensus and pertains to the extent to which doctors consistently elicit trust from their patients (Albright et al., 1988; Kenny, 1994). In other words, in our sample there were patients who reported similar and higher level of trust when treated by the same doctor, whereas other patients reported a weaker level of trust when treated by the same doctor. The partner effect depends on doctor's manners and behaviours that, if consistent, evoke similar responses from all the patients (Kenny et al., 2010). In this vein, there is evidence showing that the mechanism through which healthcare professionals influence their patients' cognitive, behavioural, emotional responses, and ultimately their health, acts through a combination of cognitive and emotional care (Di Blasi et al., 2001). Cognitive care considers the quality and the quantity of communication shared between doctors and patients and the doctors' ability to give the patients correct and understandable information. Emotional care reflects doctors' ability to provide support, empathy, reassurance, and warmth. Cognitive and emotional care interact with each other, enhancing patients' cognitive and emotional reactions (Di Blasi et al., 2001), and ultimately his/her trust.

Furthermore, even if the raw correlation between doctor-rated and patient-rated trust was significant, there was no significant relation between actor and partner effects. (i.e., there was no evidence of generalized reciprocity). In other words, there is no correspondence in the way a doctor evaluates his/her patients and the way patients evaluate that doctor. This result matched evidence from research on quality of communication in doctor-patient relation (Kenny et al., 2010; Hagiwara et al., 2014) and on working alliance in therapist-client dyads (Altena et al., 2017; Marcus et al., 2009, 2011; Marcus et al., 2011). Because a relationship would imply a minimum of interdependence between doctors and their patients, it is somewhat surprising that doctors and patients' perceptions have little overlap. Lack of agreement between patients' and doctors' trust contributes to frustrating consultations from both perspectives, and this could hamper the quality of care doctors provide (Levinson et al., 1993) and the health outcomes of patients (Street et al., 2008).

The OWM allows estimating two relationship effects and the correlation between them (see Table 2). In our research, a substantial part of the variance partitioning was due to the significant relationship effects. The patient relationship effect explained 1/3 of the total variance while the doctor relationship effect explained almost half of the total variance. Furthermore, the correlation between the two effects (i.e., dyadic reciprocity) was significant. Therefore, it appears that, other than doctors' general skills or patients' characteristics, another important dimension of doctor-patient relationship is the variance due to the specific encounter between them. This is the first study in which dyadic trust was considered within the doctor-patient dyad (see Thorne and Robinson, 1988 for a theoretical contribution). Significant dyadic effects were found in quality of communication between patient and doctor (Kenny et al., 2010) and in working alliance between therapist and client (Marcus et al., 2009, 2011). Taken together, relationship effects and dyadic reciprocity underscore the intrinsic relational and reciprocal quality of trust in the medical context. Although interpersonal trust is defined as a set of permanent beliefs across situations and partners (Rotter, 1980), an individual's trust varies according to whom they interact with and to the interpersonal history of the dyad (Rotenberg, 1994, 2010). There is something 'special' arising in dyadic relations that probably goes beyond physical or psychological similarities (Street et al., 2008). It may be that a specific match of expectations between patient and doctor is responsible for the dyadic reciprocity. Nonetheless, causes related to the unique part of variance explained by the dyadic encounter between doctor and patient need to be further studied.

A second purpose of the current study was to determine whether the quality of communication was associated with variance partitioning of trust (see Table 3). Previous research has demonstrated that high quality of doctor's communication skills increases patient's trust (Chandra et al., 2018; Pearson and Raeke, 2000). Trust involves a patient's beliefs in a doctor's competence and caring, as well as doctor's trust in the patient's ability to report symptoms and adherence in a reliable way (Chipidza et al., 2015). These dynamics emerge during the consultation by virtue of the doctor's and patient's skills to communicate with each other effectively. Our results add few insights to the debate suggesting that the nature of the association between quality of communication and trust is more complex than expected. Quality of communication was associated with three effects, such as the doctors' tendency to assimilate their evaluation of trust (i.e., actor effect) and the unique dyadic effects (i.e., doctor relationship effect and patient relationship effect). Therefore, a higher quality of communication shared in the dyad corresponds to a higher tendency of a doctor to assimilate his/her trust evaluation and see the patients in a similar way (i.e., all trustful or all distrustful). It is possible that doctors with high communication skills also have high understanding of the relationship. Finally, the quality of the communication was associated with the two relationship effects of trust, suggesting that the intrinsic relational and reciprocal quality of trust within the doctor-patient dyad depends on the doctor self-evaluation and patients' evaluation of the doctor's skills.

The quality of the communication itself has been treated as an OWM variable with a reciprocal design (see Table 2). The variance partitioning for the quality of communication yielded similar results for the partner, doctor, patient relationship, and doctor relationship effects. The majority of the variance (77.5%) could be attributed to the partner effect; the remaining part (22.5%) could be attributed to the patient-doctor relationship effect (plus patient perceiver and error variances). Dyadic reciprocity for trust and quality of communication was very similar, too. Almost half of the variance (55.5%) in doctor-rated quality of the communication could be attributed to the doctor, indicating that, across patients, some doctors consistently reported higher quality of communication than other doctors did. The other proportion of the variance (44.5%) was attributed to the doctor-patient relationship effect (plus patient partner and error variances). The very unique difference between OWM results of trust and quality of communication is related to generalized reciprocity, which was non-significant for trust and significant and negative for quality of communication, meaning that doctors who gave higher quality of communication ratings had patients who on average rated the quality of communication as lower. This result confirmed the ones by Kenny et al. (2010) and demonstrated that doctors' self-perception of their communication skills and patients' perception are not congruent. Although doctors and patients agree on the core competences of physician's communication, they diverge on their evaluation after a consultation (Cegala et al., 1995). Doctors and patients have different focus during a consultation (i.e., patient on presenting his/her symptoms and doctor on making the right diagnosis (Kenny et al., 2010)), and doctors tend to overestimate their communication abilities (Tongue et al., 2005).

4.1. Limitations

This study has some limitations. First, one limitation is inherent to

the OWM design. Because each patient rated only one doctor, there is no way to separate patient perceiver variance or patient partner variance from relationship variance. The study of specialised medical consultations (as for chronic long-life conditions), in which several doctors look after a patient, could shed light on much more complicated dynamics. In this case, the application of a round-robin design (Kenny et al., 2006) would be more adequate than OWM. Second, all the measures were self-reported. Future research should also focus on other sources of information (see for example Vrana et al., 2018). Third, doctors' and patients' means of trust were quite high, close to the maximum possible value, which may have affected our results; this could reflect social desirability on both sides, even if the recruitment was done by a researcher and not by the doctor, to avoid that physicians could choose only patients with whom they are more comfortable.

5. Conclusions

Our study emphasizes the importance of interpersonal trust being considered as a dyadic and interdependent phenomenon. We found evidence of significant actor and partner effects, as well as relationship effects and dyadic reciprocity. Because trust is considered an essential component of medical encounter (Chandra et al., 2018), our findings are theoretically and clinically relevant. First, there is a fundamental distinction in literature between trusting attitudes and trusting behaviours and the claim that a positive health behaviour may be adopted for different attitudes ranging from “trust the doctor” to “distrust the doctor” (Hall et al., 2001). For example, a patient may decide to take the prescribed pills, as the doctor suggested, because he trusts his doctor or because he distrusts his doctor, but he feels he has no other choice. Results from the present study adds a point to that discussion, that is there are six different parts in the trusting attitudes, considering both patients' and doctors' perceptions, and those may influence a wide range of health behaviours to a different degree. Future research should analyse the relations between the six parts of the trust variance on health outcomes, such as self-reported health, doctor's reported health status, compliance, adherence to medical regime, as well as other indirect outcome, such as willingness to recommend the doctor to others.

Second, our results revealed the very dyadic nature of the clinical encounter between patient and doctor. Our research showed that trust between patient and doctor did not depend on pre-established and unmodifiable patient's or doctors' characteristics, as for example gender, age, or race as found by others (see for example Hall et al., 2001), but is something said to be created within the relation. Therefore, it is crucial for doctors to develop skills to evaluate both their relationship with patients and the mechanisms underlined to it in order to remain responsive and efficient. Trainings for doctors should develop their self-awareness (i.e., the recognition of their own style to interact with patients even in different situations (routine procedures vs. non-routine ones), and awareness of others (i.e., the patient), which refers to being aware about what are the mechanisms underlined to the patient's trust. An approach leading to find more convergence in the doctor's and patients' perceptions on their trusting relationship may enhance trust more than the conventional interventions aimed at either educate doctors or patients (see Rolfe et al., 2014). Interventions that consider the dyadic nature of trust and have, as a direct outcome, the improvement of the convergence of the two actors' perception of trust, could have a significant impact on their perceived quality of the relation, in terms of satisfaction, alliance, and continuity of care, and on better self-rated health. This dyadic perspective is especially important in case of life threatening-chronic diseases, in which the therapy is developed by a team of specialists who takes care of the same patient.

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Appendix A

To carry out the one-with-many analyses reported in this study, we developed a database with six variables (see Table A1). Focal ID is an identification number for each doctor, numbered consecutively from 1 to 12. Dyad is an identification number for dyad, numbered consecutively from one to 189. Focal code is coded as 1 if the observed rating was made by the doctor and 0 by the patient. Part code is coded as 1 if the observed rating was made by the patient and 0 by the doctor. Role specifies who is the rater and was codified as −1 if the doctor made the ratings and 1 if the patient made the ratings.

Table A1
Sample of data set for one-with-many analysis

Focal ID	Dyad	Focal Code	Part Code	Role	Trust
1	1	0	1	−1	4.6
1	1	1	0	1	4.0
1	2	0	1	−1	3.8
1	2	1	0	1	2.0
1	3	0	1	−1	4.2
1	3	1	0	1	3.0
2	4	0	1	−1	4.0
2	4	1	0	1	3.1

The SPSS syntax used to analyse the data set was as follow:

MIXED
Trust BY Role WITH Focal Code Part Code
/FIXED = Focal Code Part Code | NOINT
/METHOD = REML
/PRINT = **SOLUTION TESTCOV**
/RANDOM = Focal Code Part Code | **SUBJECT** (Focal ID) **COVTYPE(UNR)**
/REPEATED = Role | SUBJECT(Focal ID*Dyad) COVTYPE(UNR)

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