



## Research paper

# Development and validation of a novel scale for measuring interpersonal factors underlying injection drug using behaviours among injecting partnerships



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## ABSTRACT

**Background:** People who inject drugs with sexual partners or close friends have high rates of syringe/ ancillary equipment sharing and HIV and hepatitis C virus (HCV) infection. Although evidence suggests that interpersonal factors underlie these higher risk profiles, there is no quantitative measure of how interpersonal factors operate within injecting relationships. We aimed to develop and validate a quantitative scale to assess levels of injecting drug-related interpersonal factors associated with risky injecting behaviours within injecting partnerships.

**Methods:** We conducted qualitative interviews with 45 people who inject drugs (PWID) who reported having injecting partners to inform item development, and tested these items in a quantitative study of 140 PWID from San Francisco, USA, to assess internal reliability (Cronbach's alpha) and validity (convergent, and discriminant validity).

**Results:** With results from the qualitative interview data, we developed the Interpersonal Dynamics in Injecting Partnerships (IDIP) scale with 54 final items for 5 subscales of injecting-related interpersonal factors. Exploratory factor analysis revealed 5 factors ("trust", "power", "risk perception", "intimacy", and "cooperation") with eigenvalues of 14.32, 6.18, 3.55, 2.46, and 2.14, explaining 57% of the variance, and indicating good internal reliability (alpha: 0.92–0.68). Strong convergent validity was observed in bivariate logistic regression models where higher levels of trust, intimacy, and cooperation within partnerships were positively associated with partners sharing needles and injecting equipment, whereas higher levels of power and risk perception were negatively associated with partners sharing needles and injecting equipment.

**Conclusions:** These findings offer strong evidence that the IDIP scale provides a psychometrically sound measure of injecting drug-related interpersonal dynamics. This measurement tool has the potential to facilitate additional investigations into the individual and collective impact of trust, intimacy, power, cooperation, and risk perception on injection drug using behaviours and engagement in HIV and HCV testing and treatment among PWID in a variety of settings.

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## Introduction

People who inject drugs (PWID) in middle- and high-income countries, including the United States remain disproportionately

affected by hepatitis C virus (HCV) and HIV infection (Centers for Disease Control and Prevention, 2012; Mathers et al., 2008). The high prevalence (30–70%) of syringe and ancillary injection equipment (e.g., cookers, cottons, and rinse water) sharing that persists among injecting partners when preparing and injecting drugs helps to explain why HCV incidence remains high (Hagan et al., 2010; Jordan et al., 2015; Morris et al., 2016; Under Review). HCV transmission occurs most often between dyads. Current research indicates that injecting partners in close relationships

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(e.g., close friends, family members, sexual partners) have substantially greater odds of sharing equipment and elevated rates of both HIV and HCV infection compared to casual or injecting-only partnerships (Hahn et al., 2002; Morris et al., 2014; Shaw, Shah, Jolly, & Wylie, 2007; Sherman & Latkin, 2001; Sherman, Latkin, & Gielen, 2001; Tracy et al., 2014; Unger et al., 2006). Given the role close relationships play in mediating individual risk, in order to be successful, risk reduction strategies must address the interpersonal factors of injecting partnerships.

A significant obstacle to understanding the mechanism by which interpersonal factors within injecting partnerships influence injection behaviours is the lack of a psychometrically validated measure of the construct. Qualitative studies have provided excellent insights into the role interpersonal factors play within injecting partnerships. Trust, intimacy, and care and cooperation are continually identified as factors influencing how individuals decide and participate in injecting drugs with others; with recent research expanding beyond sexual-injecting partnerships to acknowledge the relational qualities non-sexual injecting partners also share (Fraser, Rance, & Treloar, 2015; Ho & Maher, 2008; Lazuardi et al., 2012; Morris et al., 2015; Neaigus et al., 1994; Simmons & Singer, 2006). For example, because Partner 1 trusts Partner 2, Partner 1 is more willing to put Partner 2's wellbeing ahead of Partner 1's own, resulting in Partner 1's decision to reuse a previously used needle so Partner 2 could inject with the only new needle. While qualitative data provide important narrative evidence of the multidimensional effect interpersonal factors have on individual risk, these studies are limited in their ability to directly measure specific injection drug-related interpersonal factors driving observed risk behaviours.

While researchers have theorized the importance of intimacy and other interpersonal factors in understanding injecting behaviours within injecting partnerships, few have attempted to measure the relational qualities related to drug use, including injection drug use (Cepeda et al., 2011; Gyarmathy, Neaigus, Ujhelyi, Szabo, & Racz, 2006; Johnson, Gerstein, Pach, Cerbone, & Brown, 2002; Latkin et al., 2011). Previous measures of interpersonal factors have either been single-item measures assessing trust related to disease status disclosure (e.g., If someone you inject with tells you their HIV status, how sure are you of their status?), or focus on items that describe social relations more generally (e.g. getting vs. giving drugs) rather than dyadic relationship qualities. Other studies use proxy measures such as living together or "recent sexual behavior." To our knowledge, only one study measured characteristics of intimacy (defined as closeness), using a multi-item partner-specific measure (Johnson et al., 2002). A social network study conducted in Washington D.C. by these authors measured reciprocal assistance as a composite score of both network partners' answer to six items: "When was the last time you gave 'Partner': (1) drugs, (2) needles, (3) money, (4) food, (5) a place to stay, (6) advice?" and found that higher levels of mutual assistance were associated with high risk injecting behaviours. While these findings deepen the description of one partnership quality (reciprocity) as a mechanism underlying injecting behaviours, they do not measure other interpersonal factors that may be important, such as trust or power.

Our goal was to address these issues by developing a theoretically based and psychometrically validated multi-domain measure of interpersonal dynamics within injection drug using partnerships. The current paper focuses on the development and testing of a measurement scale for injection-related interpersonal factors in the context of injecting partnerships. Two phases are reported here: (1) the development of the interpersonal dynamics in injecting partnerships (IDIP) scale and (2) the validation of the IDIP scale and the evaluation of its psychometric properties.

## Phase 1: item creation and refinement

### Methods

#### Overview

We conducted in-depth interviews with PWID (two samples), literature reviews, and discussions with content experts to inform the development of injection drug-related interpersonal factors. Next, we conducted cognitive interviews to refine and assess item interpretation and to finalize item structure.

#### Sample and qualitative interview procedure

From January to April 2014, we used purposeful sampling to conduct semi-structured in-depth interviews with members of injecting partnerships to elicit broad information on two questions: "What are the major domains of interpersonal dynamics that influence injecting behavior most?" and "How do these domains differ within different types of injecting relationships?"

First, semi-structured interviews with both members of several injecting partnerships (sample 1:  $n = 18$  individuals, 9 partnerships) from the HITS-c Study were conducted (by MM). The HITS-c Study is an epidemiological study of HCV seroconversion and associated risk behaviours among PWID in Sydney, Australia. Methods for the partnership qualitative interviews have been published elsewhere (Morris et al., 2015). Next, in-depth interviews were conducted (by MM and EA) with 27 people (<30 years old) from the UFO study who injected drugs with another person in the past month (sample 2). The UFO study is a community-based prospective study of drug using behaviours associated with the acquisition and transmission of HCV and HIV in San Francisco, USA (Hahn et al., 2002; Page et al., 2009). In both samples, participants were selected using purposive sampling techniques from existing cohorts of PWID to estimate HCV incidence and assess exposure behaviours. Purposive sampling allowed for a diverse sample representing both genders and a variety of injecting behaviours. A manuscript detailing substantive findings from sample 2 is in progress. The University of California, San Francisco Human Subjects Research Ethics Committee approved all protocols, and participants were reimbursed \$30 USD for their time and participation.

Interview topics. A semi-structured in-depth interview guide was developed to elicit information on specific incidents of "risky behavior." The interview guide focused on the relationship context in which the behavior occurred; participant perspectives on what enabled "safer" injecting when injecting with others; trust and truthfulness within different injecting partnership relationships; willpower and the impact of heroin withdrawal in the context of injecting partnership relationships; relationship dynamics as they develop over the lifespan of an injecting partnership; and unique attributes of sexual injecting partnerships that influence the higher risk injecting behaviours observed in previous studies (De et al., 2009; Gyarmathy et al., 2010; Hahn, Evans, Davidson, Lum, & Page, 2010; Morris et al., 2014). Interviews focused on eliciting narratives about the most recent high-risk injecting event (i.e. needles/syringes or other injecting equipment, shared or reused) within partnerships. Probes were used to understand how economic, physical environment, policies, social, interpersonal, and individual factors differed in high-risk situations compared to both "average injecting experiences" with that partner as well as to experiences injecting with other partners. Questions were also asked to elicit information on how interpersonal factors varied between different injecting partnerships. All interviews were audio recorded.

#### Analysis

Following a grounded theory approach (Strauss & Corbin, 1997), were data collection and preliminary data analysis occurred in

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